

Name: Last _____, First _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question**Use a calculator to find the value of the expression rounded to two decimal places.**

1) $\sin^{-1}\left(\frac{1}{4}\right)$ 1) _____
 A) 14.48 B) 1.32 C) 75.52 D) 0.25

2) Find the smallest positive angle coterminal with -195° 2) _____
 A) 15° B) 195° C) 165° D) 525°

Solve the problem.

3) A radio transmission tower is 220 feet tall. How long should a guy wire be if it is to be attached 6 feet from the top and is to make an angle of 30° with the ground? Give your answer to the nearest tenth of a foot. 3) _____
 A) 440.0 ft B) 247.1 ft C) 428.0 ft D) 254.0 ft

Form a polynomial whose zeros and degree are given.

4) Zeros: 2, multiplicity 2; -2 , multiplicity 2; degree 4 4) _____
 A) $f(x) = x^4 + 4x^3 - 8x^2 + 8x - 16$ B) $f(x) = x^4 + 8x^2 + 16$
 C) $f(x) = x^4 - 4x^3 + 8x^2 - 8x + 16$ D) $f(x) = x^4 - 8x^2 + 16$

Find the vertex and axis of symmetry of the graph of the function.

5) $f(x) = -x^2 + 12x - 1$ 5) _____
 A) $(12, -1)$; $x = 12$ B) $(6, 35)$; $x = 6$
 C) $(-6, -37)$; $x = -6$ D) $(-6, -109)$; $x = -6$

Form a polynomial whose zeros and degree are given.

6) Zeros: -5 , multiplicity 2; 2 , multiplicity 1; degree 3 6) _____
 A) $x^3 - 8x^2 + 5x + 50$ B) $x^3 - 8x^2 - 20x + 50$
 C) $x^3 + 10x^2 + 5x - 50$ D) $x^3 + 8x^2 + 5x - 50$

Find the vertical asymptotes of the rational function.

7) $F(x) = \frac{-x^2 + 16}{x^2 + 5x + 4}$ 7) _____
 A) $x = -1$ B) $x = -1, x = 4$ C) $x = -1, x = -4$ D) $x = 1, x = -4$

Give the equation of the oblique asymptote, if any, of the function.

8) $f(x) = \frac{2x^3 + 11x^2 + 5x - 1}{x^2 + 6x + 5}$ 8) _____
 A) $y = 0$ B) $y = 2x - 1$ C) $y = 2x$ D) $y = 2x + 1$

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results.

- 9) $b = 4, c = 8, B = 80^\circ$ 9) _____
 A) one triangle B) one triangle
 $B = 40^\circ, A = 60^\circ, a = 12$ $C = 39^\circ, A = 61^\circ, a = 14$
 C) one triangle D) no triangle
 $C = 41^\circ, A = 59^\circ, a = 16$

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

Simplify the trigonometric expression by following the indicated direction.

- 10) Rewrite in terms of sine and cosine: $\cot x \cdot \tan x$ 10) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question

Simplify the expression.

- 11) $\frac{\cos \theta}{1 + \sin \theta} + \tan \theta$ 11) _____
 A) $\sec \theta$ B) $\cos \theta + \sin \theta$ C) 1 D) $\sin^2 \theta$
- 12) If the point $(x, -.8)$ is on the unit circle in the third quadrant, what is x ? 12) _____
 A) $-.6$ B) $.65$ C) $-.04$ D) $-.2$

Form a polynomial $f(x)$ with real coefficients having the given degree and zeros.

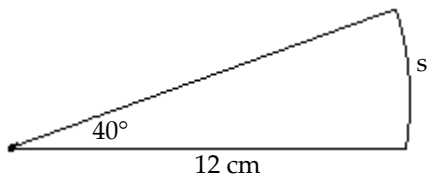
- 13) Degree: 3; zeros: -2 and $3 + i$. 13) _____
 A) $f(x) = x^3 - 4x^2 - 10x + 20$ B) $f(x) = x^3 - 8x^2 + 2x + 20$
 C) $f(x) = x^3 - 4x^2 - 2x + 20$ D) $f(x) = x^3 - 6x^2 - 10x + 20$

Find all zeros of the function and write the polynomial as a product of linear factors.

- 14) $f(x) = x^4 + 7x^3 + 16x^2 + 28x + 48$ 14) _____
 A) $f(x) = (x - i\sqrt{12})(x + i\sqrt{12})(x - 2)(x + 2)$ B) $f(x) = (x - 4)(x + 3)(x - 2)(x + 2)$
 C) $f(x) = (x - 1)(x - 12)(x - 2i)(x + 2i)$ D) $f(x) = (x + 4)(x + 3)(x - 2i)(x + 2i)$

Find the length s . Round the answer to three decimal places.

- 15) 15) _____



- A) 8.378 cm B) 6.702 cm C) 9.216 cm D) 7.54 cm

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

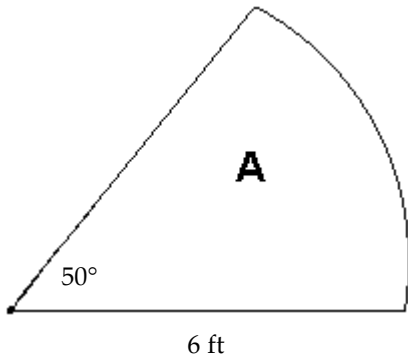
Solve the problem.

- 16) Salt Lake City, Utah, is due north of Flagstaff, Arizona. Find the distance between Salt Lake City ($40^{\circ}45'$ north latitude) and Flagstaff ($35^{\circ}16'$ north latitude). Assume that the radius of the Earth is 3960 miles. Round to nearest whole mile. 16) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the area A. Round the answer to three decimal places.

17) _____



17) _____

A) 15.708 ft^2

B) 5 ft^2

C) 31.416 ft^2

D) 2.618 ft^2

A point on the terminal side of an angle θ is given. Find the exact value of the indicated trigonometric function of θ .

- 18) $(-2, -1)$ Find $\csc \theta$.

A) -5

B) -2

C) $-\sqrt{5}$

D) $\sqrt{5}$

18) _____

Solve the problem.

- 19) If $f(\theta) = \cos \theta$ and $f(a) = \frac{1}{6}$, find the exact value of $f(a) + f(a + 2\pi) + f(a + 4\pi)$.

A) $\frac{1}{2}$

B) $\frac{5}{2}$

C) $\frac{1}{2} + 6\pi$

D) $\frac{1}{6}$

19) _____

Find the exact value of the indicated trigonometric function of θ .

- 20) $\tan \theta = -\frac{10}{7}$, θ in quadrant II Find $\cos \theta$.

A) $-\frac{7\sqrt{149}}{149}$

B) $\frac{\sqrt{149}}{10}$

C) $-\frac{\sqrt{149}}{7}$

D) $\frac{7\sqrt{149}}{149}$

20) _____

Without graphing the function, determine its amplitude or period as requested.

- 21) $y = \frac{3}{4} \cos(-\frac{4\pi}{5}x)$ Find the period.

A) $\frac{3\pi}{2}$

B) $\frac{2}{3}$

C) $\frac{5}{2}$

D) $\frac{8\pi}{5}$

21) _____

22) $y = \frac{9}{4} \cos\left(-\frac{4\pi}{7}x\right)$ Find the amplitude.

22) _____

A) $\frac{4\pi}{9}$

B) $\frac{7}{2}$

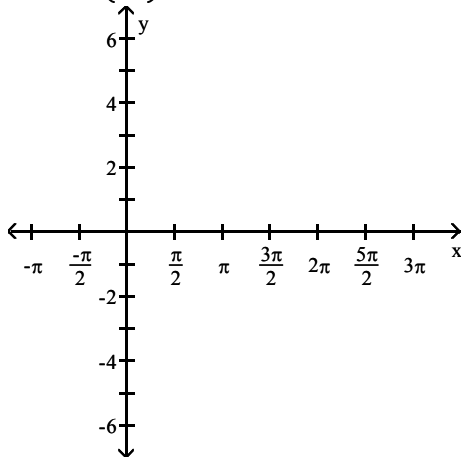
C) $\frac{4\pi}{7}$

D) $\frac{9}{4}$

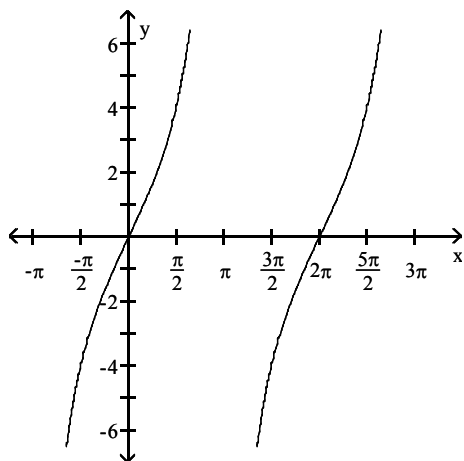
Graph the function.

23) $y = 4 \tan\left(\frac{1}{2}x\right)$

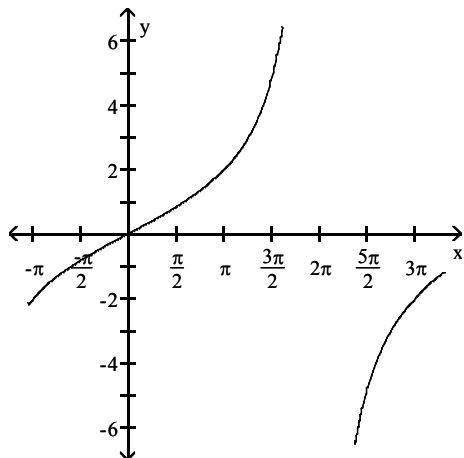
23) _____



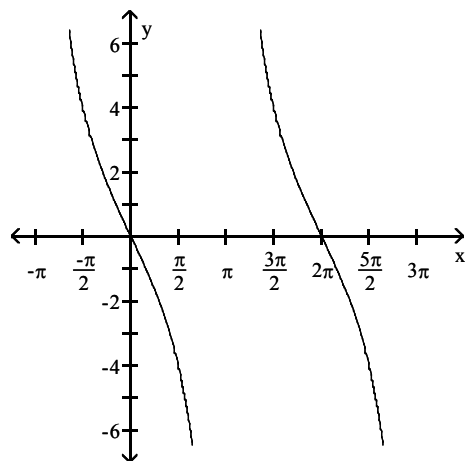
A)



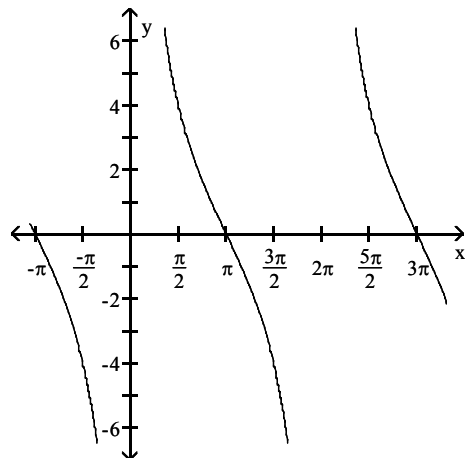
C)



B)



D)



Find the phase shift.

24) $y = 2 \sin(3\pi x - 2)$

24) _____

A) 2 units to the right

B) $\frac{2}{3\pi}$ units to the right

C) 2 units to the left

D) $\frac{2}{3}$ units to the left

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

Solve the problem.

25) When light travels from one medium to another—from air to water, for instance—it changes direction. (This is why a pencil, partially submerged in water, looks as though it is bent.)

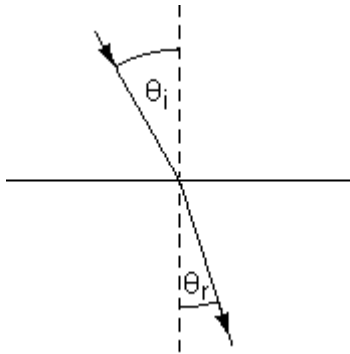
The angle of incidence θ_i is the angle in the first medium; the angle of refraction θ_r is the second medium. (See illustration.) Each medium has an index of refraction— n_i and n_r , respectively—which can be found in tables. Snell's law relates these quantities in the formula

$$n_i \sin \theta_i = n_r \sin \theta_r$$

Solving for θ_r , we obtain

$$\theta_r = \sin^{-1} \left(\frac{n_i}{n_r} \sin \theta_i \right)$$

Find θ_r for air ($n_i = 1.0003$), methylene iodide ($n_r = 1.74$), and $\theta_i = 14.7^\circ$.



MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation on the interval $0 \leq \theta < 2\pi$.

26) $2 \sin^2 \theta - 3 \sin \theta - 2 = 0$

26) _____

A) $\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

B) $\frac{4\pi}{3}, \frac{5\pi}{3}$

C) $\frac{7\pi}{6}, \frac{11\pi}{6}$

D) $\frac{\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}$

Find the real zeros of the trigonometric function on the interval $0 \leq x < 2\pi$

27) $f(x) = 4 \cos^2 x - 3$

27) _____

A) $\frac{\pi}{6}, \frac{11\pi}{6}$

B) $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

C) $\frac{\pi}{3}, \frac{5\pi}{3}$

D) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

Solve the problem.

28) An electric generator produces a 30-cycle alternating current described by the equation 28) _____

$$I(t) = 40 \sin 60\pi \left(t - \frac{1}{120} \right)$$

where $I(t)$ amperes is the current at t seconds. Find the smallest value of t for which the current is 20 amperes.

- A) $\frac{1}{120}$ B) $\frac{1}{90}$ C) $\frac{1}{30}$ D) $\frac{1}{60}$

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

Use a calculator to solve the equation. Round the solution(s) to two decimal places if necessary.

29) $x^2 - 3 \sin(2x) = 2x$ 29) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results.

30) $a = 7, b = 9, B = 49^\circ$ 30) _____

- A) two triangles
 $A_1 = 76.01^\circ, C_1 = 54.99^\circ, c_1 = 7.60$ or
 $A_2 = 103.99^\circ, C_2 = 27.01^\circ, c_2 = 12.14$
- B) one triangle
 $A = 76.01^\circ, C = 54.99^\circ, c = 7.60$
- C) one triangle
 $A = 35.94^\circ, C = 95.06^\circ, c = 11.88$
- D) no triangle

31) $a = 10, b = 5, B = 15^\circ$ 31) _____

- A) one triangle
 $A = 148.83^\circ, C = 16.17^\circ, c = 5.38$
- B) one triangle
 $A = 31.17^\circ, C = 133.83^\circ, c = 13.94$
- C) two triangles
 $A_1 = 31.17^\circ, C_1 = 133.83^\circ, c_1 = 13.94$ or
 $A_2 = 148.83^\circ, C_2 = 16.17^\circ, c_2 = 5.38$
- D) no triangle

Solve the problem.

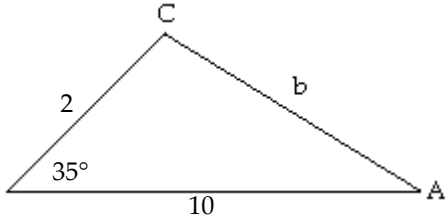
32) To find the distance AB across a river, a distance BC of 1353 m is laid off on one side of the river. It is found that $B = 112.9^\circ$ and $C = 13.2^\circ$. Find AB. Round to the nearest meter. 32) _____

- A) 385 m B) 310 m C) 382 m D) 313 m

Solve the triangle.

33)

33) _____



- A) $b = 9.44, A = 7.8^\circ, C = 137.2^\circ$
- C) $b = 7.44, A = 137.2^\circ, C = 7.8^\circ$

- B) $b = 8.44, A = 137.2^\circ, C = 7.8^\circ$
- D) $b = 8.44, A = 7.8^\circ, C = 137.2^\circ$

Solve the problem.

34) Two sailboats leave a harbor in the Bahamas at the same time. The first sails at 23 mph in a direction 330° . The second sails at 34 mph in a direction 190° . Assuming that both boats maintain speed and heading, after 2 hours, how far apart are the boats?

34) _____

- A) 107.4 mi
- B) 84.2 mi
- C) 90.3 mi
- D) 80.5 mi

35) A painter needs to cover a triangular region 63 meters by 68 meters by 71 meters. A can of paint covers 70 square meters. How many cans will be needed?

35) _____

- A) 14 cans
- B) 318 cans
- C) 3 cans
- D) 28 cans

Answer Key

Testname: MATH 1113 FINAL PRACTICE ALL

- 1) D
- 2) C
- 3) C
- 4) D
- 5) B
- 6) D
- 7) A
- 8) B
- 9) D
- 10) 1
- 11) A
- 12) A
- 13) C
- 14) D
- 15) A
- 16) 379 mi
- 17) A
- 18) C
- 19) A
- 20) A
- 21) C
- 22) D
- 23) A
- 24) B
- 25) $\theta_r = 8.39^\circ$
- 26) C
- 27) D
- 28) B
- 29) 0, 1.66
- 30) C
- 31) C
- 32) C
- 33) D
- 34) A
- 35) D