Name: _____ Period: _____

PC Second Semester Review

Show your work in each problem below – your work is part of your answer. Always simplify when possible.	**Exact Answer:** $3\sqrt{5}$ (Simplified)	**Approximate Answer:** 6.71 (round)

1. Determine the exact value of the function below.

Exact Answer. $sin^{-1}(-\frac{1}{2})$

2. Determine the exact value of the function below.

Exact Answer. $cos^{-1}\left(\sin\left(\frac{7\pi}{6}\right)\right)$

3. In which quadrants does $sin^{-1}(x)$ exist? Draw a picture to illustrate this fact.

4. In which quadrants does $cos^{-1}(x)$ exist? Draw a picture to illustrate this fact.

5. In which quadrants does $tan^{-1}(x)$ exist? Draw a picture to illustrate this fact.

6. Graph one cycle of the function below.

$$y = 4cos\left(x + \frac{\pi}{2}\right) - 1$$

7. Graph one cycle of the function below.

$$y = -3\sin\left(\frac{1}{3}x\right) + 1$$

8. Use a graph to determine the zeros on the interval $[0,2\pi]$. **Exact Answer.**

$$y = -48\cos\left(x + \frac{\pi}{13}\right)$$

9. Given $\tan\theta = -\frac{2}{7}$ and $\sin\theta > 0$. **Exact Answer.**

a) Draw a reference triangle

b) Find the value of all six trig functions.

$\sin\theta$ =	$\csc\theta$ =
$\cos\theta$ =	$\sec\theta$ =
$\tan\theta$ =	$\cot\theta$ =

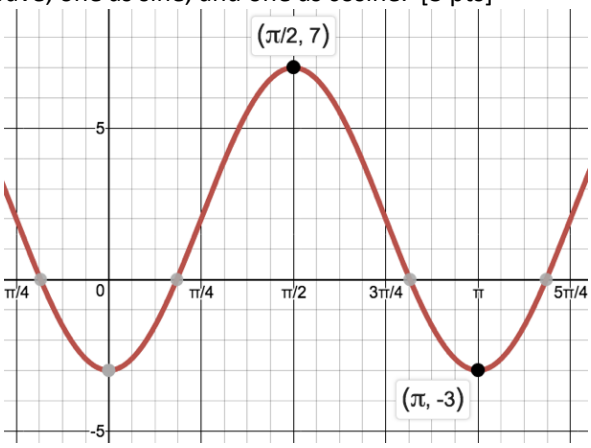
10. Determine the **exact** value of the function below.

$$csc\left(tan^{-1}\left(-\frac{12}{5}\right)\right)$$

11. Graph once cycle of the function below.

$$y = -4\cos\left(\frac{1}{2}(x-\pi)\right) + 2$$

12. Given the graph, write two possible equations that match the wave, one as sine, and one as cosine. [3 pts]



13. Find an equation of a <u>negative</u> <u>cosine</u> function with amplitude=2, period=6π, passing through the point$\left(\frac{11\pi}{5}, -3\right)$.

Establish the identity.

14) $cos\ \theta(tan\ \theta + cot\ \theta) = csc\ \theta$

Establish the identity.

15) $\csc\theta \tan\theta = \sec\theta$

Solve each equation for θ on the interval $[0, 2\pi]$. Exact Answer.

16) $\csc^2\theta = -4\csc\theta - 4$

17) $2\cos(3\theta) = -1$

18) Draw a reference triangle given the following:

$\sin\theta = -\frac{3}{11} \quad \tan\theta > 0$

19) Draw a reference triangle given the following:

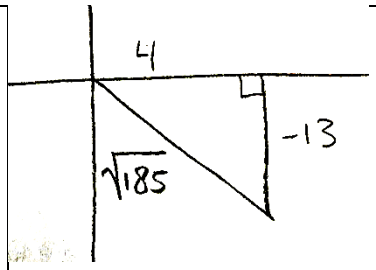
$cos^{-1}\left(-\frac{4}{13}\right)$

---------- **END OF DAY 1 Material**----------

---------- **Start of DAY 2 Material**----------

20) Find the **exact** value of the expression $tan\left(cos^{-1}\left(-\frac{3}{5}\right) + sin^{-1}\left(\frac{5}{13}\right)\right)$.

Use the reference triangle to the right on problems 8 and 9. Exact Answer.



21) $cos(2\theta)$

22) $sin(2\theta)$

23) Use a half-angle formula to find the **exact** value of the expression.

$$sin\left(\frac{7\pi}{8}\right)$$

24) Use a half-angle formula to find the **exact** value of the expression.

$$cot\left(\frac{17\pi}{8}\right)$$

25) A sailboat leaves port on a heading of N65^{0}E traveling at 12 knots for 3 hours. The boat then turns to a heading of S13^{0}E traveling at 13 knots for 4.5 hours. **Approximate Answer.**

a) Draw a diagram of the boat's path.

b) Determine how far the boat is from where it left port.

26) A small plane maintains a constant airspeed of 120 miles per hour (mph) headed $S12^0E$. The wind is 15 mph in the west direction. **Approximate Answer.**

(a) Express the velocity $\boldsymbol{v_a}$ of the plane relative to the air and the velocity $\boldsymbol{v_w}$ of the wind in terms of $\boldsymbol{i}$ and $\boldsymbol{j}$.

(b) Find the velocity of the plane relative to the ground.

(c) Find the actual speed and direction of the plane relative to the ground.

27a. The vector v has initial point P and terminal point Q. Write v in the form $a\boldsymbol{i} + b\boldsymbol{j}$; *that is, find its position vector.* P(-7,5) and Q (11, -12).

27b. The vector v has initial point P and terminal point Q. Write v in the form $a\boldsymbol{i} + b\boldsymbol{j}$; *that is, find its position vector.* P(0,3) and Q (9, -14).

28) When referring to a vector, what does the term *magnitude* mean? How do you calculate it?

29) Let $\vec{v} = 3i - 12j$ and $\vec{w} = -8i + 9j$

a) Calculate $4\vec{v}$

b) Calculate $3\vec{v} - 7\vec{w}$

c) Calculate $\|\vec{v} + \vec{w}\|$ **Approximate Answer.**

30) Find the (a) magnitude and (b) direction angle of the vector $\langle 12, -18 \rangle$. **Approximate Answer.**

31) Let $\vec{a} = -9i + 5j$ and $\vec{b} = -3i + 7j$. Find the angle between $\vec{a}$ *and* $\vec{b}$. **Approximate Answer.**

32) A student calculated the direction of the vector $v = 4i - 13j$. The answer they got was $-17.103°$.

a) What is wrong with presenting the solution this way? Correct the mistake.

b) When should the answer be presented as a direction using North/South/East/West?