

Name Key

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Convert from degrees to radians. Use the value of π found on a calculator and round answers to four decimal places, as needed.

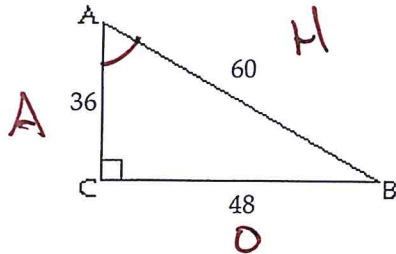
1) 252°

$$252 \cdot \frac{\pi}{180} = \frac{252\pi}{180} = 4.4$$

1) _____

Find the exact values of the indicated trigonometric functions. Write fractions in lowest terms.

2)



$$\sin A = \frac{48}{60} = \frac{4}{5}$$

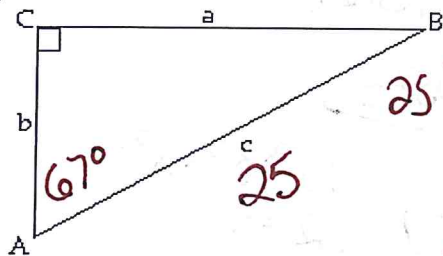
$$\cos A = \frac{36}{60} = \frac{3}{5}$$

2) _____

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

Solve the right triangle for all missing sides and angles to the nearest tenth.

3)



$c = 25$
 $A = 67^\circ$

$$\sin 67 = \frac{a}{25} \cdot 25$$

$$\boxed{23 = a}$$

$$25 \cos 67 = \frac{b}{25} \cdot 25$$

$$\boxed{9.8 = b}$$

3) _____

Evaluate without using a calculator by using ratios in a reference triangle.

4) $\sin 60^\circ$

$$\rightarrow \sqrt{3}/2$$

4) _____

Find the amplitude of the function.

5) $y = -5 \sin \frac{1}{2}x$

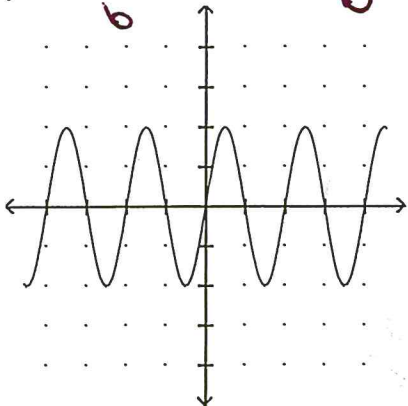
negative
flips it
doesn't
affect amp

5

5) _____

Find the period of the function.

6) $y = 2 \sin 8x$



$\frac{2\pi}{b}$

$\frac{2\pi}{8} = \frac{\pi}{4}$

6) _____

Find the exact value of the real number y.

7) $y = \arcsin\left(\frac{1}{2}\right)$

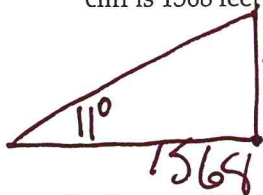
$\theta = 30$ or $\pi/6$

7) _____

Solve the problem.

8) From a boat on the lake, the angle of elevation to the top of a cliff is 11° . If the base of the cliff is 1568 feet from the boat, how high is the cliff (to the nearest foot)?

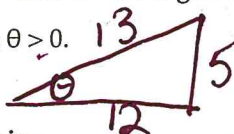
8) _____



~~1568~~ $\times 1568 \tan 11 = \frac{x}{1568} \cdot 1568$
 $304.8 \text{ ft} = 305 \text{ ft}$

Use the fundamental identities to find the value of the trigonometric function.

9) Find $\cos \theta$ if $\sin \theta = -\frac{5}{13}$ and $\tan \theta > 0$.



$13^2 = 5^2 + x^2$
 $12 = x$

9) _____

Use basic identities to simplify the expression.

10) $\frac{\cos^2 \theta}{\sin^2 \theta} + \csc \theta \sin \theta$

$\frac{1}{\sin} \cdot \sin = 1$
 $\cot^2 \theta + 1 = \csc^2 \theta$

$\cos = -12/13$

10) _____

Determine if the following is an identity.

11) $\cot^2 x = (\csc x - 1)(\csc x + 1)$

11) _____

$\cot^2 x = \csc^2 x - 1$
 $\cot^2 x = \cot^2 x$

12) $\sin \theta \sec \theta = \cos \theta \csc \theta$

12) _____

$\sin \cdot \frac{1}{\cos} = \cos \cdot \frac{1}{\sin}$

$\frac{\sin}{\cos} = \frac{\cos}{\sin}$

$\tan \neq \cot$ ← not an identity

Find an exact value.

13) $\sin \frac{11\pi}{12}$

$\sin\left(\frac{2\pi}{3} + \frac{\pi}{4}\right)$



$\frac{2\pi}{3} = \frac{8\pi}{12} + \frac{\pi}{12}$

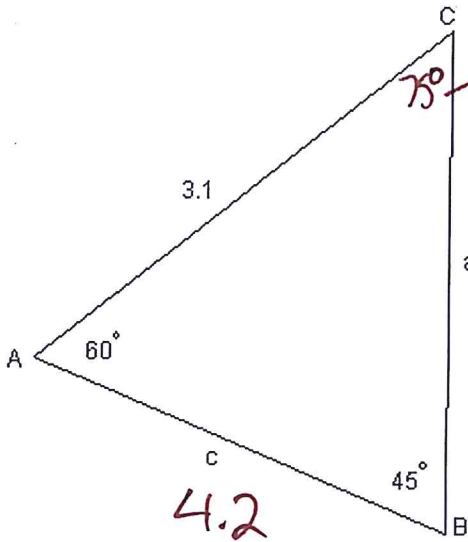
$\sin \frac{2\pi}{3} \cos \frac{\pi}{4} + \cos \frac{2\pi}{3} \sin \frac{\pi}{4}$
 $\frac{\sqrt{3}}{2} \left(\frac{\sqrt{2}}{2}\right) + -\frac{1}{2} \left(\frac{\sqrt{2}}{2}\right)$

$\frac{\sqrt{6} - \sqrt{2}}{4}$

$\frac{\sqrt{6} - \sqrt{2}}{4}$

Solve the triangle.

14)



$180 - 60 = 120$
 $\frac{120}{75}$

$\frac{\sin 60}{a} = \frac{\sin 45}{3.1}$

$a \frac{\sin 45}{\sin 45} = \frac{3.1 \sin 60}{\sin 45}$

$a = 3.8$

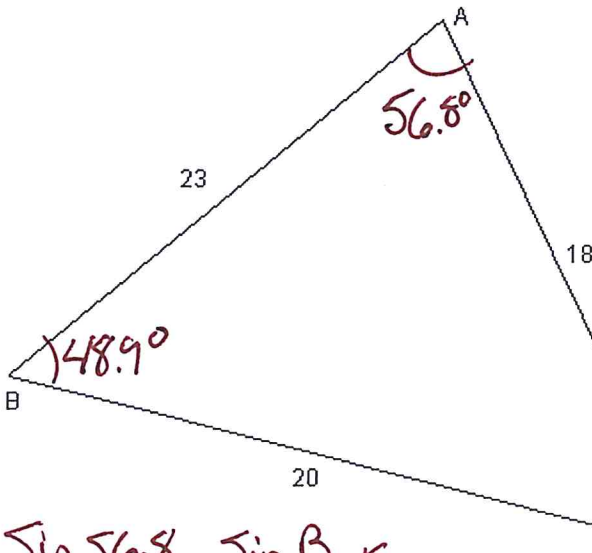
$\frac{\sin 75}{c} = \frac{\sin 45}{3.1}$

$3.1 \frac{\sin 75}{\sin 45} = \frac{c \sin 45}{\sin 45}$

$4.2 = c$

15)

15) _____



$20^2 = 18^2 + 23^2 - 2(18)(23) \cos A$

$400 = 853 - 828 \cos A$
 $-853 \quad -853$

$-453 = -828 \cos A$

$\cos^{-1}(.5471) = \cos A$

$56.8^\circ = A$

$18 \cdot \frac{\sin 56.8}{20} = \frac{\sin B \cdot 16}{18}$

$.753 = \sin B$

$48.9^\circ = B$

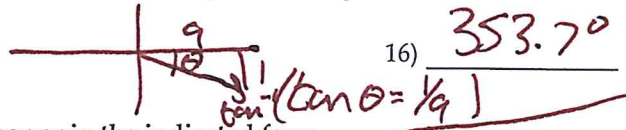
$180 - 48.9 - 56.8$
 $74.3^\circ = C$

Key

Find the magnitude and direction angle for the following vector. Give the direction angle as an angle in $[0^\circ, 360^\circ)$ rounded to the nearest tenth.

16) $\langle 9, -1 \rangle$

$\sqrt{9^2 + (-1)^2} = \sqrt{82} = \text{mag}$



16) 353.7°

Find the unit vector in the direction of the given vector. Write your answer in the indicated form.

17) Let $u = \langle 5, -2 \rangle$. Find the unit vector in the direction of u , and write your answer in component form.

$\sqrt{5^2 + (-2)^2} = \sqrt{29}$
 $\left\langle \frac{5}{\sqrt{29}}, \frac{-2}{\sqrt{29}} \right\rangle$

$6.3^\circ = \theta$
 $360 - 6.3 =$

17) _____

Find a · b.

18) $a = \langle 5, -10 \rangle$, $b = \langle 6, 5 \rangle$

$5 \cdot 6 + (-10) \cdot 5 = -20$

18) _____

Find the angle between the given vectors to the nearest tenth of a degree.

19) $u = \langle 4, -3 \rangle$, $v = \langle -6, -8 \rangle$

$\cos \theta = \frac{4 \cdot (-6) + (-3) \cdot (-8)}{|u||v|}$

$u \cdot v = -24 + 24 = 0$

19) $\theta = 90^\circ$

$u \cdot v = 0$ means orthogonal

Find the rectangular coordinates of the point with the given polar coordinates.

20) $(-4, -\pi/3)$

20) _____

Determine a pair of polar coordinates for the point with $0^\circ \leq \theta < 360^\circ$.

21) $(5, 5)$

21) _____

Solve the system by substitution.

22) $y - x^2 = 3x$
 $y = x - 1$

$x - 1 - x^2 = 3x$
 $-x^2 - 2x - 1 = 0$
 $(x+1)(x+1)$
 $x = -1$

22) _____

Divide using synthetic division, and write a summary statement in fraction form.

23) $\frac{2x^3 + 3x^2 + 4x - 10}{x + 1}$

$-1 \mid 2 \quad 3 \quad 4 \quad -10$
 $\quad \quad -2 \quad -1 \quad -3$

 $2 \quad 1 \quad 3 \quad -13$

$2x^2 + 1x + 3 - \frac{13}{x+1}$

23) _____

Use the product, quotient, and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

24) $6 \log x + 4 \log y$

$\log x^6 y^4$

24) _____

Use the change of base rule to find the logarithm to four decimal places.

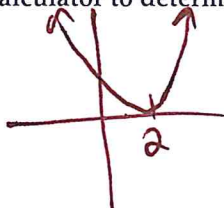
25) $\log_8 12.44$

$\frac{\log 12.44}{\log 8}$

25) _____

Graph the function on your calculator to determine the domain and range from the graph.

26) $p(x) = (x - 2)^2$

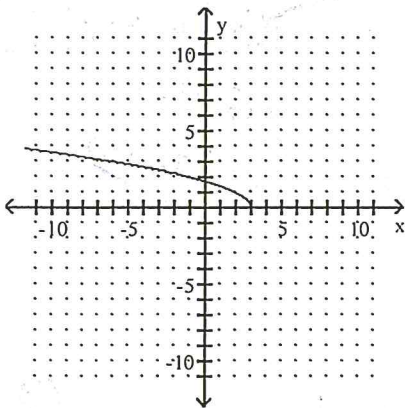


$y \geq 0$ range
 $x \in \mathbb{R}$ Domain

26) _____

The graph is that of a function $y = f(x)$ that can be obtained by transforming the graph of $y = \sqrt{x}$. Write a formula for the function f .

27)



27)

$$y = \sqrt{x-3}$$

Solve the equation using the quadratic formula.

28) $x^2 - 6x + 4 = 0$

$$\frac{6 \pm \sqrt{36 - 4(1)(4)}}{2(1)}$$

$$\frac{6 \pm \sqrt{20}}{2}$$

Solve the problem.

29) Assume that a watermelon dropped from a tall building falls $y = 16t^2$ ft in t sec. Find the watermelon's average speed during the first 5 sec of fall.

$$\frac{400}{5} = 80 \text{ ft/sec}$$

$$\frac{16(5)^2 - 16(0)}{5}$$

Determine the limit by substitution.

30) $\lim_{x \rightarrow 2} (x^3 + 5x^2 - 7x + 1)$

$$(2)^3 + 5(2)^2 - 7(2) + 1$$

$$15$$

30) _____

Determine the limit algebraically, if it exists.

31) $\lim_{x \rightarrow -4} \frac{x^2 - 16}{x + 4}$

$\frac{0}{0}$ do not!

$$\frac{(x-4)(x+4)}{x+4}$$

$$-4 - 4 = -8$$

31) _____

Find dy/dx .

32) $y = 11 - 5x^2$

$$-10x$$

32) _____

Find an equation for the line tangent to the curve at the given point.

33) $y = \frac{x^4 - 5}{x^2}, x = -1$

$u = x^4 - 5 \quad u' = 4x^3$
 $v = x^2 \quad v' = 2x$
 $\frac{uv' - u'v}{v^2}$

33) $\frac{x^2(4x^3) - (x^4 - 5)(2x)}{(x^2)^2}$

Find the fourth derivative of the function.

34) $y = 5x^6 - 7x^4 + 3x^2$

34) _____

$y' = 30x^5 - 28x^3 + 6x$

$y'' = 150x^4 - 84x^2 + 6$

$y''' = 600x^3 - 168x$

$y^{(4)} = 1800x^2 - 168$

Find dy/dx .

35) $y = \sqrt{12x - x^5}$

35) _____

$(12x - x^5)^{1/2}$

$\frac{1}{2} (12x - x^5)^{-1/2} (12 - 5x^4)$

