Hello student! Use this practice test to prepare for your math placement test: **WAMAP Test 4.** Answers are included at the end of document, if you get 75%+ correct we encourage you to **take Test 4 with Highline College.**

Practice - Prep for Placement Test 4

1. <u>Without using a calculator</u>, find the exact value of the expression: $5\sin^2(1.9) + 5\cos^2(1.9)$.

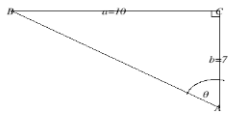
_____

2. Find the exact value of the expression

$\sin\left(\frac{\pi}{4}\right) \cdot \cos\left(\frac{\pi}{3}\right)$ (Give the exact value - do not use decimals.)

_____

3.



" alt="Graphs"/>

Two sides of a right triangle ABC (where C is the right angle) are given. Find the indicated trigonometric functions of the given angle θ . Give an exact answer (do not use decimals).

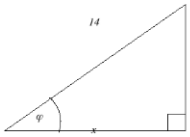
Let side $a = 10$ and side $b = 7$.

Compute the exact value of each quantity:

$\sin(\theta) =$ _____

$\tan(\theta) =$ _____

4.



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The right triangle above forms an angle φ from one side, x , and the hypotenuse, $c = 14$. Where the side opposite to angle φ is not provided.

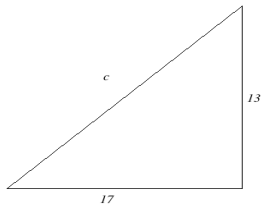
From the triangle, find **$\displaystyle{\cos{{\left(&\phi;\right)}}}$** and **$\displaystyle{\tan{{\left(&\phi;\right)}}}$** .

Compute the exact value of each quantity:

$\displaystyle{\cos{{\left(&\phi;\right)}}}=$ _____

$\displaystyle{\tan{{\left(&\phi;\right)}}}=$ _____

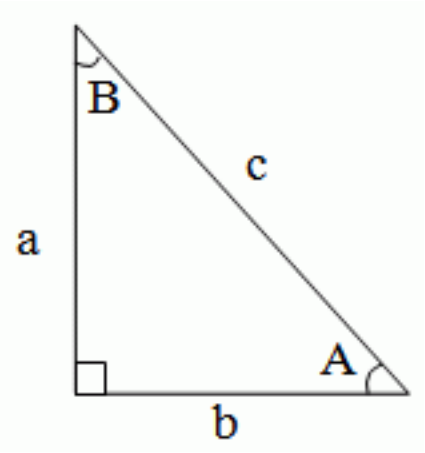
5. Use the Pythagorean Theorem to find the missing length in the given right triangle. The image is not to scale.



$c =$ _____

Exact answer required; do not enter answer as a decimal. Entry Tip: To enter an answer like $50\sqrt{x}$, you would type 50sqrt(x). Preview your answer before submitting!

6.



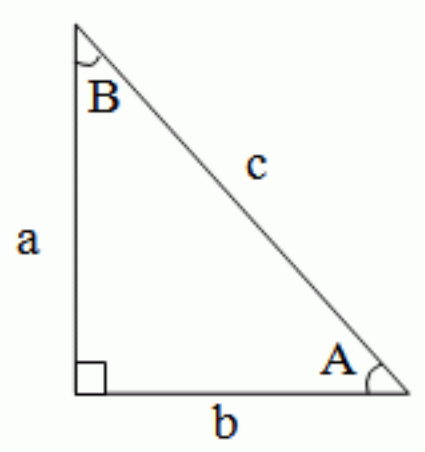
Note: Triangle may not be drawn to scale.

Suppose a = 4 and b = 2.

Find an exact value or give least two decimal places:
sin(A) = _____
cos(A) = _____
tan(A) = _____
sec(A) = _____
csc(A) = _____
cot(A) = _____

7. If $\sin\theta = \frac{3}{6}$ and θ is in quadrant II, then
$\cos(\theta) =$ _____ ;
$\tan(\theta) =$ _____ ;
$\cot(\theta) =$ _____ ;
$\sec(\theta) =$ _____ ;
$\csc(\theta) =$ _____ ;

8.



Note: Triangle may not be drawn to scale.

Suppose a = 7 and b = 2.

Find an exact value or give at least two decimal places:

sin(A) = _____

cos(A) = _____

tan(A) = _____

sec(A) = _____

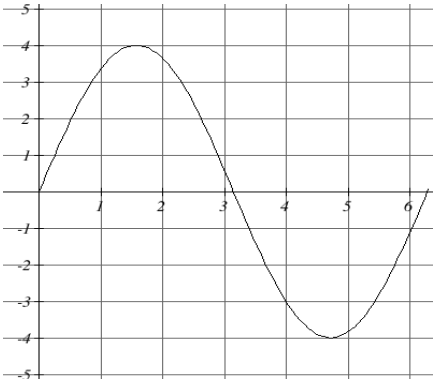
csc(A) = _____

cot(A) = _____

9. Simplify the expression $\tan(t) \cdot \cot(t)$ and write your answer as a single trig function or a constant:

$\tan(t) \cdot \cot(t) =$ _____

10. Which of the following graphs is the correct plot of $y = 4\sin(x)$?



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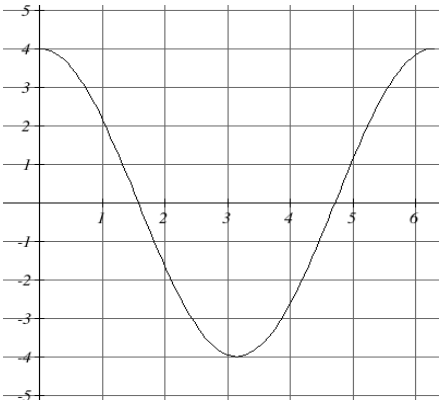

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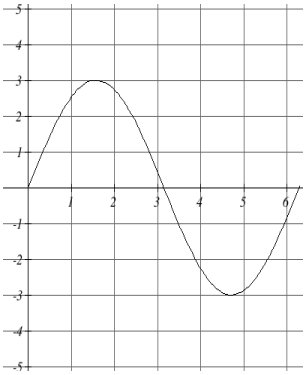

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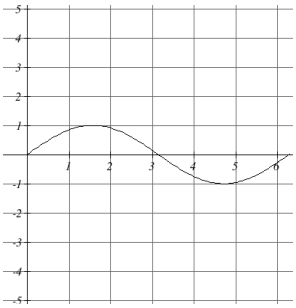

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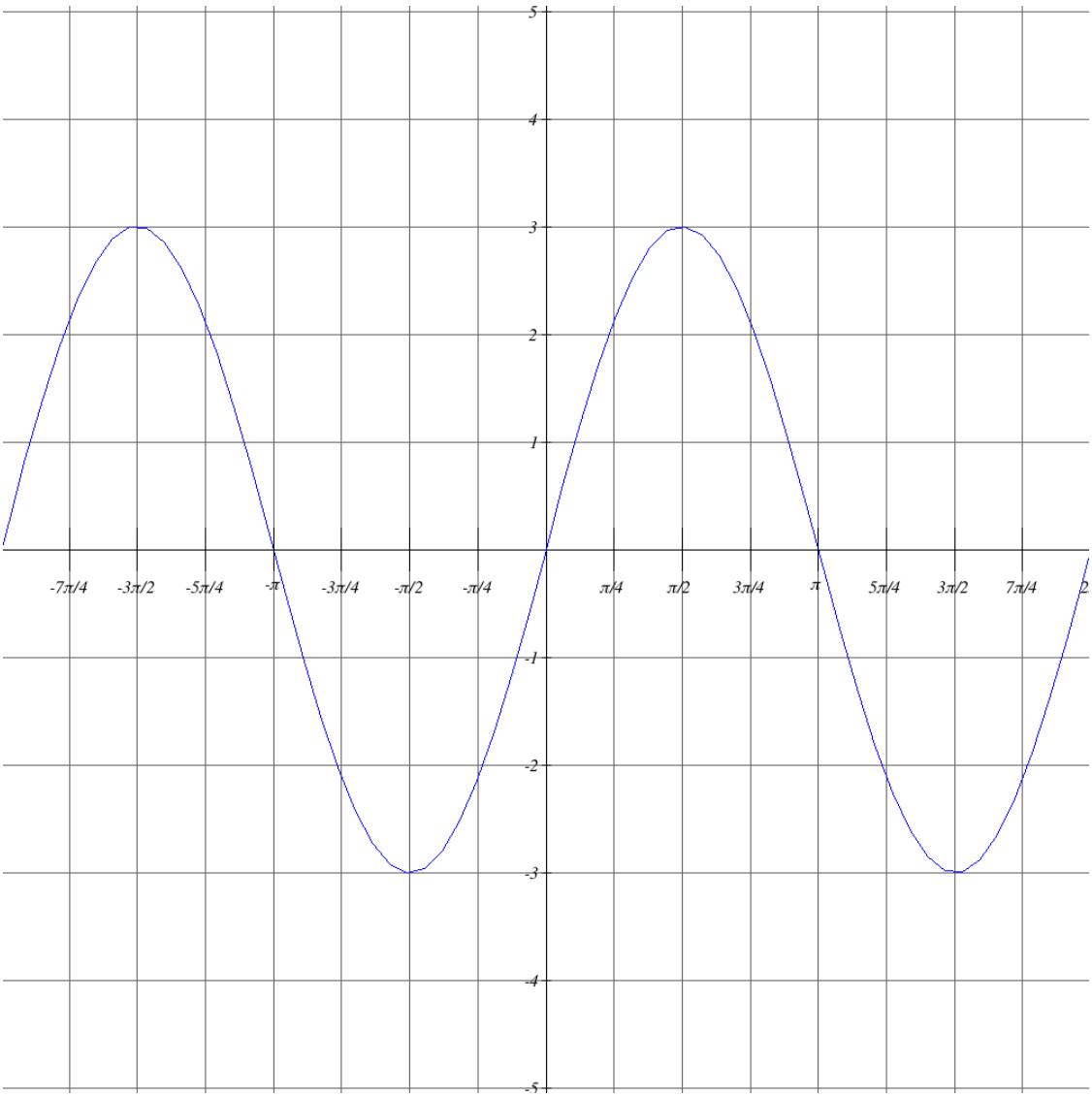
11. The graph shown is a vertical stretch of the graph of $y = \sin x$.

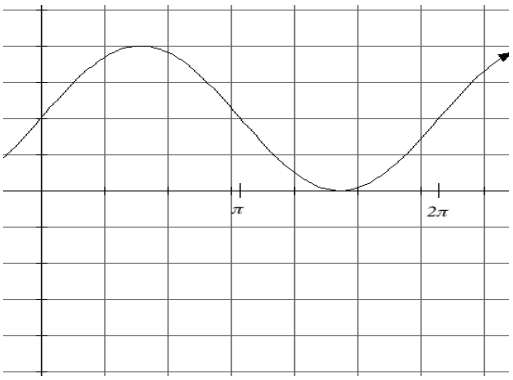


The equation of the graph shown is $y =$ _____ (Enter a sine function)

The graph could also be a transformation of the graph of $y = \cos x$.

In that case, the equation of the graph would be $y =$ _____ (Enter a cosine function)

12. Which of the following, if any, is the graph of $f(x) = \sin x$
NOTE: Gridlines are in incements of one unit.



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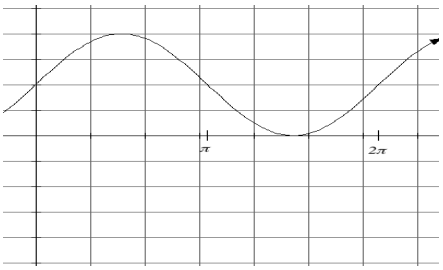

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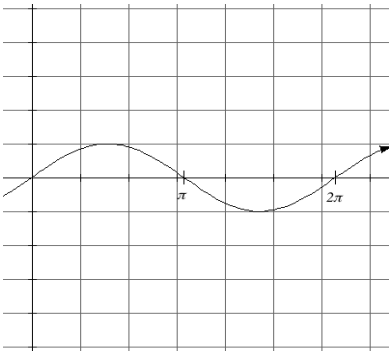

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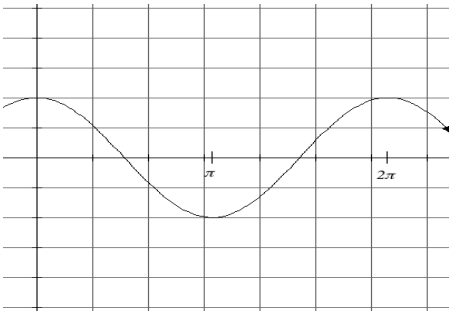

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13. Solve the equation $\tan^2(\theta)\sin(\theta) - \tan^2(\theta) = 0$.

$\theta =$ _____

14. Solve the equation $\sqrt{3}\sin(\theta) + 2\sin(\theta)\cos(\theta) = 0$.

$\theta =$ _____

15. Which of the functions $\sin(x)$ $\cos(x)$ and $\tan(x)$ are even functions [with the property that $f(-x) = -f(x)$]?

A. __ $\cos(x)$ ONLY
B. __ $\cos(x)$ and $\tan(x)$
C. __ $\sin(x)$ and $\tan(x)$
D. __ $\sin(x)$ and $\cos(x)$
E. __ $\sin(x)$ ONLY

16. Using interval notation, give all values of θ such that $\sin\theta \geq 0$ for $0 \leq \theta \leq 2\pi$.

_____

Click inside the answer box for formatting options and Greek letters/symbols.

(Type your answer in interval notation. Two lowercase "oo" will make the infinity symbol " ∞ ".)
This is standard American interval notation:

Inequality	Interval Notation
$x < -5$	$(-\infty, -5)$
$x \leq -5$	$(-\infty, -5]$
$x > -5$	$(-5, \infty)$
$x \geq -5$	$[-5, \infty)$
$-5 < x \leq 0$	$(-5,0]$

17. Simplify $\frac{(\sin(t)+\cos(t))^2-(\cos(t)-\sin(t))^2}{2\sin(2t)\sec(t)}$ to a single trig function

_____

18. Suppose A is an acute angle, and $\sin A = \frac{4}{5}$, $\cos A = \frac{3}{5}$.

Find $\sin 2A$ and $\cos 2A$.

$\sin 2A =$ _____

$\cos 2A =$ _____

19. Write the product as a sum:
$18\cos(10p)\cos(3p) =$ _____

20. For each part, type your answer in as a fraction. Do not use a decimal or round your answers.

If $\sin(x) = \frac{3}{5}$, then $\csc(x) =$ _____

If $\cos(x) = \frac{2}{3}$, then $\sec(x) =$ _____

If $\tan(x) = 7$, then $\cot(x) =$ _____

21. Solve the equation $\cos(\theta) + 2\sin(\theta)\cos(\theta) = 0$.

$\theta =$ _____

22. Solve the equation $\sin\theta - 2\sin\theta\cos\theta = 0$ on the interval $[0, 2\pi)$. List any repeated solutions only once.

$\theta =$ _____

23. Find the exact value of the expression

$\sin\left(\frac{\pi}{6}\right) \cdot \cos\left(\frac{\pi}{4}\right)$ (Give the exact value - do not use decimals.)

_____

24. Use trig identities to rewrite $\sin(2v)$ using $\sin(v)$ and/or $\cos(v)$.

_____

25. Use trig identities to rewrite the expression $\cos^2\alpha$ in terms of $\sin(2\alpha)$ and/or $\cos(2\alpha)$ and constants.

$\cos^2\alpha$ = _____

26. Simplify.

$(\sin\beta - \cos\beta)^2 = ?$

A. __ 1
B. __ $1 - \sin(2\beta)$
C. __ $1 + \cos(2\beta)$
D. __ $1 - \cos(2\beta)$

27. Evaluate the following expressions.
$\cos\left(\sin^{-1}(0)\right)$ _____

$\tan\left(\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)\right)$ _____

28. Evaluate the following expressions. Your answer must be an exact angle in radians and in the interval $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$. For example, type pi/6 for $\frac{\pi}{6}$.

$\arcsin(-1) =$ _____

$\arcsin\left(-\frac{\sqrt{3}}{2}\right) =$ _____

$\arcsin\left(-\frac{1}{2}\right) =$ _____

29. Evaluate the following expression. Your answer must be in exact form: for example, type pi/6 for $\frac{\pi}{6}$ or DNE if the expression is undefined.

$\sin\left(\arcsin(0.1)\right) =$ _____

30. Evaluate the following expressions.

$\cos\left(\sin^{-1}\left(\frac{1}{2}\right)\right)$ _____

$\tan\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)$ _____

31. Evaluate the expression $\cos^{-1}\left(\sin\left(\frac{\pi}{4}\right)\right)$.

_____

Give your answer as an exact value

32. List the domain and range of the inverse trig functions using interval notation and radians for angles.

$\sin^{-1}(x)$

Domain: _____
Range: _____

$\cos^{-1}(x)$

Domain: _____
Range: _____

$\tan^{-1}(x)$

Domain: _____
Range: _____

33. Find the exact value of the following expression. $\sin^{-1}\left(-\frac{1}{2}\right)$

A. __There is no solution
B. __The expression $\sin^{-1}\left(-\frac{1}{2}\right) =$ _____
(Simplify your answer.)

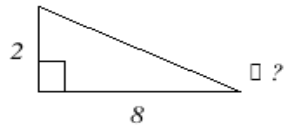
34. Find the exact value of each expression. Remember that the range of the arctan function is $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$.

$\arctan(-1) =$ _____

$\arctan(1) =$ _____

$\arctan(0) =$ _____

35. For the right triangle shown here:



the measure of the angle indicated is: _____ °

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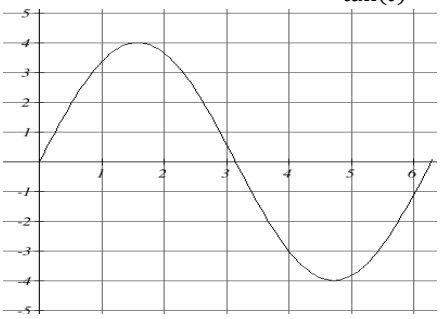
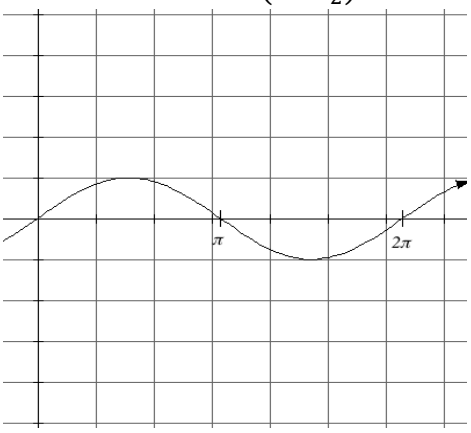
Key - Form 1

1. 5
2. 0.35355339059327
3. $\sin(\theta) = \frac{5}{6.1032778078669} \sim \tan(\theta) = \frac{10}{7}$
4. $\displaystyle{\cos{{\left(&\phi;\right)}}}=\frac{{x}}{{14}}$ ~ $\displaystyle{\tan{{\left(&\phi;\right)}}}=\frac{{\sqrt{{{14}^{{2}}-{x}^{{2}}}}}}{{x}}$
5. $\sqrt{458}$
6. 0.89442719099992 ~ 0.44721359549996 ~ 2 ~ 2.2360679774998 ~ 1.1180339887499 ~ 0.5
7. -0.86602540378444 ~ -0.57735026918963 ~ -1.7320508075689 ~ -1.1547005383793 ~ 2
8. $\frac{7\sqrt{53}}{53} \sim \frac{2\sqrt{53}}{53} \sim \frac{7}{2} \sim \frac{\sqrt{53}}{2} \sim \frac{\sqrt{53}}{7} \sim \frac{2}{7}$
9. $\tan(t) \cdot \cot(t) = \tan(t) \cdot \frac{1}{\tan(t)} = 1$
10. 

11. $3 \cdot \sin(x) \sim 3 \cdot \cos\left(x - \frac{\pi}{2}\right)$
12. 

13. $0, \pi, \frac{\pi}{2}$
14. $0, \pi, \frac{5\pi}{6}, \frac{7\pi}{6}$
15. $\cos(x)$ ONLY
16. $[0, \pi]$

17. $\cos(t)$
18. $\frac{24}{25} \sim -\frac{7}{25}$
19. $9\cos(13p) + 9\cos(7p)$
20. $\frac{5}{3} \sim \frac{3}{2} \sim \frac{1}{7}$
21. $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$
22. $0, \pi, \frac{\pi}{3}, \frac{5\pi}{3}$
23. 0.35355339059327
24. $2\sin(v)\cos(v)$
25. $\frac{1}{2}[1 + \cos(2\alpha)]$
26. $1 - \sin(2\beta)$
27. $1 \sim 1$
28. $-\frac{\pi}{2} \sim -\frac{\pi}{3} \sim -\frac{\pi}{6}$
29. 0.1
30. $0.86602540378444 \sim 1.7320508075689$
31. $\frac{\pi}{4}$
32. $[-1,1] \sim \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \sim [-1,1] \sim [0, \pi] \sim (-\infty, \infty) \sim \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$
33. $-\frac{\pi}{6}$
34. $-\frac{\pi}{4} \sim \frac{\pi}{4} \sim 0$
35. $14.036°$