

# Pre-Calculus Review Packet

3/30-4/10

Mrs. Garcia and Mr. Reaves

Look for dates and times to go over this packet on the class website:

Mrs. Garcia:

<https://www.leonschools.net/Page/21703#calendar32695/20200325/month>

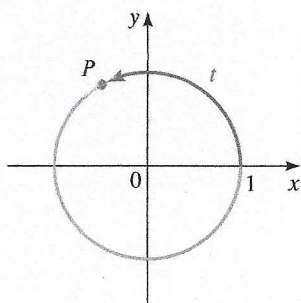
Mr. Reaves:

<https://www.leonschools.net/Page/27754#calendar32521/20200325/month>

You will not be asked to complete all of the problems in this packet. Look at the calendar on the class website to see which problems you need to complete.

We will be using Microsoft Teams, please take some time to get familiar with this. You can find a link to Microsoft Teams in your ClassLink account.

## 5 Test



- The point  $P(x, y)$  is on the unit circle in quadrant IV. If  $x = \sqrt{11}/6$ , find  $y$ .
- The point  $P$  in the figure at the left has  $y$ -coordinate  $\frac{4}{5}$ . Find:
  - $\sin t$
  - $\cos t$
  - $\tan t$
  - $\sec t$
- Find the exact value.
  - $\sin \frac{7\pi}{6}$
  - $\cos \frac{13\pi}{4}$
  - $\tan\left(-\frac{5\pi}{3}\right)$
  - $\csc \frac{3\pi}{2}$
- Express  $\tan t$  in terms of  $\sin t$ , if the terminal point determined by  $t$  is in quadrant II.
- If  $\cos t = -\frac{8}{17}$  and if the terminal point determined by  $t$  is in quadrant III, find  $\tan t \cot t + \csc t$ .

**6–7** ■ A trigonometric function is given.

- Find the amplitude, period, and phase shift of the function.
- Sketch the graph.

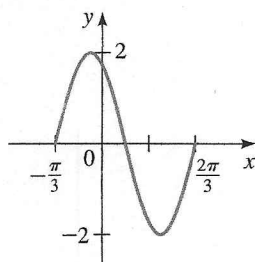
6.  $y = -5 \cos 4x$

7.  $y = 2 \sin\left(\frac{1}{2}x - \frac{\pi}{6}\right)$


**8–9** ■ Find the period, and graph the function.

8.  $y = -\csc 2x$

9.  $y = \tan\left(2x - \frac{\pi}{2}\right)$



- 10.** The graph shown at left is one period of a function of the form  $y = a \sin k(x - b)$ . Determine the function.


 **11.** Let  $f(x) = \frac{\cos x}{1 + x^2}$ .

- Use a graphing device to graph  $f$  in an appropriate viewing rectangle.
- Determine from the graph if  $f$  is even, odd, or neither.
- Find the minimum and maximum values of  $f$ .

- 12.** A mass suspended from a spring oscillates in simple harmonic motion. The mass completes 2 cycles every second and the distance between the highest point and the lowest point of the oscillation is 10 cm. Find an equation of the form  $y = a \sin \omega t$  that gives the distance of the mass from its rest position as a function of time.

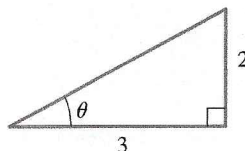
- 13.** An object is moving up and down in damped harmonic motion. Its displacement at time  $t = 0$  is 16 in; this is its maximum displacement. The damping constant is  $c = 0.1$  and the frequency is 12 Hz.

- Find a function that models this motion.

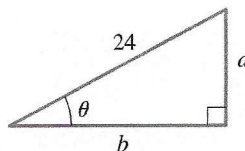
- 
  - Graph the function.

## 6 Test

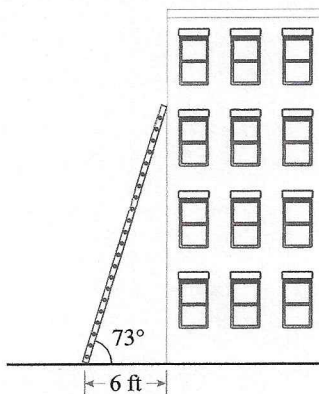
- Find the radian measures that correspond to the degree measures  $330^\circ$  and  $-135^\circ$ .
- Find the degree measures that correspond to the radian measures  $\frac{4\pi}{3}$  and  $-1.3$ .
- The rotor blades of a helicopter are 16 ft long and are rotating at 120 rpm.
  - Find the angular speed of the rotor.
  - Find the linear speed of a point on the tip of a blade.
- Find the exact value of each of the following.
  - $\sin 405^\circ$
  - $\tan(-150^\circ)$
  - $\sec \frac{5\pi}{3}$
  - $\csc \frac{5\pi}{2}$
- Find  $\tan \theta + \sin \theta$  for the angle  $\theta$  shown.



- Express the lengths  $a$  and  $b$  shown in the figure in terms of  $\theta$ .



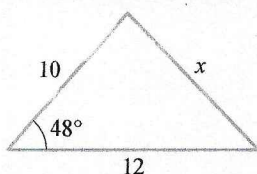
- If  $\cos \theta = -\frac{1}{3}$  and  $\theta$  is in quadrant III, find  $\tan \theta \cot \theta + \csc \theta$ .
- If  $\sin \theta = \frac{5}{13}$  and  $\tan \theta = -\frac{5}{12}$ , find  $\sec \theta$ .
- Express  $\tan \theta$  in terms of  $\sec \theta$  for  $\theta$  in quadrant II.
- The base of the ladder in the figure is 6 ft from the building, and the angle formed by the ladder and the ground is  $73^\circ$ . How high up the building does the ladder touch?



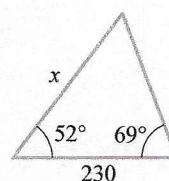


11–14 ■ Find the side labeled  $x$ .

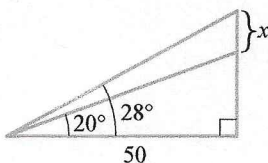
11.



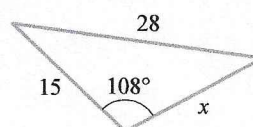
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13.

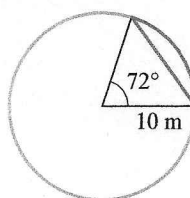


14.



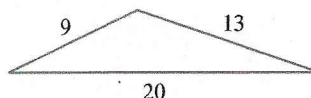
15. Refer to the figure below.

- Find the area of the shaded region.
- Find the perimeter of the shaded region.

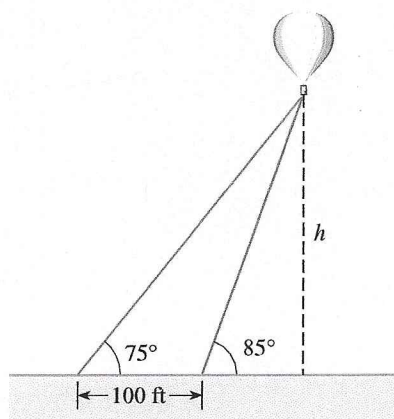


16. Refer to the figure below.

- Find the angle opposite the longest side.
- Find the area of the triangle.



17. Two wires tether a balloon to the ground, as shown. How high is the balloon above the ground?



# 7 Test

1. Verify each identity.

(a)  $\tan \theta \sin \theta + \cos \theta = \sec \theta$

(b)  $\frac{\tan x}{1 - \cos x} = \csc x (1 + \sec x)$

(c)  $\frac{2 \tan x}{1 + \tan^2 x} = \sin 2x$

2. Let  $x = 2 \sin \theta$ ,  $-\pi/2 < \theta < \pi/2$ . Simplify the expression

$$\frac{x}{\sqrt{4 - x^2}}$$

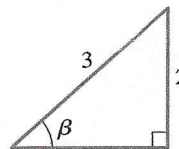
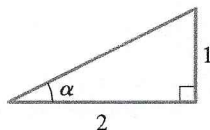
3. Find the exact value of each expression.

(a)  $\sin 8^\circ \cos 22^\circ + \cos 8^\circ \sin 22^\circ$

(b)  $\sin 75^\circ$

(c)  $\sin \frac{\pi}{12}$

4. For the angles  $\alpha$  and  $\beta$  in the figures, find  $\cos(\alpha + \beta)$ .



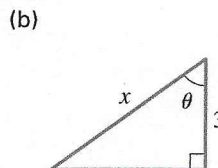
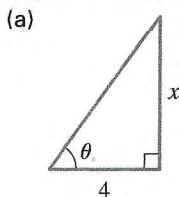
5. (a) Write  $\sin 3x \cos 5x$  as a sum of trigonometric functions.

(b) Write  $\sin 2x - \sin 5x$  as a product of trigonometric functions.

6. If  $\sin \theta = -\frac{4}{5}$  and  $\theta$  is in quadrant III, find  $\tan(\theta/2)$ .

7. Graph  $y = \sin x$  and  $y = \sin^{-1} x$ , and specify the domain of each function.

8. Express  $\theta$  in each figure in terms of  $x$ .



9. Solve each trigonometric equation in the interval  $[0, 2\pi)$ .

(a)  $2 \cos^2 x + 5 \cos x + 2 = 0$

(b)  $\sin 2x - \cos x = 0$

10. Find all solutions in the interval  $[0, 2\pi)$ , correct to five decimal places:

$$5 \cos 2x = 2$$

11. Find the exact value of  $\cos(\tan^{-1} \frac{9}{40})$ .

Use half angle identities to find the exact value:

1.  $\sin 75^\circ$

2.  $\cos \frac{\pi}{8}$

3.  $\cos 150^\circ$

4.  $\sin \frac{7}{12}\pi$

Use the given information to find the exact value of  $\sin 2x$ ,  $\cos 2x$  and  $\tan 2x$ .

5.  $\sin x = \frac{12}{13}$   $90 < x < 180$

6.  $\cos x = \frac{4}{5}$   $0 < x < \frac{\pi}{2}$

7.  $\tan x = \frac{8}{15}$   $0 < x < 90$

Use the given information to find exact values of  $\sin \frac{x}{2}$ ,  $\cos \frac{x}{2}$ ,  $\tan \frac{x}{2}$ .

8.  $\cos x = \frac{3}{5}$   $0 < x < 90$

9.  $\cos x = \frac{-2}{3}$   $90 < x < 180$

10.  $\csc x = \frac{17}{8}$   $\frac{\pi}{2} < x < \pi$

Find the exact value of the expressions given that  $\sec x = \frac{3}{2}$ ,  $\csc y = 3$  and  $x$  and  $y$  are in the 1<sup>st</sup> quadrant.

11.  $\sin(x + y)$

12.  $\cos(x - y)$

13.  $\tan(x + y)$

14.  $\sin 2x$

15.  $\cos \frac{y}{2}$

16.  $\tan \frac{y}{2}$