11th Grade Lesson Plan Packet

4/20/2020-4/24/2020

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20-24, 2020

Course: 11 Art

Teacher(s): Ms. Frank clare.frank@greatheartsirving.org

Weekly Plan:

Monday, April 20

☐ Review notes and project description, on page 4.

☐ Choosing one design to develop or adjust, make a quick full-scale sketch with notes.

☐ Begin full-page layout on a fresh page, with an empty page facing it. Starting lightly, work from general to specific.

Tuesday, April 21

☐ Sketchbook entry: movement of eye and compositional balance

☐ Complete general layout of project; introduce varied weight of line

Wednesday, April 22

☐ Introduce linework and mark-making into your work, to suggest dimensionality and texture.

☐ Continue developing the imagery; be aware of unity and variety, harmony and contrast as you work.

Thursday, April 23

☐ Sketchbook entry: the negative space; the role of the background

☐ Continue developing the imagery; be aware of contrast in the imagery as you work.

Friday, April 24

☐ Sketchbook entry: contrast and emphasis

☐ Continue developing the composition, with particular attention to the negative space and movement

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

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Student Signature

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Parent Signature

For all assignments in art this week use a pencil and your sketchbook. Remember to write your name, grade, and the date on all pages, except your project. This week you are working on a cumulative drawing project.

Keep a clean, folded piece of paper handy to place under your hand as you draw, so as not to smudge your work.

Monday, April 20

1. (1 min.) Read over the project description, located on page 4.

2. (2 min.) Turn back to your thumbnail sketches from Tuesday. Select one that you want to base your project on. Turn to a fresh page, with a blank page facing it as well as behind it. This will be your 1:1 scale "**rough draft**". Draw your border using a ruler or a folded piece of paper, making sure to use parallel lines and right angles. If your composition is horizontal, rotate your page accordingly, and have the top of the image along the valley or fold (leave a space between the valley and your top border). Use your full page, with borders no more than one inch.

3. (7-10 min.) "**Rough Draft**": On this page you will hammer out the final composition, and you will edit and make notes. You can make notes within the image as well. This will not be your final drawing, but you will refer to it as you begin your final drawing. Attend to scale (how large you are drawing the imagery relative not only to the objects but also to the original composition). Make sure that the placement of shapes, use of proportion and movement, and the negative space all contribute to a strong, well-resolved composition.

4. (7-10 min.) "**Final Draft**": Turn again to a fresh page, once more making sure it's facing a blank page. Here you will draw your project, starting now and continuing throughout next week. Start by drawing your border, evenly placed on the page and of the same dimensions as in the full-scale study. Next, work on your compositional layout, lightly drawing in the imagery. Attend carefully to shape, proportion, negative spaces, and work from general to specific. Keep contour lines light for today, so that you can work with shading, linework and mark-making more effectively in the coming days.

(Note: you will leave the back of this drawing blank, as well as the page behind it.)

Tuesday, April 21

1. (5-10 min.) In a fresh sketchbook entry, two pages past your project (so that there is a clean fresh "buffer" page in between), write today's date followed by **two short paragraphs**. In the **first**, describe the **movement of the eye** through your planned composition: where does the eye enter and exit the composition, and how does the eye move through? Note that your positive-negative shape relationships direct the movement of the eye here as in the artworks we've analyzed in class. In the **second paragraph** describe the **compositional balance - how is it achieved** in your design, and **what type of balance** is it? Refer to the imagery and specific areas of your composition that are key in establishing visual balance.

2. (5-15 min.) **Complete the general layout of your composition.** Remember to work lightly, from general to specific, and to refer regularly to your rough draft and to the actual objects to help you observe **proportion** and **specific qualities of shape**. As you draw, push your observation of shape to be specific to the subjects you are observing, distinct and interesting. Shore up your drawing by introducing **varied weight of line** into the contours of your subjects. At this point your general layout should be complete.

Wednesday, April 22

1. (20 min.) **Introduce linework and mark-making** into your work **to suggest dimensionality and texture.** Use a combination of cross-contour linework, topographical mark-making and textural techniques; I recommend you save shading for later. Note that your linework and mark-making create optical value.

Continue developing the imagery; be aware of **unity and variety**, **harmony and contrast** as you work.

Thursday, April 23

1. (3-7 min.) Turn forward to your sketchbook entry from Tuesday. Start a fresh entry on the same page with today's date, followed by a short paragraph discussing the **negative space** and the **role of the background** in your composition. What are the particular qualities of the negative space - what are the negative shapes like and how are they broken up or connected? How about the role of the background - how do you see it affecting our perception of the positive shapes or the quality of the space you will have them exist in? Do you plan to introduce linework, mark-making or shading into the background? If so, to what effect? If not, what is the effect of a pristine, crisp, white background?

2. (13-17 min.) **Continue developing the imagery, with attention to draftsmanship, craftsmanship, and beautiful effects.** Remember to keep a clean fresh folded piece of paper under your hand as you work to avoid smudging either the clean or the drawn areas.

Be aware of **contrast** in the imagery and between the positive/negative shapes as you work. Consider the contrast in texture, pattern, and optical or actual value as these qualities develop.

Friday, April 24

1. (5-10 min.) Turn forward to your written sketchbook entries in which you reflect on the project. Begin a fresh entry on the same page with today's date, followed by short paragraphs discussing **contrast** and **emphasis** in your composition. Give **three or more examples of contrast** in your project. You might consider texture or value contrast, grouping numbers or density, or qualities of implied movement lines. Regarding emphasis, **identify three areas of emphasis**, places the eye is led to and caused to rest for a while. What causes these to be emphasized? Is there a hierarchy amongst them? For example, perhaps one is the primary emphasis, or more significant, and the other two are secondary. What is the configuration of these points of emphasis in the picture plane? For example, perhaps they form a triangle, with the primary emphasis toward the upper left and the secondary emphases toward the lower right and the middle-lower left near the edge of the picture plane.

2. (10-15 min.) **Continue developing the composition and imagery, with particular attention to negative space and movement.** Use linework, mark-making and shading well to create beautiful effects.

Remember to keep a clean fresh folded piece of paper under your hand as you work to avoid smudging either the clean or the drawn areas.

Supplemental Materials

Reminder of Visual Resources: Refer occasionally to the supplemental materials and examples from earlier weeks, such as **cross-contour linework, topographical mark-making,** and **texture approaches.**

It will also be helpful to keep in mind the **principles of design** and guidelines for resolving and strengthening visual compositions, such as those discussed in the context of **thumbnail sketches**. Revising the artwork is an ongoing process that begins with brainstorming and sketching but continues up to the moment of the final touches. At times we work without thinking actively about these guidelines, suspending analysis to the side of our minds as we intuitively make and respond, but at other times we pull those guidelines into the forefront and use our understanding of composition to resolve and strengthen our artwork. In this respect a parallel could be made to the proof-reading and editing process in writing a paper.

There is a back-and-forth process of creating and revising.

Project Guidelines: Drawing Project with Found Objects

This drawing will be an artwork that incorporates observational drawing, composition, and imagery in a way that is expressive, poetic, or graphically compelling.

___ You will devise a composition that incorporates hands or feet (one or several), together with the organic objects. (You can collect additional items to meet your expressive needs.)

___Use strong positive/negative shape relationships and actively incorporate 2-3 principles of design to make strong, unified and visually interesting composition.

___ Employ strong craftsmanship in your media application and manipulation, attending to varied weight of line, fluidity of line, line quality, and consistency and transitions in shading.

___ Employ a variety of linework, value and texture texture techniques, including cross-contour linework and topographical mark-making.

___ Create a work that challenges and stretches your skills, and that communicates to the viewer as expressive, poetic, or graphically compelling. It may suggest a narrative, have a contemplative quality, pose a dramatic tension, or simply be a graphically strong, effective design.

GreatHearts Irving

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: 11 Calculus I

Teacher(s): Mr. Simmons

Weekly Plan:

Monday, April 20

☐ Revise your proof of Fermat's Theorem.

Tuesday, April 21

☐ Extreme Value Theorem proof and diagram.

Wednesday, April 22

☐ Diagrams for Fermat's Theorem, Rolle's Theorem, and the MVT

Thursday, April 23

☐ Prove Rolle's Theorem.

Friday, April 24

☐ Prove the MVT.

Statement of Academic Honesty

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Monday, April 20

I would like to apologize, because in the list of theorems that I sent you, there was a typo. In the hypotheses for two of the theorems, there were written nonstrict inequalities, but they should have been strict inequalities. I have corrected this in the new version.

If you have felt particularly challenged by these proofs, that's okay! I hope that this is an opportunity for you not to memorize a method and execute it perfectly, but rather to be challenged and to struggle with real mathematical problems. I highly encourage you to come to office hours (virtually) to ask questions about these problems. And feel free to email me as well!

This week's handout is a rewriting of those same theorems, along with one more, the Extreme Value Theorem. I apologize for all the changes, but I - along with the rest of you - am still adjusting to this new setup. My plan had been for us to study the relationship between graphs and their derivatives, for these theorems to arise naturally from our study, and then for us to prove these theorems rigorously - needless to say, we haven't had the liberty to pursue such mathematical play together, so our interactions with these theorems, for most of us, have probably felt more like getting hit by a bus.

That's okay.

In this week's handout, I have proven the Extreme Value Theorem and Fermat's Theorem (which you looked at last week), and your assignment for this week is to **check your work against mine, work to understand the proofs as they are written, and then prove for yourself both Rolle's Theorem and the Mean Value Theorem.** Leave the corollaries for later.

1. **Today,** you should revise your proof of Fermat's Theorem, using the proof I have provided as a guide. Feel free to write in your own language. I don't intend for you to copy my proof word for word. In fact, mine is probably clunky at times and could be rewritten to be more elegant.

Tuesday, April 21

1. Read carefully through the statement and proof of the Extreme Value Theorem.
2. Complete Exercise 1.

Wednesday, April 22

1. Read carefully through the statement and proof of Fermat's Theorem.
2. Complete Exercise 2.
3. Read carefully through the theorem statements for Rolle's Theorem and the Mean Value Theorem.
4. Complete Exercises 3 and 5.

Thursday, April 23

1. Complete Problem 4 of the handout.

Friday, April 24

1. Complete Problem 5 of the handout.

Important Derivative Theorems

Calculus I
Mr. Simmons

Theorem (Extreme Value Theorem)**.** *If a real-valued function f is continuous on the closed interval $[a, b]$, then f must attain a maximum and a minimum somewhere in $[a, b]$, each at least once.*

Exercise 1. Draw a clear diagram that represents the Extreme Value Theorem. You may even draw more than one diagram to illustrate the universality of the theorem.

Proof. Let f be a real-valued function that is continuous on the closed interval $[a, b]$. The theorem says that f must attain a maximum and a minimum. We will prove that it must attain a maximum, and the proof that it must attain a minimum is trivially similar.

For $f(x)$ to have a maximum value means that the function value gets that high and doesn't get any higher. There will be two parts to this proof. First we will show that there is a value that $f(x)$ doesn't get higher than. Then we will prove that it does get that high.

Part I. First we show that there must be a finite upper bound (a value that $f(x)$ doesn't get higher than). We will accomplish this by assuming that there is no such value, and then deriving a contradiction.

Suppose for contradiction that there is no finite upper bound on $f(x)$. This means that the function attains larger and larger values. There must be some point x_1 with $f(x_1) > 1$, and a point

x_2 with $f(x_2) > 2$, and a point x_3 with $f(x_3) > 3$, and in general for any positive integer n, a point x_n in $[a, b]$ such that $f(x_n) > n$.

Now look at this sequence (list) of points we just created:

$$x_1, x_2, x_3, \ldots, x_n, \ldots.$$

It's not clear that

$$\lim_{n\to\infty} x_n$$

exists, but we shall pick out certain x_n's from the list to form a subsequence (sub-list)

$$x_{n_1}, x_{n_2}, x_{n_3}, \ldots, x_{n_k}, \ldots,$$

such that

$$\lim_{k\to\infty} x_{n_k}$$

exists.[1] This will be useful at the end of the proof.

We find the subsequence by first splitting the interval $[a, b]$ in half down the middle and considering its two halves. There are infinitely many x_n's in $[a, b]$, so there must be infinitely many x_n's in either the left half or the right half (maybe both). Pick one for which that's the case, and call it $[a_1, b_1]$. Since there are infinitely many of the x_n's in $[a_1, b_1]$, we can pick one with $n \geq 1$ and call it x_{n_1}.

There are infinitely many x_n's in $[a_1, b_1]$, so there must be infinitely many x_n's in either its left or right half. Pick a half for which that's the case, and call it $[a_2, b_2]$. Select one of the infinitely many x_n's in $[a_2, b_2]$ that has $n \geq 2$ and call it x_{n_2}.

We continue in this way and end up with the sequence

$$x_{n_1}, x_{n_2}, x_{n_3}, \ldots, x_{n_k} \quad (n_k \geq k).$$

The intervals from which we chose the x_{n_k}'s were all in $[a, b]$, and their width approaches zero as k tends toward infinity,[2] so we conclude that

$$\lim_{k\to\infty} x_{n_k}$$

exists and is in $[a, b]$. Let's name this limit x. (I.e., let $x = \lim_{k\to\infty} x_{n_k}$.)

We now observe that

$$f(x) = f\left(\lim_{k\to\infty} x_{n_k}\right) = \lim_{k\to\infty} f(x_{n_k}) = \lim_{n\to\infty} f(x_n).$$

We can pass the limit outside of the function since we are given that the function is continuous. The last equality we can conclude since every x_{n_k} was chosen as one of the x_n's in the first place, and $n_k \geq k$.[3]

[1] To illustrate and perhaps clarify, if our sequence of x_n's was $\frac{1}{2}, \frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{1}{8}, \frac{7}{8}, \frac{1}{16}, \frac{15}{16}, \frac{1}{32}, \frac{31}{32}, \ldots$, for example, our subsequence of x_{n_k}'s might be every other element from that list—namely the sequence $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \ldots$—because while our x_n's here wouldn't have a limit, our x_{n_k}'s would.

[2] If the width of $[a, b]$ is δ, then the width of $[a_1, b_1]$ is $\frac{\delta}{2}$, the width of $[a_2, b_2]$ is $\frac{\delta}{4}$, the width of $[a_3, b_3]$ is $\frac{\delta}{8}$, and in general the width of $[a_k, b_k]$ is $\frac{\delta}{2^k}$, which approaches zero as k tends toward infinity.

[3] If you are not satified with this justification, see if you can use the definition of a limit at infinity to work out a more rigorous justification.

Since we chose the x_n's originally such that the values $f(x_n)$ increased to infinity an n increased, we see that this limit cannot be finite. But then the above equality would then suggest that $f(x)$ does not exist. This contradicts the assumption that f is defined on the entire closed interval.

Having derived a contradiction, we see that our original assumption must have been false, so in fact there must be a finite upper bound.

Part II. We have now shown that there must be a finite upper bound. Let M be the smallest such upper bound.[4] It remains to be shown that there exists some point such that the value of the function there is M.

Since M is the least upper bound, this means that the function attains values closer and closer to M. That is, for some positive ε, there must be some point x_1 such that $f(x_1)$ is within ε of M, and a point x_2 such that $f(x_2)$ is within $\frac{\varepsilon}{2}$ of M, and a point x_3 such that $f(x_3)$ is within $\frac{\varepsilon}{3}$ of M, and in general for any positive integer n, a point x_n such that $f(x_n)$ is within $\frac{\varepsilon}{n}$ of M.[5]

Now look at this sequence of points

$$x_1, x_2, x_3, \ldots, x_n, \ldots.$$

It is not clear that

$$\lim_{n\to\infty} x_n$$

exists, but we shall find a subsequence

$$x_{n_1}, x_{n_2}, x_{n_3}, \ldots, x_{n_k}, \ldots$$

such that

$$\lim_{k\to\infty} x_{n_k}$$

exists.

To find this subsequence, split $[a,b]$ into two halves as before. Select a half that has infinitely many x_n's in it, choose an x_n from among them where $n \geq 1$, and call it x_{n_1}. As before, this continued process yields the subsequence

$$x_{n_1}, x_{n_2}, x_{n_3}, \ldots, x_{n_k}, \ldots \quad (n_k \geq k).$$

The intervals from which we chose the x_{n_k}'s were all in $[a,b]$, and they approach a width of zero as n tends toward infinity, so we conclude that

$$\lim_{k\to\infty} x_{n_k}$$

exists and is in $[a,b]$. Let's name this limit x.

[4] The reason we can do this depends on one of the defining properties of the real numbers. This property says there are no "holes" in the real numbers and is called the completeness property. To illustrate the need for this property, consider the function $f(x) = x^2 - 2$. Since $f(0) = -2$ and $f(2) = 2$, the Intermediate Value Theorem implies that there is some real number x between zero and 2 such that $f(x) = 0$. And there is, namely $\sqrt{2}$. But if we were working with rational instead of real numbers, this value would not exist because $\sqrt{2}$ is not a rational number, so the IVT would be false. Whether or not this makes sense, the point should be clear: the theorems of calculus rest on the theory of the real numbers. This theory is a rich and powerful theory, but it is more appropriately discussed in detail in an introductory real analysis class than a high school calculus class.

[5] Notice that these x_n's are not the same as those in Part I. I use the same variable to emphasize the similarity in the ideas we are using in the two parts.

We now observe, similarly to before, that

$$f(x) = f\left(\lim_{k\to\infty} x_{n_k}\right) = \lim_{k\to\infty} f(x_{n_k}) = \lim_{n\to\infty} f(x_n),$$

with the same justifications as before.

Since we chose the x_n's originally such that the values $f(x_n)$ were approaching M, we know that

$$\lim_{n\to\infty} f(x_n) = M.$$

The above equality then suggests that

$$f(x) = M.$$

This shows what we were trying to prove, that the funtion f attains its maximum value at the point x in the interval $[a, b]$.

This concludes the proof. □

Theorem (Fermat's Theorem)**.** *If a local extremum occurs at an interior point, $x = c$, and $f'(c)$ exists, then*

$$f'(c) = 0.$$

Exercise 2. Draw a clear diagram that represents Fermat's Theorem. You may even draw more than one diagram to illustrate the universality of the theorem.

Proof. Let f be a function with a local extremum at an interior point c of its domain, and suppose $f'(c)$ exists. Since a local maximum of f will be a local minimum of $-f$, we can suppose without loss of generality that $f(c)$ is a local maximum.

Proof that the derivative is nonpositive. Suppose for contradiction that $f'(c) > 0$. Let $\varepsilon = f'(c)$, so that by the definition of a derivative there exists $\delta > 0$ such that for all x,

$$0 < |x - c| < \delta \quad \Longrightarrow \quad \left| \frac{f(x) - f(c)}{x - c} - f'(c) \right| < f'(c). \tag{1}$$

By the definition of a local maximum, there exists an open interval (a, b) containing c such that $f(x) < f(c)$ for all $x \in (a, b)$.

Pick x such that $c < x < \min\{b, c + \delta\}$.

Since $x \in (a, b)$, by the definition of a local maximum, therefore $f(x) \leq f(c)$.

Since $0 < |x - c| < \delta$, by (1), we know

$$\left| \frac{f(x) - f(c)}{x - c} - f'(c) \right| < f'(c). \tag{2}$$

Case 1. Suppose the expression in the absolute value bars in (2) is nonnegative. This means that

$$\begin{aligned} \frac{f(x) - f(c)}{x - c} - f'(c) &\geq 0 \\ \frac{f(x) - f(c)}{x - c} &\geq f'(c) \\ f(x) - f(c) &\geq f'(c)(x - c) \\ f(x) &\geq f(c) + f'(c)(x - c) \\ f(x) &> f(c), \end{aligned}$$

since $f'(c)$ and $(x - c)$ are both strictly positive.

Case 2. Suppose the expression in the absolute value bars in (2) is negative. Then (2) becomes

$$\begin{aligned} -\left(\frac{f(x) - f(c)}{x - c} - f'(c) \right) &< f'(c) \\ \frac{f(x) - f(c)}{x - c} - f'(c) &> -f'(c) \\ \frac{f(x) - f(c)}{x - c} &> 0 \\ f(x) - f(c) &> 0 \\ f(x) &> f(c). \end{aligned}$$

Both cases yield $f(x) > f(c)$, a contradiction, since $f(x) \leq f(c)$. So $f'(c) \not> 0$.

Proof that the derivative is nonnegative. Suppose for contradiction that $f'(c) < 0$. Let $\varepsilon = -f'(c)$, so that by the definition of a derivative there exists $\delta > 0$ such that for all x,

$$0 < |x - c| < \delta \quad \Longrightarrow \quad \left| \frac{f(x) - f(c)}{x - c} - f'(c) \right| < -f'(c). \tag{3}$$

By the definition of a local maximum, there exists an open interval (a, b) containing c such that $f(x) < f(c)$ for all $x \in (a, b)$.

Pick x such that $\max\{a, c-\delta\} < x < c$.
Since $x \in (a,b)$, by the definition of a local maximum, therefore $f(x) \leq f(c)$.
Since $0 < |x-c| < \delta$, by (3) we know

$$\left| \frac{f(x)-f(c)}{x-c} - f'(c) \right| < -f'(c). \tag{4}$$

Case 1. Suppose the expression in the absolute value bars in (4) is nonnegative. Then (4) becomes

$$\begin{aligned} \frac{f(x)-f(c)}{x-c} - f'(c) &< -f'(c) \\ \frac{f(x)-f(c)}{x-c} &< 0 \\ f(x)-f(c) &> 0 \\ f(x) &> f(c), \end{aligned}$$

since $x-c$ is negative.

Case 2. Suppose the expression in the absolute value bars in (4) is negative. This means that

$$\begin{aligned} \frac{f(x)-f(c)}{x-c} - f'(c) &< 0 \\ \frac{f(x)-f(c)}{x-c} &< f'(c) \\ f(x)-f(c) &> f'(c)(x-c) \\ f(x) &> f(c)+f'(c)(x-c) \\ f(x) &> f(c), \end{aligned}$$

since $f'(c)(x-c)$, being the product of two strictly negative values, is itself strictly positive.

In both cases, we have $f(x) > f(c)$, a contradiction, since $f(x) \leq f(c)$. So $f'(c) \not< 0$.

Conclusion. We have shown that $f'(c) \not> 0$ and that $f'(c) \not< 0$. Therefore, by the trichotomy property of the real numbers, we conclude that $f'(c) = 0$. □

Theorem (Rolle's Theorem)**.** *If a real-valued function f is continuous on a closed interval $[a,b]$, differentiable on the open interval (a,b), and $f(a) = f(b)$, then there exists at least one c in the open interval (a,b) such that*

$$f'(c) = 0.$$

Exercise 3. Draw a clear diagram that represents Rolle's Theorem. You may even draw more than one diagram to illustrate the universality of the theorem.

Problem 4. Rolle's Theorem is a direct consequence of the Extreme Value Theorem and Fermat's Theorem. Prove Rolle's Theorem.

Theorem (Mean Value Theorem)**.** *Let $f : [a, b] \to \mathbb{R}$ be a continuous function on the closed interval $[a, b]$ and differentiable on the open interval (a, b). Then there exists some c in (a, b) such that*

$$f'(c) = \frac{f(b) - f(a)}{b - a}.$$

Exercise 5. Draw a clear diagram that represents the Mean Value Theorem. You may even draw more than one diagram to illustrate the universality of the theorem.

Problem 6. The Mean Value Theorem is the generalized case of Rolle's Theorem. Using Rolle's Theorem, prove the Mean Value Theorem.

Corollary. *If $f'(x) = 0$ for all x in an open interval I, then*

$$f(x) = C$$

for all x in I, where C is a constant.

Corollary. *If $f'(x) = g'(x)$ at each point of an open interval I, then*

$$f(x) = g(x) + C$$

for all x in I, where C is a constant.

Corollary. *Suppose that f is continuous at each point of $[a, b]$ and differentiable at each point of (a, b).*

1. *If $f'(x) > 0$ at each point of (a, b), then $f(x)$ is increasing on $[a, b]$.*
2. *If $f'(x) < 0$ at each point of (a, b), then $f(x)$ is decreasing on $[a, b]$.*
3. *If $f''(x) > 0$ at each point of (a, b), then $f(x)$ is concave up on $[a, b]$.*
4. *If $f''(x) < 0$ at each point of (a, b), then $f(x)$ is concave down on $[a, b]$.*

Theorem. *If $f'(c) = 0$ and $f''(c) > 0$, then $f(x)$ has a local maximum at $x = c$.*

Theorem. *If $f'(c) = 0$ and $f''(c) < 0$, then $f(x)$ has a local minimum at $x = c$.*

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: 11 Drama

Teacher(s): Mrs. Jimenez (margaret.cousino@greatheartsirving.org)

Weekly Plan:

Monday, April 20

☐ Practice lines for 20 minutes

Tuesday, April 21

☐ Practice lines for 20 minutes

Wednesday, April 22

☐ Practice lines for 20 minutes

Thursday, April 23

☐ Practice lines for 20 minutes

Friday, April 24

☐ Practice lines for 20 minutes

Statement of Academic Honesty

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I affirm that, to the best of my knowledge, my child completed this work independently

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Student Signature

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Parent Signature

Monday, April 20

- Practice lines for 20 minutes. Every day you should review the lines you have already mastered without looking, then focus on a new scene. If you are a lead and have many lines, choose one scene to review and a new one to work on. Every day you should review a different scene you already have memorized and work for as many days as necessary to master the new one. Record your time on the sheet.

- If you have a small part and already have your lines memorized, please go over all your lines and cues once every day, then elaborate on your backstage assignments from two weeks ago (3/30). Email me if you need more direction.

- And yes, we will be doing some sort of performance despite the quarantine (likely filmed, either together or not, depending on legal restrictions). SO DON'T STOP MEMORIZING!

Line memorizing strategies:

- Recite your lines OUT LOUD. Practice them like you will say them on stage – projecting, appropriate speed and emotion, etc. Ask yourself why your character is saying what he/she says and that will help you interpret how to say the line.
- Run your lines with a friend or family member. They should read the lines of the other characters in your scenes while you practice your lines from memory.
- Practice your lines in front of a mirror—the bigger the better! Watch yourself—your facial expressions, how you move, stand, etc.—to be aware of how you look while saying your lines.
- Record yourself saying your lines and listen to the audio (even better if you record your cues!)
- Write out your lines by hand (especially if you have a long speech, it is helpful to get it into your memory through writing it out multiple times).
- KNOW YOUR CUES! What line or action comes before you speak?
- Run through the parts of the scenes in which you do not speak—what is your character doing during those parts of the play?
- After spending a period of time going over your lines, take a walk or a nap 😊
- REMEMBER: Consistent practice is the key to success!

ALL LINES MUST BE MEMORIZED BY THE END OF APRIL! Pace yourself accordingly.

Tuesday, April 21

- Practice lines for 20 minutes according to Monday's directions. Record your time on the sheet.

Wednesday, April 22

- Practice lines for 20 minutes according to Monday's directions. Record your time on the sheet.

Thursday, April 23

- Practice lines for 20 minutes according to Monday's directions. Record your time on the sheet.t.

Friday, April 24

- Practice lines for 20 minutes according to Monday's directions. Record your time on the sheet.

Drama Weekly Line Memorization

Name: **Week: 4/20-4/26**

Day:	**Minutes practiced:**
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Minimum time: 20 mins/day, 5 days/week

I verify that this is a true and accurate account of the time I have spent memorizing my lines this past week.

Signature: **Date:**

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: 11 Greek

Teacher(s): Miss Salinas annie.salinas@greatheartsirving.org

Weekly Plan:

Monday, April 20

☐ Worksheet: counting to δέκα in Greek (cardinal numbers) / declension of πας, πασα, παν; εἷς, μια, ἑν; and οὐδεις, οὐδεμια, οὐδεν

Tuesday, April 21

☐ Declensions of δύο, τρεῖς, and τέτταρες / counting to δεκατος, δεκατη, δεκατον in Greek (ordinal numbers)

Wednesday, April 22

☐ Worksheet on expressions of time when, duration of time, and time within which / sentences
(Optional/recommended: **log in to Google Classroom** to complete this worksheet online)

Thursday, April 23

☐ Worksheet on sentences
(Optional/recommended: **log in to Google Classroom** to complete this worksheet online)

Friday, April 24

☐ Worksheet on sentences
(Optional/recommended: **log in to Google Classroom** to complete this worksheet online)

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____

Student Signature

_____

Parent Signature

χαιρετε φιλοι! Welcome to our fourth week of remote learning. This week, we are working on the information from the latter half of Chapter 8β. I'm looking forward to being able to both offer and receive more immediate feedback from y'all, and that may be possible in a big way for us starting Wednesday.

This week we're working on Greek numbers and the grammar that goes along with them. Once we get to the middle of the week, we'll be translating sentences using the new grammar. (I really wanted to give y'all multiple sentences each day so it wasn't just straight grammar on Monday and Tuesday, but the sentences I have use all the grammar at once so we had to cover it before we dove straight in.) Good luck!

Monday, April 20

Complete the Monday worksheet on the cardinal numbers and comparing πας, πασα, παν to εἷς, μια, ἑν.

(Also I just checked on a hunch and yep, I definitely made a typo last week and called these the ordinal numbers. They're not. These are the cardinal numbers. Forgive me.)

Tuesday, April 21

Complete the Tuesday worksheet on declensions of δύο, τρεῖς, and τέτταρες and counting to δεκατος, δεκατη, δεκατον in Greek (ordinal numbers)

Moment of silence for the field trip to Texas A&M / Baylor we were supposed to go on today. RIP. But hey, if you ever have questions about A&M, let me know - as I've probably mentioned too many times, I'm a proud member of the Fightin' Texas Aggie Class of 2016 and I love talking about my university!

Wednesday, April 22

Complete the Wednesday worksheet on expressions of time when, duration of time, and time within which, and the sentences that follow. **By the time you are reading this message on Wednesday, it will likely be possible that you are able to complete today's, tomorrow, and Friday's worksheets directly in Google Classroom and receive immediate feedback on your answers. Thus, if you have access to a computer and desire ease of completion and speed of feedback, please log in to Google Classroom!** If so, it may improve the quality of both your life and mine.

Thursday, April 23

Complete the Thursday worksheet with sentences. Reminder: Google Classroom is your friend!

Friday, April 24

Complete the Friday worksheet with sentences. (Google Classroom is, again, your new φιλος.) Join me for Zoom office hours at 10:30 if you want. Then, celebrate: you made it through another week!!

Monday

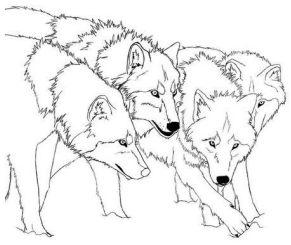
Counting to δεκα / εἷς, μια, ἑν; οὐδεις, οὐδεμια, οὐδεν

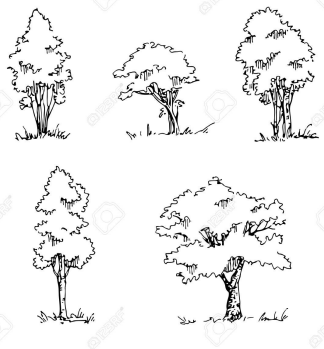
Grammar: counting to δεκα

As you did on Friday of last week, place in order here the cardinal numbers in Greek, 1-10. First try to do them from logic/memory, then check page 148 of your textbook to see if you got them correctly. Once you've got them down, practice counting from 1-10 five times. Write down the transliteration (e.g. "heis" instead of "εἷς") if you need to. ***Don't forget your breathing marks!***

1. ἑξ
2. εἷς, μια, ἑν
3. πεντε
4. δεκα
5. δυο
6. τετταρες, τεττταρα
7. ὀκτω
8. ἑπτα
9. ἐννεα
10. τρεῖς, τρια

Label the following in Greek, with the number and the nominative pl name of the thing:





Grammar: εἷς, μια, ἕν

Read the part of Ch 8β grammar 5 that begins with the first full sentence at the top of page 149 through the first declension chart on the same page. Answer the following questions:

How does εἷς, μια, ἕν translate?

How does οὐδεις, οὐδεμια, οὐδεν translate?

What other adjective's declension is remarkably like that of εἷς, μια, ἕν / οὐδεις, οὐδεμια, οὐδεν?

What declension's endings do the masculine of these words follow?

What declension's endings do the feminine of these words follow?

What declension's endings do the neuter of these words follow?

Now, try it. ***Don't forget your breathing marks - they make a big difference here!***

	"one"		
	m	**f**	**n**
nom	εἷς	μια	ἕν
gen			
dat			
acc			

"no one, nothing; no"		
m	**f**	**n**
οὐδεις	οὐδεμια	οὐδεν

Tuesday

Declensions of δύο, τρεῖς, and τέτταρες / ordinal numbers

Grammar: δυο, τρεις, τέτταρες

Look at the declension charts in the middle of pg. 149 for δυο, τρεις, and τετταρες.

Honestly, these aren't super tough to recognize when you see them in a passage, and I'm not going to require you to memorize them. Simply look at the charts and answer these comprehension questions:

1. Which of the following use(s) the same form for all three of the masculine, feminine, and neuter?
   εἷς δυο τρεις τετταρες

2. Which of the following use(s) the same form for the masc and fem but a different form for the neuter?
   εἷς δυο τρεις τετταρες

3. Which of the following use(s) a different form for all three of the masculine, feminine, and neuter?
   εἷς δυο τρεις τετταρες

4. They're all irregular, but which declension's endings are the declensions of τρεις and τετταρες most similar to?
   1st 2nd 3rd

Grammar: ordinal numbers

First, for comparison, below write and translate the cardinal numbers you've been practicing in the first column. Next, in the second column, write all three genders and translate the ten ordinal numbers given on page 149. (One is done for you.)

	CARDINAL		ORDINAL
1.		1.	
2.		2.	
3.		3.	
4.	τετταρες (m./f.), τετταρα (n.) - four	4.	τεταρος, τεταρη, τεταρον - fourth
5.		5.	
6.		6.	
7.		7.	
8.		8.	
9.		9.	
10.		10.	

Wednesday

Expressions of *time when, duration of time,* and *time within which*

Grammar

Read grammar section 6 of Chapter 8β, from the bottom of page 149 to the top of page 150. As you read, answer the following questions by circling the correct answer:

Time when

1. Which case is associated with expressions of *time when*?
   genitive dative accusative

2. Which English preposition is usually used for translating expressions of *time when*/saying the time when something happens?
   on/in within for

3. Which of the following do expressions of *time when* usually use?
   cardinal numbers (one, two, three) ordinal numbers (first, second, third)

4. Which of the following is an expression of *time when*?
   at night on the fifth morning for six hours within a month

Duration of Time

5. Which case is associated with expressions of *duration of time*?
   genitive dative accusative

6. Which English preposition is usually used for translating expressions of *duration of time*/saying the time for how long something happens?
   on/in within for

7. Which of the following do expressions of *duration of time* usually use?
   cardinal numbers (one, two, three) ordinal numbers (first, second, third)

8. Which of the following is an expression of *duration of time*?
   at night on the fifth morning for six hours within a month

Time Within Which

9. Which case is associated with expressions of *time within which*?
   genitive dative accusative

10. Which English preposition is usually used for translating expressions of *time within which*/saying the time within which something happens?
    on/in within for

11. Which of the following do expressions of *time within which* usually use?

cardinal numbers (one, two, three) ordinal numbers (first, second, third)

12. Which of the following is an expression of *time within which*?
    at night on the fifth morning for six hours within a month

Not Really Any of the Above but Still Helpful/Important

13. Which case do expressions like "by day", "by night", and "at night" take in Greek?
    genitive dative accusative

Translation

1. αὐτουργῳ τινι εἰσι τρεις παιδες: δυο μεν υἱεις (sons), μια δε θυγατηρ.

    a. Circle the correct use of the dative for the first clause:
       indirect object possession special verb

    b. Circle the correct case and number for the word θυγατηρ:
       nominative plural accusative singular nominative singular

Translation: _____

2. οἱ μεν παιδες πασαν την ἡμεραν ἐν τῷ ἀγρῷ πονουσιν, ἡ δε θυγατηρ οἰκοι μενει και τῇ μητρι συλλαμβανει. νυκτος δε παντες ἐν τῇ οἰκιᾳ καθευδουσιν.

    a. Circle which is the correct translation of πασαν την ἡμεραν (according to pg. 147 of your textbook):
       predicate position: "all day" no definite article: "every day"

    b. νυκτος is in which case, and how does it translate (according to pg. 150 of your textbook)?
       accusative: "for the night" genitive: "at/by night"

Translation: _____

_____

3. τῇ δ'ὑστεραιᾳ ἡ μητηρ τῇ θυγατρι, "οὐ πολυ (*much*) ὑδωρ (*water*) ἐστιν ἐν τῇ οἰκιᾳ. δυοιν ἡμερων οὐδεν ὑδωρ ἑξομεν (*we will have*). ἰθι οὐν και φερε μοι ὑδωρ."

    a. Circle which is the correct case and translation of τῇ δ'ὑστεραιᾳ:
       dative of time when: "on the next day" accusative duration of time: "for the next day"

    b. Circle which is the correct case and translation of δουιν ἡμερων:
    dative of time when: "on the second day" genitive of time within which: "within two days"

Translation: _____

_____

Thursday

Putting it all together: sentences (Ex. 8ζ continued)

4. ἀφικομενη (*having arrived*) δ'εἰς την κρηνην, ἡ παις τετταρας γυναικας ὁρᾷ τας ὑδριας πληρουσας (*filling*).

    a. How many women does the girl see at the spring?
    two three four nine

Translation: _____

5. ἡ πρωτη γυνη, "χαιρε, ὠ φιλη," φησιν. "ἐλθε δευρο και την ὑδριαν πληρου (*fill!*)."

    a. Is πρωτη a cardinal or an ordinal number?
    cardinal: "one" ordinal: "first"

Translation: _____

6. ἡ δε δευτερα, "τι συ ἡκεις (*have you come*) εἰς την κρηνην; τι ποιει ἡ ση μητηρ;"

    a. Who seems like someone you'd rather meet?
    ἡ πρωτη γυνη ἡ δευτερα γυνη

*note: I had a Karen joke in here but my roommates strongly suggested that I take it out because it's pop culture. So email me if you want Karen memes in Ancient Greek, which are truly the height of comedy.

    b. Which is ποιει?
    1st person 2nd person 3rd person

Translation: _____

7. ἡ δε παις ἀποκριναμενη, "ἡ μητηρ," φησιν, "περιεργος (*busy*) ἐστιν. πεντε γαρ πεπλους (cloths) ὑφαινει (*is weaving*)."

    a. Which is ἀποκριναμενη?
    a middle-voice verb: "answers" a middle-voice participle: "answering"

    b. Conjugate and translate the whole present tense for ἐστιν here:

	singular	*plural*
1st person		
2nd person		
3rd person	ἐστιν - he is	
imperative		
infinitive	εἰναι - to be	

Translation: _____

8. ἡ δε τριτη γυνη, “σπευδε, ὠ ἀργε παι,” φησιν, “ἡ γαρ μητηρ σε μενει.”

   a. τριτη is which of the following?
      ordinal: “third” cardinal: “three”

   b. σπευδε is in which mood?
      infinitive: “to hurry” imperative: “hurry!” indicative: “is hurrying”

Translation: _____

9. ἡ δε τεταρτη γυνη, “μη οὑτω χαλεπη ἰσθι,” φησιν, “ἡ γαρ παις ἠδη σπευδει.”

   a. What does οὑτω mean?
      not don’t so therefore

   c. σπευδει is in which mood?
      infinitive: “to hurry” imperative: “hurry!” indicative: “is hurrying”

Translation: _____

10. ἡ οὐν παις την πασαν ὑδριαν ταχεως πληροι (fills) και οἰκαδε σπευδει.

   a. την πασαν ὑδριαν is which of the following?
      attributive position: “the whole water jar” no definitive article: “every water jar”

Translation: _____

Friday

Putting it all together: sentences (Ex. 8η)

1. αἱ θυγατερες τῇ μητρι πειθομεναι τον πατερα ἐγειρουσι (*wake up x*) και πειθουσιν αὐτον Ἀθηναζε πορευεσθαι.

    a. Which declension is αἱ θυγατερες? Which case and number?
    1st 2nd 3rd

    b. Which case and number is αἱ θυγατερες?
    nom sg dat pl nom pl gen sg

    c. πειθομεναι is a middle-voice participle. πειθω and πειθομαι have different meanings. Which are the TWO correct pairings (one for each the active and middle voice)?
    πειθω: I command πειθομαι: I obey πειθω: I persuade πειθομαι: I follow

    d. Hey, this is the part where somebody finally says the title of the TV show in the script! *("He's the Doctor." "Doctor Who?")* What does Ἀθηναζε mean?
    to/toward Athens the Athenians when in Athens

Translation: _____

2. ὁ πατηρ τους μεν παιδας οἰκοι λειπει, ταις δε θυγατρασιν Ἀθηναζε ἡγειται.

    a. What is the best translation for "οἰκοι"?
    homeward at home the home

    b. What case is ταις θυγατρασιν, and why?
    dative pl: special verb accusative sg: direct object dative sg: respect

    c. Who is doing the action of ἡγειται?
    the children the daughters the father

Translation: _____

3. μακρα ἡ ὁδος και χαλεπη. τῇ δε δευτερᾳ ἡμερᾳ ἐκεισε (*thither*) ἀφικνουνται.

    a. What's missing but implied in the first sentence?
    εἰναι ἐστιν εἰσιν

    b. Circle which is the correct case and translation of τῇ δε δευτερᾳ ἡμερᾳ:
    dative of time when: "on the second day" genitive of time within which: "within two days"

Translation: _____

4. πολλους ἀνθρωπους ὁρωσιν δια (*through*) των ὁδων πανταχοσε (*in all directions*) σπευδοντας (*hurrying*).

    a. What is the subject of this sentence?
    πολλους ἀνθρωπους ὁ πατηρ και ὁι παιδες (implied)

    b. Based on this sentence, which case do you think the preposition δια takes?
    genitive dative accusative

    c. τινες σπευδουσιν; *(Hint: check the case of the participle.)*
    the people who are the direct object the people who are the subject

Translation: _____

5. ἐπει δε εἰς την ἀγοραν ἀφικνουνται, πολυν χρονον μενουσι παντα θεωμενοι (*looking at everything*).

    a. Circle which is the correct case and translation of πολυν χρονον:
dative of time when: "many times" accusative duration of time: "for much time"

    b. What case, number, and gender is παντα here?
    fem nom sg neut acc pl masc dat sg

Translation: _____

6. δυο μεν ἡμερας τα (*the things*) ἐν τῇ ἀγορᾷ θεῶνται, τῇ δε τριτῇ ἐπι την Ἀκροπολιν ἀναβαινουσιν.

    a. Circle which is the correct case and translation of δυο ἡμερας:
dative of time when: "two times" accusative duration of time: "for two days"

    b. Circle which is the correct case and translation of τῇ τριτῇ:
dative of time when: "on the third" genitive of time within which: "within three"

Translation: _____

7. ἐννεα μεν ἡμερας Ἀθηνησι μενουσιν, τῇ δε δεκατῃ οἰκαδε ὁρμῶνται (*they start/set themselves in motion*).

    a. Circle which is the correct case and translation of ἐννεα ἡμερας:
accusative duration of time: "for nine days" genitive of time within which: "within nine days"

    b. Which is the correct case and translation for Ἀθηνησι? *(Hint: remember that "Athens" is treated as a plural verb in Greek)*

accusative: Athens dative: in Athens vocative: oh Athens!

c. Circle which is the correct case and translation of τῇ δεκατῃ:
dative of time when: “on the tenth” genitive of time within which: “within nine days”

Translation: _____

8. τετταρας μεν ἡμερας ὁδον ποιουνται, βραδεως πορευομενοι (*going*). τῇ δε πεμπτῃ οἰκαδε ἀφικνουνται.

a. Circle which is the correct case and translation of τετταρας ἡμερας:
accusative duration of time: “for four days” dative of time when: “on the fourth day”

b. Circle which is the correct case and translation of τῇ πεμπτῃ:
genitive of time within which: “within five” dative of time when: “on the fifth”

Translation: _____

GreatHearts Irving

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20-24, 2020

Course: 11 Humane Letters

Teacher(s): Mr. Brandolini david.brandolini@greatheartsirving.org
Mr. Mercer andrew.mercer@greatheartsirving.org

Weekly Plan:

Monday, April 20
☐ Read and annotate Sophocles, *Oedipus the King*, lines 1-526 (p. 159-185)
☐ Answer reading questions

Tuesday, April 21
☐ Read and annotate *Oedipus the King*, lines 527-953 (p. 186-208)
☐ Answer reading questions

Wednesday, April 22
☐ Read and annotate *Oedipus the King*, lines 954-1310 (p. 209-232)
☐ Answer reading questions

Thursday, April 23
☐ Read and annotate *Oedipus the King*, lines 1311-1684 (p. 233-251)
☐ Answer reading questions

Friday, April 24
☐ Read the attached lecture
☐ Compose a 1-2 page essay on *Oresteia* and *Oedipus*

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____
Student Signature

_____
Parent Signature

Monday, April 20

Read and annotate *Oedipus the King*, lines 1-526 (p. 159-185) and answer the reading questions.

For the time being, we will move ahead with our next Greek Tragedy, courtesy of Sophocles, before revisiting some ideas from the *Oresteia* at the end of the week. Much like the House of Atreus in the *Oresteia,* Thebes boasts a storied and tumultuous history. We've included a brief account of the immediate history of *Oedipus the King*'s characters here:

An oracle informed [Laius] that he would be killed by his own son, and, as a result, Laius refrained from intercourse with his wife, until one night, in a drunken rage, he had intercourse with her anyway.

When Jocasta bore a son, Laius had his feet pinned together (to keep his ghost from walking) and ordered a shepherd to abandon the baby on Mount Cithaeron near Thebes. Instead, the shepherd gave the baby to a friend from Corinth. This friend delivered the baby to Polybus, king of Corinth, and he and his wife, Meriope, adopted the child, giving him the name "Oedipus", which seems to mean "swollen foot" or "sore foot".

When he was older, a drunken man questioned Oedipus' parentage, though his mother would not speak to him about the matter. Instead, he went to Delphi to learn about his background, where the oracle instead told him that he would kill his father and marry his mother. Horrified, he abandoned Corinth, and headed towards Thebes where he decided to try his luck as an exile. On the way, a chariot ran him off the road and grazed his foot. In anger, Oedipus killed the driver, the passenger, and all of his retainers except one, who escaped.

Upon arriving at Thebes, he encountered the monstrous Sphinx, possibly sent by Hera as punishment against the Thebans for failure to atone for the crimes of Laius. The Sphinx was eating Thebans. Before killing them, the monster posed a riddle: "What goes on four legs in the morning, two at midday, and three in the evening?" Only when the riddle was answered would the Thebans be spared the agony of the Sphinx, but no one had been able to solve the riddle. Laius had gone to Delphi to learn how to rid Thebes of the Sphinx, but reports of his demise by bandits came back to Creon, brother-in-law of Laius and acting ruler of Thebes. Creon decreed that whoever could solve the riddle would become the next king. Oedipus encountered the Sphinx and quickly realized that the answer was "man". The Sphinx, in her anger, threw herself off a cliff.

Oedipus became king of Thebes and married Jocasta. She bore two sons, Polynices and Eteocles, and two daughters, Antigone and Ismene. A plague followed and the stage was set for the action of Sophocles' Oedipus Rex.

-from http://www.classics.upenn.edu/myth/php/tragedy/index.php?page=thebes

Tuesday, April 21

Read and annotate *Oedipus the King*, lines 527-953 (p. 186-208) and answer the reading questions.

Wednesday, April 22

Read and annotate *Oedipus the King*, lines 954-1310 (p. 209-232) and answer the reading questions.

Thursday, April 23

Read and annotate *Oedipus the King*, lines 1311-1684 (p. 233-251) and answer the reading questions.

Friday, April 24

1. Lecture

Towards the end of the *Republic*, we saw Plato suggest that imitation/poetry's value could perhaps lie in communicating or exploring difficult ideas in a more digestible and beautiful way. In his *Poetics*, Aristotle essentially agrees, and argues that the Tragedy is among the highest forms of fictional expression. He defines tragedy as "an imitation of an action [movement of story/character] that is serious, complete, and of a certain magnitude" (*Poetics* VI). For Aristotle, such an action must be single, focused, and aimed at stirring a cathartic pity and fear within the audience. The key to great tragedy is that it captures the singular movement of a particularly noble, but not perfect man's soul: it is a movement from fortune to misfortune, brought about due to his *hamartia*, or tragic flaw. This flaw is not typically something minor, but rather a fundamental blindness in the tragic hero's soul that affects his mind and will, a fault of which he himself is not aware and is unable to control, resulting in tragic error. While we have examined this idea in both Achilles and Odysseus, the singular focus of a Tragedy makes the effects of the hero's flaw all the more apparent and visceral.

Witnessing the recognition of this tragic flaw and its consequences arouses both "pity and fear": pity for the character due to one's distance from the "unmerited misfortune" (*Poetics* XIII), and fear due to the immediacy of sharing in that suffering despite the distance. Both are brought about due to an innate sense of justice: we pity the seemingly unjust suffering of an otherwise good man, but also fear the recognition that this otherwise virtuous man is, for the most part, directly responsible for what has occurred.

While the *Eumenides* ends Aeschylus' trilogy with a hopeful movement from revenge to the establishment of justice by lawful trial, the movement of Orestes' character itself is nonetheless tragic throughout the dramas. In both the *Oresteia* and *Oedipus the King*, the extent to which fate has placed the hero into an unwinnable situation is a central dilemma. The important thing that these dramas highlight is that even despite the circumstances of fate (or as Jocasta impiously puts it, "chance"), what a man does with his circumstances is the essential action of the play. Aristotle emphasizes the importance of the good man coming to a *recognition*, a reversal of fortune or action that makes his flaw known and obvious to him; while painful, this process in fact grants the hero the opportunity to free himself from his *hamartia*

and move towards resolution and reconciliation. For the *Oresteia*, this involves a recognition of the flaws within the House of Atreus, and the sickness of retaliation and revenge. As for Sophocles' *Oedipus the King*, The extent to which Oedipus exemplifies this will hopefully become clear as your turn towards your writing for this week.

2. Essay Prompt: choose ONE of the following. Any prompt chosen should include a total of at least 3 meaningful citations and/or quotations of examples:

A. In light of the lecture above, attempt to identify Oedipus' tragic flaw and the moment his flaw is made clear and recognized. Explore how he ultimately benefits, learns from, and/or is redeemed by his suffering.

B. Drawing from both the *Oresteia* (either a specific play or the trilogy as a whole) and *Oedipus the King*, explore how both plays demonstrate the principle of stirring pity and fear within the audience. *Note that this is not a subjective reflection of whether or not you personally felt pity and fear. Rather, it is an account of how these plays show examples of characters who wrestle with their circumstances of fate and the extent to which they seem responsible for their suffering.*

Reminder: Next week, we will be taking a brief interlude in our study of the Ancients to read Shakespeare's *Hamlet*:

Shakespeare, *Hamlet*, ISBN 978-0-7434-7712-3

_____
_____
_____
_____

Monday: *Oedipus* lines 1-526 Reading Questions

Answer in complete sentences.

1. How does Oedipus respond to the plight of his people and the priest's request for help in the beginning of this section?

_____
_____
_____
_____
_____

2. What oaths does Oedipus make after learning the cause of the plague and how to stop it?

_____
_____
_____
_____
_____

3. What does Tiresias reveal to Oedipus, and how does Oedipus receive the prophet's words?

_____
_____
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_____
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_____

Tuesday: *Oedipus* lines 527-953 Reading Questions

Answer in complete sentences.

1. How does Creon defend himself against the charge made against him by Oedipus? Does he convince the king of his innocence?

_____
_____
_____
_____
_____

2. What is Jocasta's attitude toward prophecies and oracles in this section?

_____
_____
_____
_____
_____

3. What does Oedipus reveal to Jocasta about his past near the end of this section?

_____
_____
_____
_____
_____

Wednesday: *Oedipus* lines 954-1310 Reading Questions

Answer in complete sentences.

1. Pride is denounced by the chorus in lines 954-997. Are they speaking of the pride of a particular person? If so, state who you think they are speaking of and why.

2. What news arrives from a Corinthian messenger in this section, and how does it change the narrative of the drama?

3. Briefly evaluate Jocasta's advice to Oedipus in lines 1069-1078. Is it wise or unwise advice, and why?

4. Why did Jocasta seek to have her child killed?

Thursday: *Oedipus* lines 1311-1684 Reading Questions

Answer in complete sentences.

1. What are the fates of both Jocasta and Oedipus in this final section?

2. In what state is the relationship between Oedipus and Creon by the end?

3. Does the chorus pity Oedipus, find him at fault, or both?

4. How do you interpret the final two lines of *Oedipus the King*? Based on the events of this drama, is happiness impossible in this life, or should the happiness of any given person not be judged until the end of his or her life?

_____
_____
_____
_____

Friday: 11th Grade Humane Letters *Oresteia* and *Oedipus* Short Essay, Prompt _____

Answer in at least one full page, using the second page as needed. See the lesson plan above for the prompt.

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: 11 Physics
Teacher: Miss Weisse natalie.weisse@greatheartsirving.org
Resource: *Miss Weisse's Own Physics Textbook* — new pages found at the end of this packet

Weekly Plan:

Monday, April 20
☐ Read & Understand Notes on *Unit 8 Part 1 – An Introduction to Energy* (pages 39-43)
☐ Organize the information from Unit 8 Part 1.

Tuesday, April 21
☐ Read & Understand Notes on *Unit 8 Part 2 – Tracking Energy – Systems* (pages 44-48)
☐ Complete practice problems a-d on pages 49-50
☐ Email Miss Weisse with Questions and to Ask for Solutions

Wednesday, April 22
☐ Re-read & Understand Notes on *Unit 8 - Energy* (pages 39-49)
☐ Complete Unit 8 Worksheet 1a
☐ Email Miss Weisse with Questions and to Ask for Solutions

Thursday, April 23
☐ Read & Understand Notes on *Unit 8 - Energy* (pages 39-49)
☐ Complete Unit 8 Worksheet 1b #1-4
☐ Email Miss Weisse with Questions and to Ask for Solutions

Friday, April 24
☐ Read & Understand Notes on *Unit 8 - Energy* (pages 39-49)
☐ Complete Unit 8 Worksheet 1b #5-8
☐ Email Miss Weisse with Questions and to Ask for Solutions

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

_____
Student Signature

I affirm that, to the best of my knowledge, my child completed this work independently

_____
Parent Signature

Monday, April 20

- ➔ Read & Understand Notes on *Unit 8 Part 1 – An Introduction to Energy* (pages 39-43)
- ➔ On a sheet of paper with a full heading, organize the information from Unit 8 Part 1. Make sure you understand the terms so they don't hold you back for the next few weeks.

Tuesday, April 21

- ➔ Read & Understand Notes on *Unit 8 Part 2 – Tracking Energy – Systems* (pages 44-48)
  - ◆ If you are able and allowed, follow the following link which will take you to a simulation referenced in the notes. https://phet.colorado.edu/sims/html/energy-skate-park-basics/latest/energy-skate-park-basics_en.html
- ➔ On a sheet of paper with a full heading, complete practice problems a-d on pages 49-50

Wednesday, April 22

- ➔ Review Notes on *Unit 8 - Energy* (pages 39-49)
- ➔ On a sheet of paper with a full heading, complete Unit 8 Worksheet 1a #1-6.

Directions: Use pie charts to analyze the energy changes in each situation given of the wind-up bunny toy moving (or not) on wheels.

Hint 1: Your system includes the wind-up mechanism, the toy itself, and the surface.

Hint 2: Possible sources of energy are gravitational potential energy (E_g), kinetic energy (E_k), elastic energy from wind-up mechanism (E_{el}), and thermal energy (E_{th}) from friction with the surface.

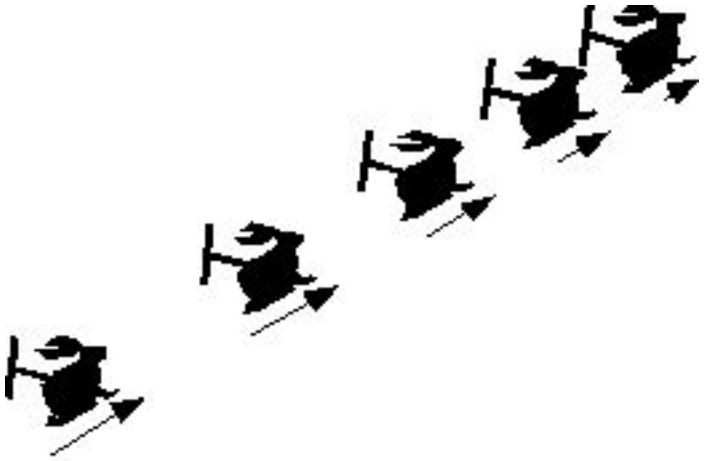
1. A wind-up toy is fully wound and at rest.

2. A wind-up toy is wound up and moving across level ground. The toy is speeding up.

3. The toy is wound up and is moving at a constant speed up an incline.

4. The toy is wound up and moving along at a constant speed.

5. The toy is wound up and slowing down as it moves up an incline.



6. The toy is wound up and speeding up as it moves up an incline.

Thursday, April 23

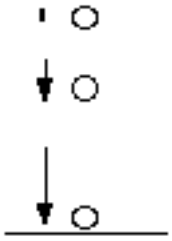
- ➔ Review Notes on *Unit 8 - Energy* (pages 39-49)
- ➔ Complete Unit 8 Worksheet 1b #1-4
- ➔ Email Miss Weisse with Questions and to Ask for Solutions

Directions: Use pie charts to analyze the energy changes in each situation given of the wind-up bunny toy moving (or not) on wheels.

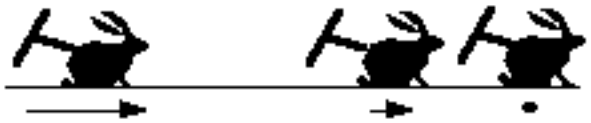
Hint 1: Your system includes the wind-up mechanism, the toy itself, and the surface.

Hint 2: Possible sources of energy are gravitational potential energy (E_g), kinetic energy (E_k), thermal energy (E_{th}) from friction with the surface, elastic energy from a wind-up mechanism or an otherwise bouncy surface (E_{el}), chemical energy from the combustion of gas in a car (E_{ch}).

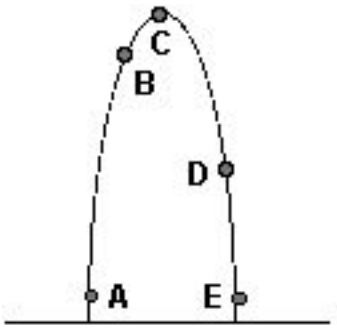
1. A ball is held above the ground, and then is dropped so it falls straight down. (Restrict your analysis to the ball being in the air, BEFORE it hits the ground.)



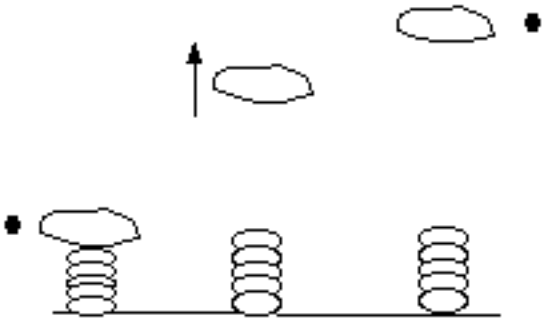
2. A wind-up toy is wound up, then "walks" across a table and comes to a stop.



3. A baseball is thrown up in the air and then falls back down. Place velocity vectors beside each corresponding baseball in the drawing, and draw an energy storage pie for each lettered position.



4. An object rests on a coiled spring, and is then launched upwards.



Friday, April 24

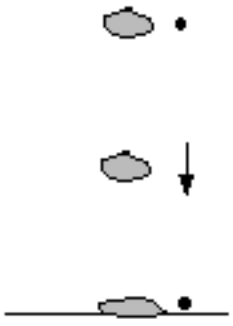
- ➔ Review Notes on *Unit 8 - Energy* (pages 39-49)
- ➔ Complete Unit 8 Worksheet 1b #5-8
- ➔ Email Miss Weisse with Questions and to Ask for Solutions

Directions: Use pie charts to analyze the energy changes in each situation given of the wind-up bunny toy moving (or not) on wheels.

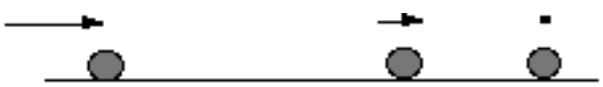
Hint 1: Your system includes the wind-up mechanism, the toy itself, and the surface.

Hint 2: Possible sources of energy are gravitational potential energy (E_g), kinetic energy (E_k), thermal energy (E_{th}) from friction with the surface, elastic energy from a wind-up mechanism or an otherwise bouncy surface (E_{el}), chemical energy from the combustion of gas in a car (E_{ch}).

5. A piece of clay is dropped to the floor.

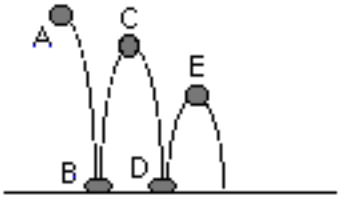


6. A ball rolls to a stop on the floor.



7. A truck being driven down the street.

8. A superball is dropped and bounces up and down. Draw a pie chart for each position of the ball shown. Why does the ball not bounce as high each time? Where does the energy "go"?



Miss Weisse's Own Physico Textbook

Unit 8
Part 1

An Introduction to Energy

ENERGY is difficult to define. If you look up a definition of energy you are most likely going to find something similar to "energy is the ability to do work." But this is like saying "force is the ability to change the motion of an object." Neither of these definitions explain what the thing is, but, rather, what the thing does.

Here are more concrete things we know about energy (though im still unconvinced we can say it is a definition).

Energy is...

...Universal. → although we name different "kinds" of energy (kinetic, potential, chemical, etc.) the energy itself does not change. As an analogy, we do the same thing with force (push force, frictional force, gravitational force) but all "kinds" of forces are simply a push or pull on an object.

...a Substance-Like Quantity. → We can measure and quantify the amount of energy an object (or a system) has. We can even quantify how much of each "kind" of energy an object has at a given moment.

...Conserved. → energy cannot be created or destroyed, but sometimes it appears to be as it changes the "kind" of energy.

...a Scalar Quantity. → unlike velocity, acceleration, force, and momentum, energy does NOT have direction. It is just a number.

... the capability to produce change. → this is like the statement "energy is the ability to do work." In a very basic way, we can think of energy as fueling motion or fueling-up for future motion.

STORAGE MODES OF ENERGY

Energy always has a home. There are generally three types of homes or storage modes.

1. Energy can be stored in an object.
   - → Kinetic Energy (E_K) is energy stored in an object that is in motion.
   - → Elastic Energy (E_{el}) is energy stored in an object when the object is undergoing restorable deformation.

     Examples:
     - the stretching of a spring or rubberband
     - gearing up a wind-up toy
     - a bouncy ball compressing against a surface

2. Energy can be stored by a field.
   - it is only energy caused by non-contact forces (the gravitational force, magnetic force, and electrical force) that are stored in fields. Fields are NOT physical, just like energy is not physical.

→ Gravitational Energy (E_g), also known as gravitational potential energy, is stored in a field. We know an object that is lifted above a surface has the potential to fall. The higher the object the more capability to produce a change when the object falls compared to a lower object. On the other hand, if you move an object horizontally while heald above a surface, the possible change is not changed because the object will fall the same vertical distance. So the field stores energy relative to how far two objects are from eachother (it is ok if you do not understand).

→ Electrical Energy (E_e), also known as electrical potential energy, is stored in a field. From your knowledge of chemistry you know positive and negative charges attract. The field holds the energy of this attraction and this energy can be transformed into kinetic energy if the charges have a path to travel toward eachother. The further the charges are from eachother, the more electrical energy is stored in the field because the charges have more capability to produce a change

Example:

- Think about your hair standing on end when an electrical (lightning) storm is about to happen or when you rub your hair with a balloon. This action opposite of gravity is due to stored energy from the field.

3. Energy can be stored in the ENVIRONMENT.
(By "environment" we mean the air or the surface on which another object is in contact.)

→ We know air is actually made up of many (and many types) of small particles. Energy stored in air is really just a way to say energy stored in these many, many objects.

Examples:
- Sound Energy (E_{sound} OR E_{sonic})
- Thermal Energy (E_{Th})

→ We have experienced our hands warming up as we rub them together or as we drag a hand along a surface. The interaction between the two surfaces causes the random motions of particles which is felt as heat, or Thermal Energy (E_{Th}). This is also described as a non-restorable deformation.

Energy Transfer can occur in two ways, but ALWAYS requires FORCE

1. Energy is transferred between storage modes by forces between objects.

2. Energy is transferred between storage modes by forces between an object and a field.

Unit 8
Part 2

Tracking Energy – Systems

- We track energy by dividing up the universe into groups of objects we call SYSTEMS. Everything outside of a given system is the surroundings or environment.

- Although we like to think of systems in isolation, we know, and should be aware of the possibility that, the surroundings/environment can interact with the system.

- Energy is stored within a system in one or more of the three storage modes (in an object, in a field, or in the environment of the system) The total amount of energy in the system is typically unchanging, unless there is an interaction with something from the surroundings.

  → If energy enters or leaves our system, we say the surroundings are doing work on our system to either give the system work or take it away.

  → We know there is a law of conservation of energy - energy cannot be created or destroyed - but within a system it is possible that energy is gained from the surroundings or lost to the surroundings.

- The choice of what is in our system is arbitrary, we get to pick, but it is helpful to add as much to the system as possible to keep the energy in our system conserved.

Analyzing Energy In A System

Assuming energy is conserved, a handy way to keep track of energy in a system is using a pie chart.

If energy is conserved the size of the pie does not change, but you can cut different size pieces... I am unsure this analogy will hold up, so let's use a pie chart in a money analogy instead.

You Have $100

All of it is in the bank.

You still have $100 but...

You took $50 out in cash And the other $50 is still in the bank.

Of that $100...

You Spent $20
You Have $30 Cash
You still have $50 in the Bank.

Total $100 → Total $100 → Total $100

The Money is Conserved, but the Pie Chart Told Us Where (or what kind of) the money is.

We Can Do The Same Thing With Energy.

NOTE

You can model all of the following examples using the PhET Simulation online. (link in lesson plan)

When you get there, choose "Intro" then select the following setting

→ By the Pause and Play Buttons near the bottom of the screen, select Slow Motion

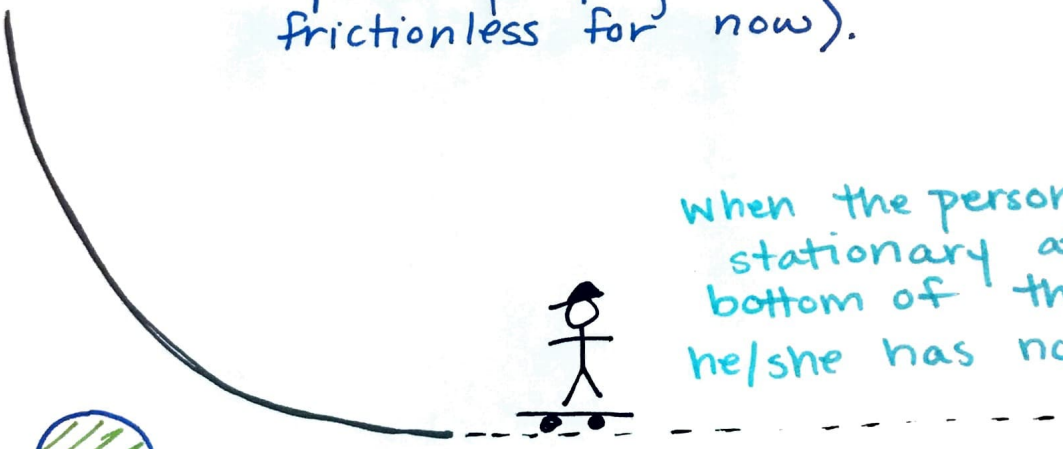
→ In the top right corner of the screen, select Pie Chart

→ You must click on the person and place him/her on the track

* Select the Ramp Like the One Below on the Right Side of the Screen.

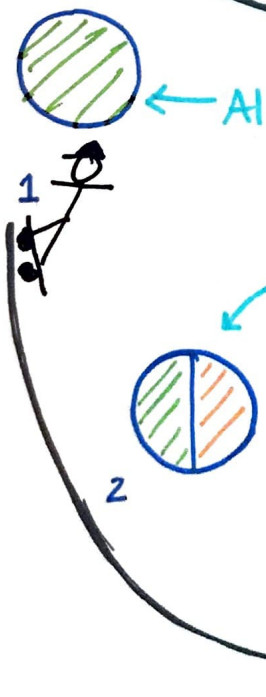
Example 1: We are watching a person at a skate park playing on a ramp (which is frictionless for now).

a)



When the person is stationary at the bottom of the ramp, he/she has no energy.

b)



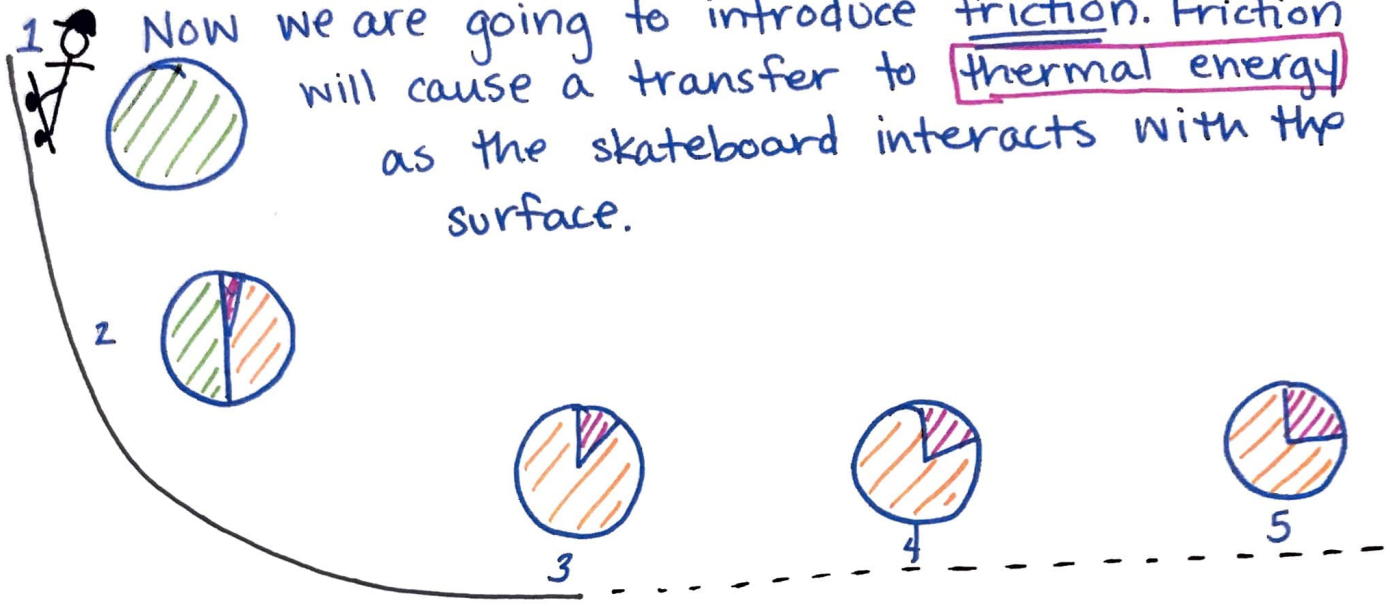
All gravitational potential energy

- E_g (gravitational energy)
- E_K (kinetic energy)

The person has already traveled ½ the vertical distance so it has ½ its original gravitational energy.

Both Positions 3 + 4 have the same amount of E_K because they are on the surface and there is nowhere for the energy to transfer with no friction.

* Select FRICTION at the very bottom of the screen.

C) 

Now we are going to introduce friction. Friction will cause a transfer to thermal energy as the skateboard interacts with the surface.

Explanations:

1 

While the skateboarder is at the top of the ramp at his/her highest point above the surface, he/she has ALL gravitational potential energy (E_g) The original height also determines the total amount of energy in the system because it determines how much change can be produced.

2 

When the skateboarder is half way down the ramp he/she is half the height above the ground. Therefore, half the change that could occur already has so there is ½ as much E_g. The other half is mostly kinetic energy, but already some energy has been transferred to the ramp as E_{th} due to friction.

3 

4 

5 

Once the skateboarder is level with the surface there is no more gravitational energy. Most of the energy is kinetic energy but energy is also continuously being transferred to the ramp as thermal energy (E_{th}) due to friction. This is why the skateboarder might eventually stop.

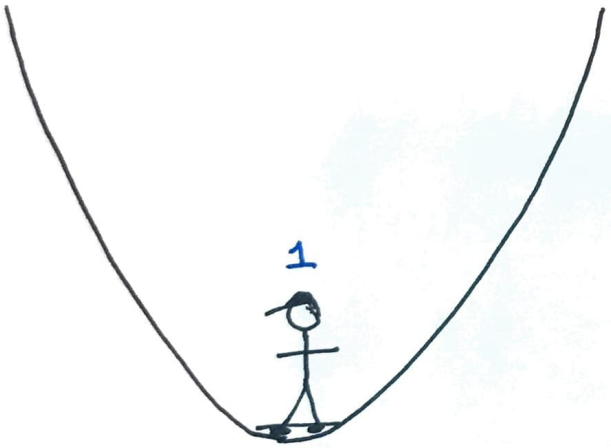
TRY THESE YOURSELF!

Fill in the pie chart for each marked position and write a short explanation justifying your answer.

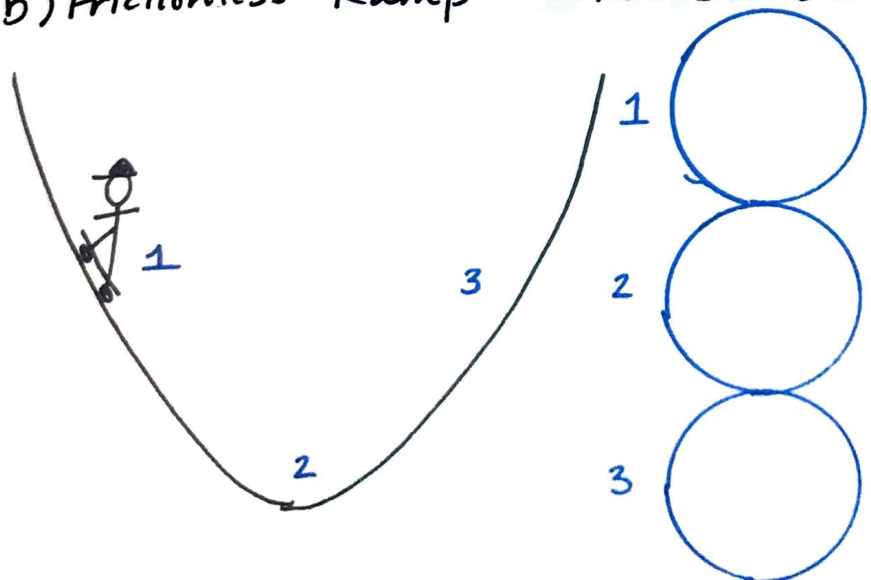
NOTE

If you are using the PhET simulation, ATTEMPT THESE PROBLEMS YOURSELF FIRST! You can check your work by choosing the corresponding ramp on the right side of the screen. Don't forget to reset your other settings described on page 47.

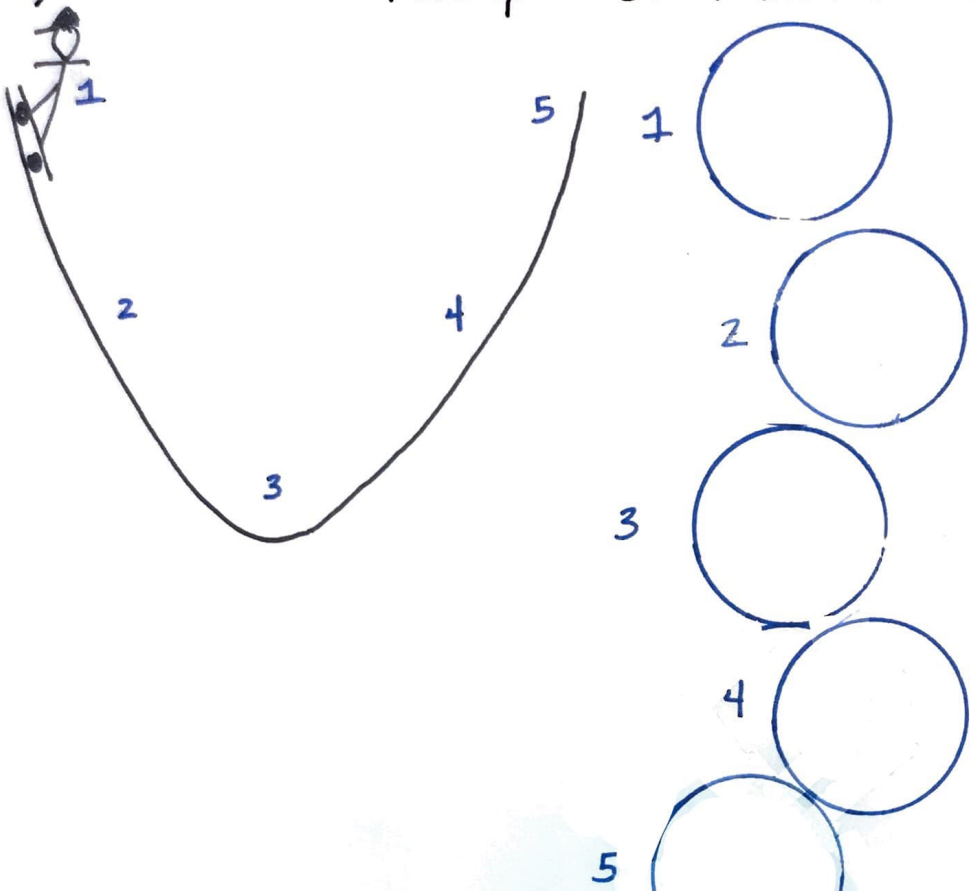
a) Frictionless Ramp - Skateboarder begins at the bottom.



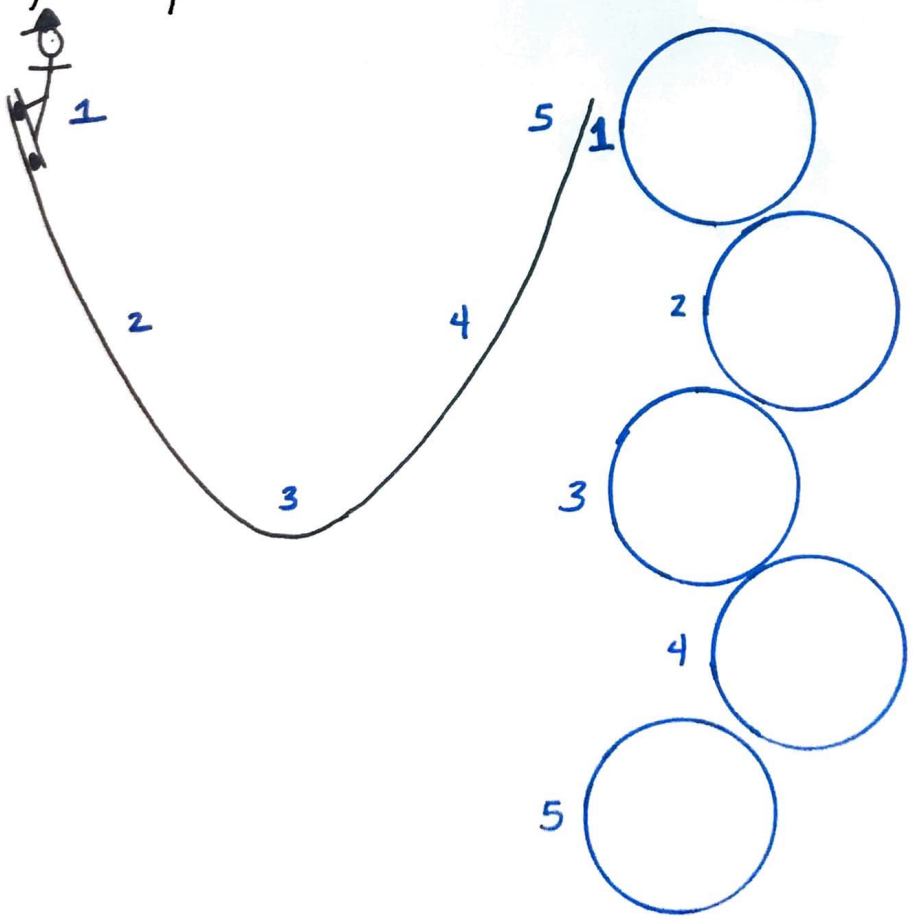
b) Frictionless Ramp - Skateboarder begins half way up.



c) Frictionless Ramp - Skateboarder begins at the top left.



d) Ramp WITH Friction - Skateboarder begins at top left.



GreatHearts Irving

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: 11 Precalculus

Teacher(s): Mr. Simmons

Weekly Plan:

Monday, April 20

☐ "The Unit Circle: Sine and Cosine" handout

Tuesday, April 21

☐ "The Unit Circle: Sine and Cosine" handout answer key

Wednesday, April 22

☐ "The Other Trigonometric Functions" handout

Thursday, April 23

☐ "The Other Trigonometric Functions" handout answer key

Friday, April 24

☐ Vocabulary

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____

Student Signature

_____

Parent Signature

Monday, April 20

Read through carefully and complete each of the problems and exercises in the handout entitled “The Unit Circle: Sine and Cosine.”

Tuesday, April 21

Check your answers on the “Unit Circle” handout with my answer key. Make corrections as needed.

Wednesday, April 22

Read through carefully and complete each of the problems and exercises in the handout entitled “The Other Trigonometric Functions.”

Thursday, April 23

Check your answers on the “Other Trig Functions” handout with my answer key. Make corrections as needed.

Friday, April 24

Spend all of today reviewing vocabulary from the last few handouts, starting with the handout entitled “Angles.” The expectation is that you be able to give, without looking at notes, a complete mathematical definition of each word whose formal definition is stated in these handouts.

The Unit Circle: Sine and Cosine

Precalculus
Mr. Simmons

Read through this handout carefully and pause to think and respond when instructed.

Definition (UNIT CIRCLE)**.** The unit circle is the circle centered at $(0, 0)$ with a radius of 1.

Problem 1. Draw a diagram of the unit circle with a central angle of measure $\frac{\pi}{2}$. Label the point at which this angle's terminal side intersects the unit circle (x, y). Calculate x and y. That is, find their exact values.

Problem 2. Draw a diagram of the unit circle with a central angle of measure $\frac{\pi}{4}$. Label the point at which this angle's terminal side intersects the unit circle (x, y). Calculate x and y. (Hint: draw a triangle with corners at $(0, 0)$, (x, y), and $(x, 0)$.)

Problem 3. Draw a diagram of the unit circle with a central angle of measure $\frac{\pi}{6}$. Label the point at which this angle's terminal side intersects the unit circle (x, y). Calculate x and y. (Hint: after drawing a triangle with corners at $(0, 0)$, (x, y), and $(x, 0)$, draw that triangle's reflection across the x-axis as well.)

For each of the preceding two problems, you were given (as an input) an angle measure θ, and you found (as outputs) a value x and a value y. Notice how I'm phrasing this in the language of functions. We can put θ through two different functions, one of which puts out a horizontal distance x—the horizontal leg of the right triangle with its hypotenuse going from the origin to (x, y)—the other of which puts out a vertical distance y—the vertical leg of that same right triangle.

Let's give names to each of these functions:

Definition (SINE AND COSINE—UNIT CIRCLE DEFINITION)**.** Let a line through the origin, making an angle of θ with the positive half of the x-axis, intersect the unit circle. The x- and y-coordinates of this point of intersection are equal to $\cos(\theta)$ and $\sin(\theta)$, respectively.

Exercise 4. Draw a diagram of the unit circle (in green pencil if you have one) and label the point $(\cos(\theta), \sin(\theta))$ for each of

$$\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{5\pi}{4}, \frac{4\pi}{3}, \frac{3\pi}{2}, \frac{5\pi}{3}, \frac{7\pi}{4}, \frac{11\pi}{6}.$$

For example, to label $(\cos(\theta), \sin(\theta))$ for $\theta = \frac{\pi}{2}$, you would plot the point $(0, 1)$ and label it "$(0, 1)$." You would *not* label it "$\left(\cos\left(\frac{\pi}{2}\right), \sin\left(\frac{\pi}{2}\right)\right)$."

Exercise 5. Draw coodinate axes, label the horizontal axis θ, and label the vertical axis $\sin(\theta)$. On the $\sin(\theta)$-axis, draw and label tick marks at 1 and -1. On the θ-axis, draw and label tick marks at $\frac{\pi}{2}$, π, $\frac{3\pi}{2}$, and 2π. Plot (in red pencil if you have one) the point $(\theta, \sin(\theta))$ for each of

$$\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{5\pi}{4}, \frac{4\pi}{3}, \frac{3\pi}{2}, \frac{5\pi}{3}, \frac{7\pi}{4}, \frac{11\pi}{6}, 2\pi.$$

You needn't label each point.

Then connect the dots as smoothly as possible.

Exercise 6. Draw coodinate axes, label the horizontal one θ, and label the vertical one $\cos(\theta)$. On the $\sin(\theta)$-axis, draw and label tick marks at 1 and -1. On the θ-axis, draw and label tick marks at $\frac{\pi}{2}$, π, $\frac{3\pi}{2}$, and 2π. Plot (in blue pencil if you have one) the point $(\theta, \cos(\theta))$ for each of

$$\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{5\pi}{4}, \frac{4\pi}{3}, \frac{3\pi}{2}, \frac{5\pi}{3}, \frac{7\pi}{4}, \frac{11\pi}{6}, 2\pi.$$

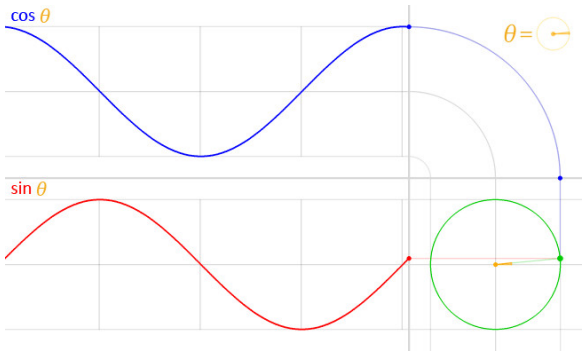
You needn't label each point.

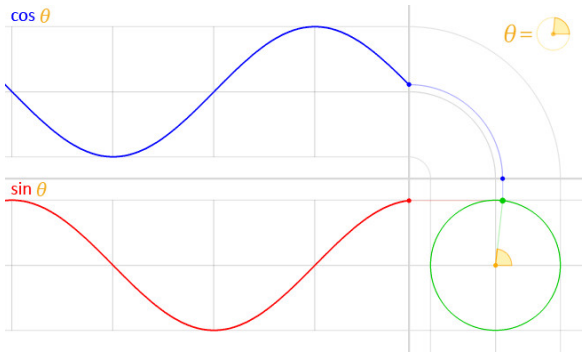
Then connect the dots as smoothly as possible.

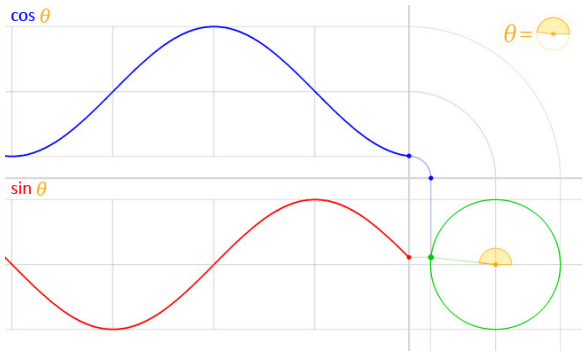
Exercise 7. If you are able, go to

https://upload.wikimedia.org/wikipedia/commons/3/3b/Circle_cos_sin.gif

and observe the animation. Here are a few frames from the animation for those who are not able to view it:

1. 

2. 

3. 

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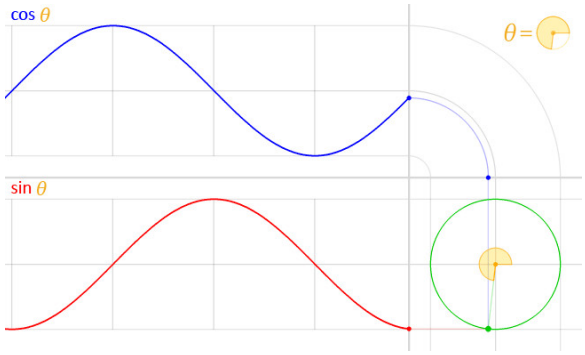

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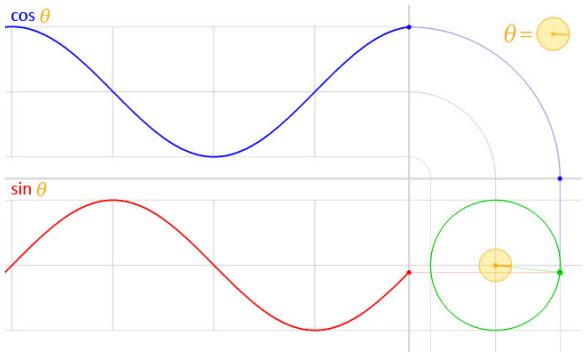


In completing the problems earlier in this packet, you probably used the Pythagorean Theorem:

Theorem (Pythagorean Theorem)**.** *For any right triangle with legs of lengths a and b and a hypotenuse of length c,*

$$a^2 + b^2 = c^2.$$

Problem 8. Let a line through the origin, making an angle of θ with the positive half of the x-axis, intersect the unit circle at point (x, y). Rephrase the Pythagorean Theorem as a statement about the right triangle formed by the points $(0, 0)$, (x, y), and $(x, 0)$ completely in terms of θ.

The equation you just derived is known as the **Pythagorean Identity**.

The Unit Circle: Sine and Cosine – Answer Key

Precalculus
Mr. Simmons

Read through this handout carefully and pause to think and respond when instructed.

Definition (UNIT CIRCLE)**.** The unit circle is the circle centered at $(0, 0)$ with a radius of 1.

Problem 1. Draw a diagram of the unit circle with a central angle of measure $\frac{\pi}{2}$. Label the point at which this angle's terminal side intersects the unit circle (x, y). Calculate x and y. That is, find their exact values.

Solution. Since the angle's terminal side intersects the unit circle at $(0, 1)$, there are hardly any calculations to be done: $x = 0$ and $y = 1$.

Problem 2. Draw a diagram of the unit circle with a central angle of measure $\frac{\pi}{4}$. Label the point at which this angle's terminal side intersects the unit circle (x, y). Calculate x and y. (Hint: draw a triangle with corners at $(0, 0)$, (x, y), and $(x, 0)$.)

Solution. Since x and y are the legs of a right triangle (the one hinted at), we can use the Pythagorean Theorem to get

$$x^2 + y^2 = 1^2,$$

since the hypotenuse of this triangle is the radius of the unit circle, which is 1. In a right triangle with one acute angle of $\frac{\pi}{4}$, we know the other acute angle is also $\frac{\pi}{4}$, since all three angles have to add up to π (180°). Since, then, $x = y$, we have

$$\begin{aligned} x^2 + x^2 &= 1 \\ 2x^2 &= 1 \\ x^2 &= \frac{1}{2} \\ x &= \sqrt{\frac{1}{2}} \\ &= \frac{1}{\sqrt{2}} \\ &= \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \\ &= \frac{\sqrt{2}}{2}, \end{aligned}$$

and since $x = y$, we then know $y = \frac{\sqrt{2}}{2}$ as well.

Problem 3. Draw a diagram of the unit circle with a central angle of measure $\frac{\pi}{6}$. Label the point at which this angle's terminal side intersects the unit circle (x, y). Calculate x and y. (Hint: after drawing a triangle with corners at $(0, 0)$, (x, y), and $(x, 0)$, draw that triangle's reflection across the x-axis as well.)

Solution. The triangle with corners at $(0, 0)$, (x, y), and $(x, -y)$ has an angle of $\frac{\pi}{3}$ $(60°)$, and the sides touching that angle each have length 1—so it's an equilateral triangle. Therefore the third side also has length 1. That is, the distance between (x, y) and $(x, -y)$ is 1, telling us that $y = \frac{1}{2}$.

What about x? Consider only the top half of that equilateral triangle. It is a right triangle, so we can use the Pythagorean Theorem as before to get

$$\begin{aligned} x^2 + y^2 &= 1 \\ x^2 + \left(\frac{1}{2}\right)^2 &= 1 \\ x^2 + \frac{1}{4} &= 1 \\ x^2 &= \frac{3}{4} \\ x &= \sqrt{\frac{3}{4}} \\ &= \frac{\sqrt{3}}{2}. \end{aligned}$$

For each of the preceding two problems, you were given (as an input) an angle measure θ, and you found (as outputs) a value x and a value y. Notice how I'm phrasing this in the language of functions. We can put θ through two different functions, one of which puts out a horizontal distance x—the horizontal leg of the right triangle with its hypotenuse going from the origin to (x, y)—the other of which puts out a vertical distance y—the vertical leg of that same right triangle.

Let's give names to each of these functions:

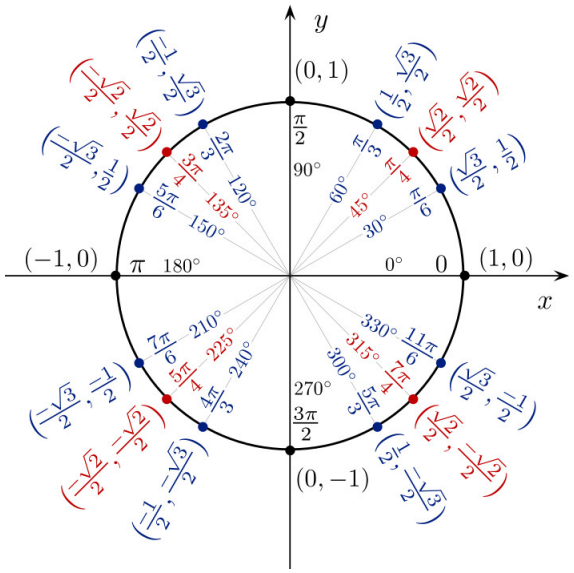
Definition (SINE AND COSINE—UNIT CIRCLE DEFINITION)**.** Let a line through the origin, making an angle of θ with the positive half of the x-axis, intersect the unit circle. The x- and y-coordinates of this point of intersection are equal to $\cos(\theta)$ and $\sin(\theta)$, respectively.

Exercise 4. Draw a diagram of the unit circle (in green pencil if you have one) and label the point $(\cos(\theta), \sin(\theta))$ for each of

$$\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{5\pi}{4}, \frac{4\pi}{3}, \frac{3\pi}{2}, \frac{5\pi}{3}, \frac{7\pi}{4}, \frac{11\pi}{6}.$$

For example, to label $(\cos(\theta), \sin(\theta))$ for $\theta = \frac{\pi}{2}$, you would plot the point $(0, 1)$ and label it "$(0, 1)$." You would *not* label it "$\left(\cos\left(\frac{\pi}{2}\right), \sin\left(\frac{\pi}{2}\right)\right)$."

Solution. Your diagram should look something like this (but with only the points labeled, not necessarily the angle measures):



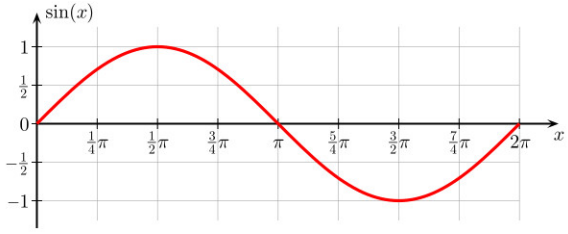
Exercise 5. Draw coodinate axes, label the horizontal axis θ, and label the vertical axis $\sin(\theta)$. On the $\sin(\theta)$-axis, draw and label tick marks at 1 and -1. On the θ-axis, draw and label tick marks at $\frac{\pi}{2}$, π, $\frac{3\pi}{2}$, and 2π. Plot (in red pencil if you have one) the point $(\theta, \sin(\theta))$ for each of

$$\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{5\pi}{4}, \frac{4\pi}{3}, \frac{3\pi}{2}, \frac{5\pi}{3}, \frac{7\pi}{4}, \frac{11\pi}{6}, 2\pi.$$

You needn't label each point.

Then connect the dots as smoothly as possible.

Solution. Your graph should look something like this (but with θ instead of x):



Exercise 6. Draw coodinate axes, label the horizontal one θ, and label the vertical one $\cos(\theta)$. On the $\sin(\theta)$-axis, draw and label tick marks at 1 and -1. On the θ-axis, draw and label tick marks at $\frac{\pi}{2}$, π, $\frac{3\pi}{2}$, and 2π. Plot (in blue pencil if you have one) the point $(\theta, \cos(\theta))$ for each of

$$\theta = 0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{5\pi}{4}, \frac{4\pi}{3}, \frac{3\pi}{2}, \frac{5\pi}{3}, \frac{7\pi}{4}, \frac{11\pi}{6}, 2\pi.$$

You needn't label each point.

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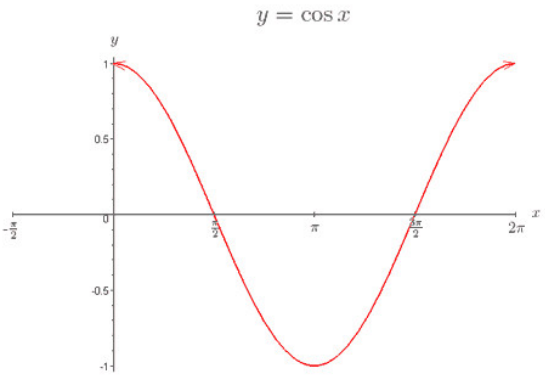

Exercise 7. If you are able, go to

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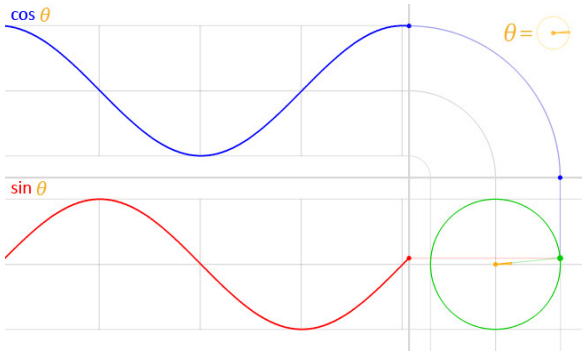
and observe the animation. Here are a few frames from the animation for those who are not able to view it:

1.



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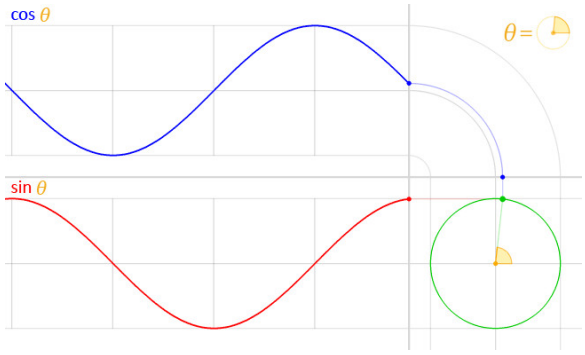

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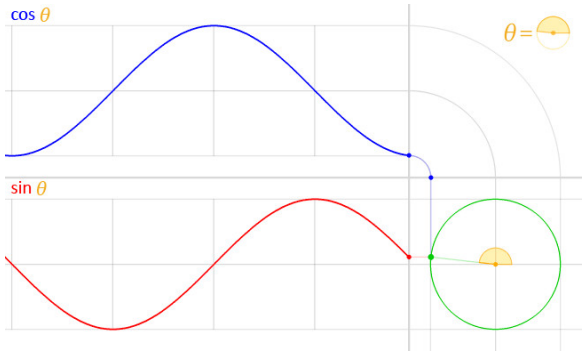

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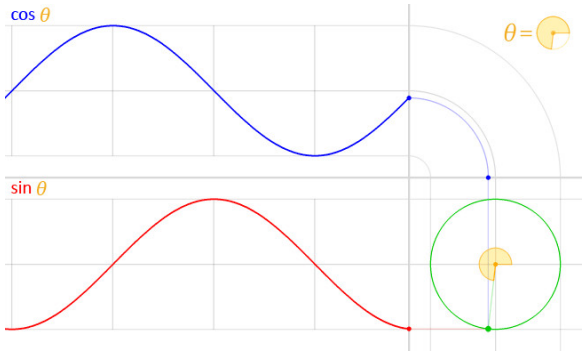

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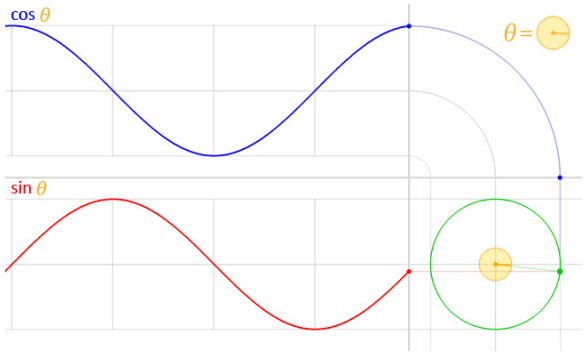

In completing the problems earlier in this packet, you probably used the Pythagorean Theorem:

Theorem (Pythagorean Theorem)**.** *For any right triangle with legs of lengths a and b and a hypotenuse of length c,*

$$a^2 + b^2 = c^2.$$

Problem 8. Let a line through the origin, making an angle of θ with the positive half of the x-axis, intersect the unit circle at point (x, y). Rephrase the Pythagorean Theorem as a statement about the right triangle formed by the points $(0, 0)$, (x, y), and $(x, 0)$ completely in terms of θ.

Solution.

Derivation. Since we have the right triangle with leg lengths x and y and hypotenuse 1 (the radius of the unit circle), the Pythagorean Theorem formula

$$a^2 + b^2 = c^2$$

becomes

$$x^2 + y^2 = 1^2,$$

but x and y can be rewritten in terms of θ using the trigonometric functions, since $x = \cos(\theta)$ and $y = \sin(\theta)$, so our final equation is

$$\sin^2(\theta) + \cos^2(\theta) = 1.$$

□

The equation you just derived is known as the **Pythagorean Identity**.

The Other Trigonometric Functions

Precalculus
Mr. Simmons

Read through this handout carefully and pause to think and respond when instructed.

Definition (TANGENT)**.** If θ is a real number and (x, y) is a point where the terminal side of a central angle of measure θ intersects the unit circle, then

$$\tan(\theta) = \frac{y}{x},$$

provided $x \neq 0$.

Exercise 1. The terminal side of a central angle of measure θ passes through the point $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ on the unit circle. Find $\sin\theta$, $\cos(\theta)$, and $\tan(\theta)$.

These values are all fractions. For convenience, mathematicians have defined three more trigonometric functions that are simply the reciprocals of the three we have convered. This helps get rid of ugly fractions. The reciprocal of sine is cosecant, the reciprocal of cosine is secant, and the reciprocal of tangent is cotangent.

Definition (COSECANT, SECANT, AND COTANGENT)**.** If θ is a real number and (x, y) is a point where the terminal side of a central angle of measure θ intersects the unit circle, then

$$\csc(\theta) = \frac{1}{y}, \text{ provided } (y \neq 0),$$

$$\sec(\theta) = \frac{1}{x}, \text{ provided } (x \neq 0),$$

and

$$\cot(\theta) = \frac{x}{y}, \text{ provided } (y \neq 0).$$

Exercise 2. The terminal side of a central angle of measure θ passes through the point $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ on the unit circle. Find $\csc\theta$, $\sec(\theta)$, and $\cot(\theta)$.

Exercise 3. Fill in the following chart:

Angle	0	$\frac{\pi}{6}$, or 30°	$\frac{\pi}{4}$, or 45°	$\frac{\pi}{3}$, or 60°	$\frac{\pi}{2}$, or 90°
Sine					
Cosine		$\frac{\sqrt{3}}{2}$			
Tangent			1		
Cosecant	Undefined			2	
Secant					
Cotangent					0

The Other Trigonometric Functions – Answer Key

Precalculus
Mr. Simmons

Read through this handout carefully and pause to think and respond when instructed.

Definition (TANGENT)**.** If θ is a real number and (x, y) is a point where the terminal side of a central angle of measure θ intersects the unit circle, then

$$\tan(\theta) = \frac{y}{x},$$

provided $x \neq 0$.

Exercise 1. The terminal side of a central angle of measure θ passes through the point $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ on the unit circle. Find $\sin\theta$, $\cos(\theta)$, and $\tan(\theta)$.

Solution. We have here

$$\sin(\theta) = y = \frac{1}{2},$$

$$\cos(\theta) = x = -\frac{\sqrt{3}}{2},$$

and

$$\tan(\theta) = \frac{y}{x} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{1}{2}\left(-\frac{2}{\sqrt{3}}\right) = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}.$$

These values are all fractions. For convenience, mathematicians have defined three more trigonometric functions that are simply the reciprocals of the three we have convered. This helps get rid of ugly fractions. The reciprocal of sine is cosecant, the reciprocal of cosine is secant, and the reciprocal of tangent is cotangent.

Definition (COSECANT, SECANT, AND COTANGENT)**.** If θ is a real number and (x, y) is a point where the terminal side of a central angle of measure θ intersects the unit circle, then

$$\csc(\theta) = \frac{1}{y}, \text{ provided } (y \neq 0),$$

$$\sec(\theta) = \frac{1}{x}, \text{ provided } (x \neq 0),$$

and

$$\cot(\theta) = \frac{x}{y}, \text{ provided } (y \neq 0).$$

Exercise 2. The terminal side of a central angle of measure θ passes through the point $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ on the unit circle. Find $\csc\theta$, $\sec(\theta)$, and $\cot(\theta)$.

Solution. We have here

$$\csc(\theta) = \frac{1}{y} = \frac{1}{\frac{1}{2}} = 2,$$

$$\sec(\theta) = \frac{1}{x} = \frac{1}{-\frac{\sqrt{3}}{2}} = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3},$$

and

$$\cot(\theta) = \frac{x}{y} = \frac{\frac{-\sqrt{3}}{2}}{\frac{1}{2}} = -\frac{\sqrt{3}}{2}\left(\frac{2}{1}\right) = -\sqrt{3}.$$

Exercise 3. Fill in the following chart:

Angle	0	$\frac{\pi}{6}$, or 30°	$\frac{\pi}{4}$, or 45°	$\frac{\pi}{3}$, or 60°	$\frac{\pi}{2}$, or 90°
Sine	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
Cosine	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{}}{}$	$\frac{1}{2}$	0
Tangent	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	Undefined
Cosecant	Undefined	2	$\sqrt{2}$	$\frac{2\sqrt{3}}{3}$	1
Secant	1	$\frac{2\sqrt{3}}{3}$	$\sqrt{2}$	2	Undefined
Cotangent	Undefined	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: Spanish III

Teacher(s): Ms. Barrera anna.barrera@greatheartsirving.org

Supplemental links: www.lingt.com/barreratumble www.spanishdict.com

Weekly Plan:

Monday, April 20

☐ Capítulo 5 - Trabajo y comunidad. Listen to job descriptions and respond.

☐ Capítulo 5 - Infer meaning unfamiliar words or phrases contextualized from a spanish speaker.

Tuesday, April 21

☐ Capítulo 5 - Trabajo y comunidad. Practice with the present perfect in combination with pronouns.

☐ Capítulo 5 - Responding to job interview questions.

Wednesday, April 22

☐ Capítulo 5 - Trabajo y comunidad. Learning and using regular and irregular past participles.

☐ Cap 5 - Applying the present tense of the verb haber (to have) with the appropriate past participle.

Thursday, April 23

☐ Capítulo 5 -Culture and History Readings.

☐ Capítulo 5 - Understand how history has influenced Hispanics and Cities in the United States

Friday, April 24

☐ Capítulo 5 - Continuation of the Readings from Thursday with different exercises.

☐ Capítulo 5 - Continuation of the Readings from Thursday with higher level critical thinking questions.

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____

Student Signature

_____

Parent Signature

Monday, April 20

Capítulo 5 - Trabajo y comunidad. Listen to job descriptions and respond. Infer meaning unfamiliar words or phrases contextualized from a spanish speaker.

I.**Activity 4** - p.216 - *Un trabajo perfecto.* You are going to listen to 4 sentences in lingt. (link provided for you) of job descriptions and decide whether it is a true statement or a false statement. Es verdad o No es verdad. Speak clearly and loud.

II. **Textbook** - p.218 **Activity 7**, *Consejos para escribir un trabajo.* Your friend is looking for a job. Give him advice, using the vocabulary from the word bank. Please write the entire 5 sentences filling in the space with the appropriate vocabulary.

Tuesday, April 21

Capítulo 5 - Trabajo y comunidad. Practice with the present perfect in combination with pronouns. Responding to job interview questions.

I.**Core Practice 5-5** - *Entrevista para un nuevo puesto*. Ms. Cadiz is interviewing several candidates for a position with her company. There are 8 sentences in which you will have to understand the vocabulary and what it is asking you. You will respond with the appropriate pronoun and the appropriate present perfect. For example: Reparo Ud. computadoras como las nuestras? In this question the direct object noun is computadoras so your pronoun will be "las". Also, in this question Ms. Cadiz is talking to you which is Ud. (formal) so the (I) responds with the present perfect. Answer: Muchas veces <u>las he reparado.</u>

Wednesday, April 22

Capítulo 5 - Trabajo y comunidad. Learning and using regular and irregular past participles. Applying the present tense of the verb haber (to have) with the appropriate past participle.

I.**Handout:** *The Past Participle; compound tenses.* **Exercise A**. Gladys leaves a note for her parents. Complete the note with the appropriate past participles of the verbs indicated.

II. **Exercise B**. You are planning to call the Spanish -speaking exchange student who is ill at home. Complete the questions you will ask with the past participle of the verbs indicated.

Thursday, April 23

Capítulo 5 Culture and History Readings. Understand how history has influenced Hispanics and Cities in the United States. - Read about the geography of Spain, its regions, foods, important cities and landscape. Comprehension of reading using multiple choice and choosing the appropriate word to complete the sentence. **Please write legibly and dark your answers on a loose-leaf piece of paper with your name and date.**

I. **Handout - Spanish Reading Comprehension**: Read pp. 387 and 388 - *La geografía de España* - **Exercise A**. Choose the appropriate vocabulary that corresponds from the B list. **Exercise B.** Choose the appropriate phrase in order to complete the sentence.

Friday, April 24

Capítulo 5 Culture and History Readings. Continuation of the readings of Spain. Understand how history has influenced Hispanics and Cities in the United States- Read about the geography of Spain, its regions, foods, important cities and landscape. Sentence comprehension and indicating whether the sentence is True or False (Cierto of Falso) and then rewriting the sentence to make it true according to the reading. Filling in the blank with the appropriate word from the reading to make the statement complete and true. **Please write legibly and dark your answers on a loose-leaf piece of paper with your name and date.**

I. Handout - Continuation of the Spanish Reading Comprehension from Thursday. *La geografía de España* - **Exercise C**. Read the sentences and then decide if the statement is true or false. If false, rewrite the sentence to make it true according to the reading. If the sentence is True rewrite the sentence anyway. Make sure you write (cierto o falso) next to the sentence so I know which sentences you rewrote. There should be 15 sentences. **Exercise D**. Fill in the blank with the appropriate word from the reading. Please write the entire sentence. There should be 15 sentences.

[1] THE PAST PARTICIPLE

a. Past Participles of Regular Verbs

The past participle of regular verbs is formed by dropping the infinitive ending and adding *-ado* or *-ido:*

INFINITIVE	PAST PARTICIPLE	MEANING
visitar	visit*ado*	*visited*
aprender	aprend*ido*	*learned*
vivir	viv*ido*	*lived*

b. Past Participles Ending in *-ído*

The past participles of *-er* and *-ir* verbs with stems ending in a vowel have an accent mark.

INFINITIVE	PAST PARTICIPLE	MEANING
caer	caído	*fallen*
creer	creído	*believed*
leer	leído	*read*
oír	oído	*heard*
reír	reído	*laughed*
traer	traído	*brought*

c. Irregular Past Participles Ending in *-to*

The following verbs have irregular past participles ending in *-to.*

INFINITIVE	PAST PARTICIPLE	MEANING
abrir	abier*to*	*opened*
cubrir	cubier*to*	*covered*
descubrir	descubier*to*	*discovered*
escribir	escri*to*	*written*
morir	muer*to*	*died*
poner	pues*to*	*put*
romper	ro*to*	*broken*
ver	vis*to*	*seen*
volver	vuel*to*	*returned*

The following verbs have irregular past participles ending in *-cho.*

INFINITIVE	PAST PARTICIPLE	MEANING
decir	di*cho*	*said*
hacer	he*cho*	*done, made*

EXERCISE A. **Gladys leaves a note for her parents. Complete the note with the appropriate past participles of the verbs indicated.**

Ricky yo yo hemos _____ (1. salir). Hemos _____ (2. decidir) ver una película y nos hemos _____ (3. ir) al cine. He _____ (4. dar) de comer al gato y ya lo ha _____ (5. comer) todo. Hemos _____ (6. seguir) todas sus instrucciones: hemos _____ (7. sacar) la basura, hemos _____ (8. apagar) todas las luces, hemos _____ (9. cerrar) las ventanas. He _____ (10. sacar) la carne del congelador y la he _____ (11. dejar) en la mesa de la cocina. También he _____ (12. barrer) el piso. Y no hemos _____ (13. romper) nada. ¡Hemos _____ (14. ser) muy buenos!

EXERCISE B. **You are planning to call the Spanish-speaking exchange student who is ill at home. Complete the questions you will ask with the past participle of the verbs indicated.**

1. ¿Has _____ la medicina? (*tomar*)
2. ¿Has _____ mucho jugo de naranja? (*beber*)
3. ¿Has _____ sopa de pollo? (*comer*)
4. ¿Has _____ en cama todo el día? (*permanecer*)
5. ¿Has _____ la siesta? (*dormir*)
6. ¿Has _____ con otros amigos? (*hablar*)
7. ¿Has _____ la tarea de matemáticas? (*recibir*)
8. ¿Ya has _____ la tarea? (*hacer*)
9. ¿Has _____ el periódico de hoy? (*leer*)
10. ¿Has _____ a ver al médico? (*volver*)
11. ¿Qué ha _____ el médico? (*decir*)
12. ¿Qué restricciones te ha _____ el médico? (*poner*)

[2] THE PRESENT PERFECT TENSE

a. The present perfect tense is formed by the present tense of the verb *haber* (to have) and a past participle.

yo	he	visitado/aprendido/vivido
tú	has	
él, ella, Ud.	ha	
nosotros, -as	hemos	
vosotros, -as	habéis	
ellos, ellas, Uds.	han	

Nombre _____ Hora _____

Capítulo 5

Fecha _____ Core Practice **5-5**

Entrevista para un nuevo puesto

La Sra. Cádiz está entrevistando gente para unos puestos en su compañía. Escribe las respuestas usando el presente perfecto y los pronombres apropiados.

Modelo ¿Reparó Ud. computadoras como las nuestras?
Muchas veces *las he reparado.*

1. ¿Se llevaron bien Ud. y su gerente?

   Siempre _____

2. ¿Repartió Ud. paquetes antes?

   Sí, _____

3. ¿Atendió Ud. a los clientes de su compañía?

   Muchas veces _____

4. ¿Tuvo Ud. beneficios en su trabajo?

   Siempre _____

5. ¿Solicitó Ud. empleo antes?

   Nunca _____

6. ¿Escribió Ud. anuncios clasificados?

   Muchas veces _____

7. ¿Fue Ud. mensajero antes?

   No, nunca _____

8. ¿Llenó Ud. la solicitud de empleo?

   Sí, ya _____

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Nombre _____ Hora _____

Capítulo 5 Fecha _____ Core Practice **5-5**

Entrevista para un nuevo puesto

La Sra. Cádiz está entrevistando gente para unos puestos en su compañía. Escribe las respuestas usando el presente perfecto y los pronombres apropiados.

Modelo ¿Reparó Ud. computadoras como las nuestras?
Muchas veces *las he reparado.*

1. ¿Se llevaron bien Ud. y su gerente?
   Siempre *nos hemos llevado bien.*
2. ¿Repartió Ud. paquetes antes?
   Sí, *los he repartido antes.*
3. ¿Atendió Ud. a los clientes de su compañía?
   Muchas veces *los he atendido.*
4. ¿Tuvo Ud. beneficios en su trabajo?
   Siempre *los he tenido.*
5. ¿Solicitó Ud. empleo antes?
   Nunca *lo he solicitado.*
6. ¿Escribió Ud. anuncios clasificados?
   Muchas veces *los he escrito.*
7. ¿Fue Ud. mensajero antes?
   No, nunca *lo he sido.*
8. ¿Llenó Ud. la solicitud de empleo?
   Sí, ya *la he llenado.*

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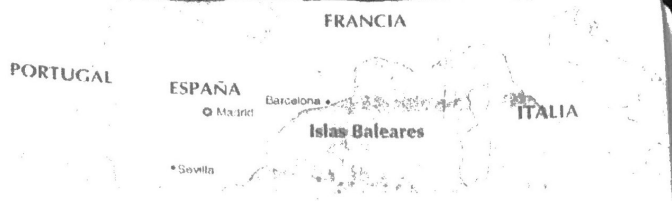
ESPAÑA
MAR CANTÁBRICO
FRANCIA
Gijón
Cuevas de Altamira
Santander
Bilbao
La Coruña
Oviedo
ASTURIAS
CANTABRIA
PAÍS VASCO
San Sebastián
PIRINEOS
ANDORRA
Santiago de Compostela
MONTES CANTÁBRICOS
Pamplona
NAVARRA
GALICIA
León
Burgos
Logroño
LA RIOJA
ARAGÓN
Vigo
CASTILLA Y LEÓN
Valladolid
Río Ebro
CATALUÑA
Barcelona
Zaragoza
Río Duero
SIERRA DE GUADARRAMA
Segovia
Salamanca
El Escorial
Madrid
OCÉANO ATLÁNTICO
MADRID
Menorca
Mallorca
Palma
PORTUGAL
Río Tajo
Toledo
CASTILLA - LA MANCHA
Valencia
ISLAS BALEARES
EXTREMADURA
LA MANCHA
Ibiza
Lisboa
Mérida
Badajoz
Río Guadiana
Almadén
VALENCIA
Alicante
SIERRA MORENA
Río Guadalquivir
Murcia
MAR MEDITERRÁNEO
Minas de Riotinto
Córdoba
MURCIA
Cartagena
Sevilla
ANDALUCÍA
Palos
Granada
SIERRA NEVADA
Mulhacén
Málaga
Cádiz
Torremolinos
Gibraltar
Ceuta
Melilla
ISLAS CANARIAS
Lanzarote
La Palma
Tenerife
Las Palmas
Gomera
Fuerteventura
Hierro
Gran Canaria
100 M
MARRUECOS
ÁFRICA DEL NORTE
0
100 millas
0
200 kilómetros
▲ Volcán o pico

Chapter 35
La geografía de España



LOCALIZACIÓN DE ESPAÑA

España está situada en el sudoeste de Europa. Ocupa el 80 por ciento de la Península Ibérica, que comparte con Portugal.

EXTENSIÓN Y POBLACIÓN

Su extensión es de unas 200 millas cuadradas, (cuatro veces más grande que la del estado de Nueva York). Tiene una población de unos 40.000.000 de habitantes.

MONTAÑAS

España es un país muy montañoso.

1. Los Montes Pirineos están en el nordeste y marcan la frontera entre España y Francia.
2. La Cordillera Cantábrica está en el noroeste.
3. La Sierra de Guadarrama está en el centro, cerca de Madrid.
4. La Sierra Nevada y la Sierra Morena están en el sur.

RÍOS

1. El Ebro, en el nordeste, desemboca en el Mar Mediterráneo.
2. El Tajo, en la región central, es el río más largo. Pasa por la ciudad de Toledo.
3. El Guadalquivir, en el sur, es el río más profundo y navegable de España. Pasa por las ciudades de Sevilla y Córdoba.

INDUSTRIAS Y PRODUCTOS PRINCIPALES

1. España es un país agrícola e industrial.
2. Los productos principales agrícolas son aceitunas, naranjas, uvas, trigo, limones y corcho.
3. España ocupa el tercer lugar mundial en la producción de vinos de Europa. Los centros principales de la producción de vinos son Málaga y Jerez.
4. España es uno de los productores principales del aceite de oliva del mundo.
5. Sus recursos minerales incluyen carbón, hierro, mercurio, plomo y cobre.

REGIONES

España está dividida en quince regiones:

Cantabria, en el norte.
Galicia, en el noroeste.
Asturias, en el norte al este de Galicia.
el País Vasco, en el norte, con frontera en los Pirineos.
Navarra, en el norte.
Aragón, en el nordeste, al este de Navarra.
Cataluña, en el nordeste.
La Rioja, en el centro al sur de Navarra.
Castilla y León, en el noroeste-centro.
Castilla-La Mancha, en el centro, al sur de Castilla y León.
Madrid, en el centro, al norte de Castilla-La Mancha.
Valencia, en el este.
Extremadura, en el norte, entre Portugal y Castilla-La Mancha.
Murcia, en el sudeste.
Andalucía, en el sur.

POSESIONES ULTRAMARINAS

1. **Las Islas Baleares** están en el Mar Mediterráneo. Mallorca es la isla más grande del grupo.
2. **Las Islas Canarias** están en el Océano Atlántico, cerca de la costa noroeste de Africa.
3. **Ceuta y Melilla** son dos puertos de Marruecos, África.

IDIOMAS

1. El **español** (también llamado el castellano) es el idioma principal de España.
2. El **gallego** es un dialecto que se habla en Galicia.
3. El **catalán** es la lengua de Cataluña.
4. El **vascuence** es la lengua de los vascos, que viven en el País Vasco.

CIUDADES IMPORTANTES

Madrid es la capital y la ciudad más grande de España. Tiene una población de unos 4.500.000 de habitantes. Entre los lugares de mayor interés de Madrid y sus alrededores se encuentran:

1. **El Retiro** es un parque famoso.
2. **La Puerta del Sol** es la plaza principal de Madrid. De allí se extienden muchas calles que conducen a todas partes de la ciudad.

3. **El Museo del Prado** es un museo de bellas artes de fama mundial.
4. **El Escorial** está situado cerca de Madrid. Es un edificio enorme que tiene un monasterio, un palacio, una biblioteca y un mausoleo para reyes españoles. Fue construído por orden del rey Felipe II entre 1563 y 1584.
5. **El Valle de los Caídos** también está situado cerca de Madrid. Es un monumento grandísimo dedicado a la memoria de los soldados que murieron en la Guerra Civil española (1936-1939). El dictador Francisco Franco está enterrado allí.

Barcelona, en la región de Cataluña, es el puerto principal y la ciudad más industrial de España. Tiene unos 4.000.000 de habitantes. Cerca de la ciudad está el famoso Monasterio de Montserrat.

Sevilla, en la región de Andalucía, es la ciudad más pintoresca y romántica. Está situada a orillas del río Guadalquivir. Entre sus lugares de interés se encuentran:

a. ***La Catedral de Sevilla,*** la catedral más grande de España.
b. ***La Giralda,*** una torre de la catedral, es un admirable ejemplo de la arquitectura árabe.
c. ***El Alcázar*** que es un famoso palacio moro.

Valencia es la ciudad principal de la región del mismo nombre. Esta región se llama «la huerta de España» y es famosa por las naranjas que produce.

Bilbao, en el norte, es famosa por su producción de hierro y acero. Tiene el apodo de «el Pittsburgh de España».

Toledo es una antigua ciudad situada en el Río Tajo. Es famosa por sus productos de acero y de metales preciosos. También es conocida por ser la casa del pintor famoso El Greco. Muchas de sus pinturas se exhiben allí.

Granada, en la región de Andalucía, tiene la famosa Alhambra, y también otro palacio moro, el Generalife. Granada fue la última posesión de los moros en España. La volvieron a ganar los cristianos en 1492.

Córdoba, también en Andalucía y situada en el Río Guadalquivir, tiene la famosa **Mezquita** (Mosque), un antiguo templo de la época de los moros, que fue convertido en una catedral católica en 1238. Durante los siglos X y XI Córdoba fue la capital mora de España y uno de los centros culturales de Europa.

Burgos, que se encuentra en Castilla y León, es la ciudad natal del Cid, el héroe nacional de España. Su tumba está en la Catedral de Burgos.

Salamanca es famosa por su universidad. Establecida en el siglo XIII, la **Universidad de Salamanca** es la más antigua de España y una de las más prestigiosas de Europa.

Segovia es una antigua ciudad situada en la parte central de España. Es famosa por el acueducto romano, construido bajo el emperador romano Trajano (A.D. 53-117). El acueducto funciona aun hoy en día.

EXERCISE A. **A la izquierda de cada expresión de la columna A, escriba la letra de la expresión correspondiente de la lista B.**

A	B
_____ *1.* la Península Ibérica	*a.* lengua hablada en Cataluña
_____ *2.* la Sierra de Guadarrama	*b.* río más navegable
_____ *3.* la Puerta del Sol	*c.* construido por orden de Felipe II
_____ *4.* el Tajo	*d.* las Islas Baleares
_____ *5.* Córdoba	*e.* el Cid
_____ *6.* el catalán	*f.* España y Portugal
_____ *7.* Málaga	*g.* región situada en el sur
_____ *8.* El Escorial	*h.* Sevilla
_____ *9.* los Pirineos	*i.* el río más largo
_____ *10.* el Guadalquivir	*j.* centro de la producción de vinos
_____ *11.* Andalucía	*k.* plaza principal de Madrid
_____ *12.* Burgos	*l.* cerca de Madrid
_____ *13.* Mallorca	*m.* puerto de Marruecos
_____ *14.* Cueta	*n* la Mezquita
_____ *15.* La Giralda	*o.* frontera entre España y Francia

EXERCISE B. **Escoja las frases que completen correctamente las oraciones.**

1. La frontera que separa a España de Francia es (la Sierra de Guadarrama, la Sierra Nevada, los Pirineos).

_____

2. España está situada en la parte (sudoeste, nordeste, central) de Europa.

_____

3. Una región del norte de España es (Valencia, Extremadura, Galicia).

_____

4. En (Madrid, Segovia, Valencia) se encuentra un acueducto romano.

_____

5. Andalucía es (una ciudad, un río, una región) de España.

_____

6. Las ciudades de Jerez y Málaga son famosas por sus (aceitunas, vinos, naranjas).

_____

7. (El Generalife, El Escorial, La Mezquita) es un palacio moro.

_____

8. Mallorca es una de (las Islas Baleares, las Islas Canarias, los Cantábricos).

9. La población de España es aproximadamente (40.000.000, 25.000.000, 37.000.000) de habitantes.

10. La catedral más grande de España se encuentra en (Madrid, Burgos, Sevilla).

11. Un dialecto que se habla en Galicia es el (vascuence, catalán, gallego).

12. Salamanca es famosa por su (catedral, universidad, acueducto).

13. Los recursos minerales de España incluyen el (estaño, mercurio, oro).

14. El río más navegable de España es el (Guadalquivir, Tajo, Ebro).

15. El Greco se relaciona con la ciudad de (Burgos, Córdoba, Toledo).

EXERCISE C. **Indique si cada frase es cierta o falsa. Si es falsa, cámbiela para hacerla cierta.**

1. El río Tajo desemboca en el Mar Mediterráneo.

2. La Cordillera Cantábrica marca la frontera entre España y Francia.

3. El Cid, el héroe nacional, nació en la ciudad de Toledo.

4. España tiene una población de más de cuarenta millones de habitantes.

5. El tabaco es un producto principal agrícola de España.

6. La Universidad de Salamanca se estableció en el siglo XIII.

7. Jerez y Málaga son los centros de la producción de vinos.

8. Galicia está en el noroeste del país.

9. Barcelona es el puerto principal de España.
_____

10. Hay veinte regiones tradicionales en España.
_____

11. El vascuence es el idioma principal de España.
_____

12. La Giralda era un templo antiguo de la época de los moros.
_____

13. Las Islas Canarias están en el Mar Mediterráneo.
_____

14. España es un productor principal de jugo de naranja del mundo.
_____

15. Bilbao es la ciudad conocida por su producción de hierro y acero.
_____

EXERCISE D. Complete las frases siguientes.

1. El gallego es el idioma de _____ .
2. En _____ , hay dos ciudades españolas en la costa de Marruecos.
3. Los vascos hablan _____ además del español.
4. Los Pirineos separan a España de _____ .
5. El río más navegable de España es el _____ .
6. Un famoso palacio moro de Sevilla es _____ .
7. El monasterio de Montserrat se encuentra cerca de la ciudad de _____ .
8. La región central de España se llama _____ .
9. El río más grande de España es el _____ .
10. España ocupa la mayor parte de la _____ .
11. La última posesión de los moros en España fue _____ .
12. Durante los siglos X y XI _____ fue la capital mora de España.
13. Dos posesiones ultramarinas de España son _____ y _____ .
14. Dos riquezas mineras de España son _____ y _____ .
15. El museo famoso de Madrid es _____ .