# Week 10 Pre-Calc Assignment:

Day 1: Chapter 3 test
Day 2: pp. 269-72 #1-61 odd
Day 3: pp. 269-72 #63-89 odd, 97, 111-131 odd
Day 4: pp. 287-90 #1-41 odd
Day 5: pp. 287-90 #43-65 odd, 81-85 odd

## Notes on Assignment:

### Chapter 3 test:

For the test:

- Describe rigid transformation shifts
- Use a calculator to find the value of logarithmic and exponential expressions.
- Write a logarithmic equation in exponential form.
- Write an exponential equation in logarithmic form.
- Graph logarithmic and exponential functions, listing intercepts, asymptotes, and the domain.
- Use the change of base formula to find the value of logarithms.
- Expand and condense logarithmic expressions using the properties of logarithms.
- Solve logarithmic and exponential equations algebraically.
- Solve logarithmic and exponential equations using a graphing calculator (graph each side separately and look for the intersection of the 2 graphs.)
- Solve application problems, given the formula.

### Pages 269-272:

#1-5: Remember that 1 radian = 180°/π ≈ 57.3°. That is almost 2/3 of a quadrant.

#7-11: Remember that the upper right quadrant is I, the upper left is II, the lower left is III and the lower right is IV.

| | |
|---|---|
| II | I |
| III | IV |

#11: The angle measures do not have π in them. You either need to change them to degrees by multiplying by 180/π, or look at π/2, π, and 3π/2, on your graph and evaluate them. For example, π/2 ≈1.57, so any angle from 0 to 1.57 is in the 1st quadrant.

#13-15: Remember that if the angle is positive, the rotation is counterclockwise. If it is negative, the rotation is negative.

#17-19: To find a positive coterminal angle, you need to add a complete rotation to the angle. (You can also add more than one rotation if you like.) A complete rotation is $2\pi$. To find a negative coterminal angle, you need to subtract at least one rotation from your angle. Again, a complete rotation is $2\pi$.

#21: Complements must add to $\pi/2$ and supplements must add to $\pi$.

#23: From #11 we know that $\pi/2 \approx 1.57$, so complementary angles must add to give 1.57. Since $\pi \approx 3.14$, supplementary angles must add to give 3.14.

#25-47: Use the conversion formulas on page 266.

#55-57: Refer to #7-11 above.

#59-61: Remember that if the angle is positive, the rotation is counterclockwise. If it is negative, the rotation is negative.

#63-65: To find a positive coterminal angle, you need to add a complete rotation to the angle. (You can also add more than one rotation if you like.) A complete rotation is 360°. To find a negative coterminal angle, you need to subtract at least one rotation from your angle. Again, a complete rotation is 360°.

#67-69: Complements must add to 90° and supplements must add to 180°.

#71-73: Make sure your calculator [MODE] is set to Degrees. Enter the angle measure using the [ANGLE] menu for degrees and minutes, and [ALPHA] [ + ] for the seconds. Press [MATH] [►Dec] [ENTER] to change the angle to decimal degrees.

#75-77: Make sure your calculator [MODE] is set to Degrees. Enter the angle measure. Press [ANGLE] [►DMS] [ENTER] to change to degrees, minutes, and seconds.

#79-85: Remember that to find the radian measure of the central angle, we need to take the arc length and see how many times the radius r will go into it. In other words the formula is $\theta = s/r$.

#87-89: If we manipulate the formula $\theta = s/r$ by multiplying both sides by r, we get $s = r\,\theta$. Use this formula to find s (the length of the intercepted arc.)

#97: For this problem, the radius is 6 cm and the intercepted arc is 2.5 cm. Use $\theta = s/r$ to find the angle.

## Pages 287-290:

#1-3: Find the 3rd side using the Pythagorean Theorem. Then refer to the Right Triangle Definitions of Trig Functions on page 280 to find the 6 trig functions for each angle.

#5-7: Do these the same as #1-3. As for the explanation, think of ratios and equivalent fractions.

#9: Since the $\sin\theta = \frac{3}{4} = \frac{opp}{hyp}$ we can set the opposite side = 3 and the hypotenuse = 4 on the triangle we draw. Find the 3rd side using the Pythagorean Theorem.

#11: If the sec θ = 2, then we must have cos θ = ½ since secant and cosine are reciprocals of each other. So set the adjacent side = 1 and the hypotenuse = 2 on your triangle.

#13-15: Do these using the same procedure as #9-11.

#17a): $\tan\theta = \frac{\sin\theta}{\cos\theta}$ so $\tan 60° = \frac{\sin 60°}{\cos 60°} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}$. Simplify this complex fraction.

#17b&c): Since 30° and 60° are complementary, we know that the sine of one equals the cosine of the other.

#17d): Cotangent and tangent are reciprocals.

#19a): Cosecant and sine are reciprocals

#19d): This is asking for the secant of the complement of θ, which is equal to the cosecant of θ, which we know. (ie. use sec (90°-θ) = csc θ.)

#23-25: If you haven't memorized these yet, DO IT!!! (o: You can also use the chart on p. 282 if you need to.

#29b): Use [SIN] (16.35) [$x^{-1}$] [ENTER] to find the cosecant.

#37-41: This is asking you to do this from memory. If you have memorized that the sin 30°= ½, then you will know that the answer to #37a) is θ = 30° or π/6. If you haven't memorized them yet, DO IT!!! (o: You can also use the chart on p. 282 if you need to.

#39a): You might not know what angle has a secant of 2, but you do know that secant and cosine are reciprocals. So, if the secant = 2, then the cosine must = 1/2, and you should know what angle gives you a cosine of ½.

#43a): Make sure your calculator is in degree mode. Use [2nd ] [SIN] (0.0145) [ENTER]. This will give you the angle in decimal degrees. You then need to change that to radian measure by multiplying the degrees by π/180.

#45: Do the same as #43.

#47-55: To do these, start with the more complicated side. Then apply any of the definitions or identities on p. 280 and 283 to see if you can make it look like the other side. For example, on number 47, we know that the cot θ =$\frac{1}{\tan\theta}$. Then

$$\tan\theta\cot\theta = \tan\theta\left(\frac{1}{\tan\theta}\right) = \frac{\tan\theta}{\tan\theta} = 1$$

#49: Hint: Change tan θ to $\frac{\sin\theta}{\cos\theta}$.

#51: Hint: Multiply the left side using FOIL. After that, replace the "1" with what "1" equals according to the Pythagorean Identity.

#53: Do this similarly to #51 but use the Pythagorean Identity that involves the secant and tangent.

#55: Sometimes it's necessary to work with both sides and see if you can somehow "meet in the middle." On the left, treat this as a rational equation. In other words, get a common denominator on the left and add those 2 fractions. To do this, multiply the first fraction by $\frac{\sin\theta}{\sin\theta}$ and the second fraction by $\frac{\cos\theta}{\cos\theta}$ . On the left side, change cosecant and secant to their reciprocal functions (ie $\csc\theta = \frac{1}{\sin\theta}$ and $\sec\theta = \frac{1}{\cos\theta}$.

#57-59: Decide which trig function matches the "pieces you are given." Then write the trig function, fill in the information from the triangle, and solve for x.

#61a): The person's own shadow is not part of the problem. You just need to know that he stops when he is 3 feet from the tip of the tower's shadow.

#61b&c): Do these as one problem. You are basically supposed to find the height of the tower. This is similar to the example we did in class. Refer to that problem if needed.

#63d): How does the change in the angle affect the height of your triangle?

#63e): You need to solve the right triangle for each of these angles.

#65: Use the diagram to come up with your equation.