1. If θ is in the second quadrant and $\sin\theta = 0.6$, find $\cos\theta$.
   A. -0.75 B. 0.2 C. -0.8 D. 0.8 E. None of these.

2. The angles with measures listed are all coterminal except:
   A. $\frac{\pi}{3}$ B. $-\frac{5\pi}{3}$ C. $-300°$ D. $420°$ E. $-60°$

3. The radian measure of an angle of 135° is:
   A. $\frac{5\pi}{4}$ B. $\frac{3\pi}{2}$ C. $\frac{3\pi}{4}$ D. $\frac{7\pi}{8}$ E. None of these.

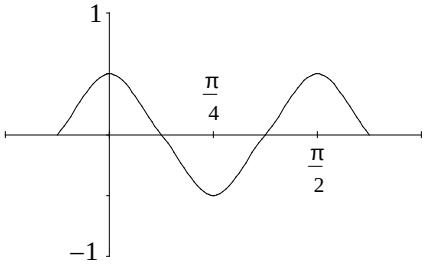
4. Use a calculator to find the sec 126° correct to 4 decimal places.
   A. 1.2361 B. -0.5878 C. -1.7013 D. -1.2361 E. None of these.

5. The point $(12, -16)$ is on the terminal side of the angle θ. Find $\tan\theta$
   A. $\frac{5}{3}$ B. $-\frac{5}{4}$ C. $\frac{4}{3}$ D. $\frac{4}{5}$ E. None of these.

6. If the diameter of a circle is 6 cm, find the length of the arc that subtends a central angle of 30°.
   A. 1.571 cm B. 2.356 cm C. 3.142 cm D. 9.425 cm E. None of these.

7. Find the area of a sector determined by θ in problem #6.
   A. 1.571 cm^2 B. 2.356 cm^2 C. 3.142 cm^2 D. 9.425 cm^2 E. None of these.

8. Sketched below is a portion of the graph of which trigonometric function?



   A. $y = \frac{1}{2}\cos\frac{1}{4}x$ B. $y = 4\cos\frac{1}{2}x$ C. $y = -\frac{1}{2}\sin 4x$ D. $y = \frac{1}{2}\cos 4x$ E. $y = -\frac{1}{2}\cos\frac{1}{4}x$

9. The graph of $y = 3 + \sin x$ (Choose all the correct answers.)
   I. crosses the y-axis at 3
   II. crosses the x-axis at multiples of π
   III. is always above the x-axis
   IV. has period 2π

   A. I, II B. I, III, IV C. I, II, IV D. II, IV E. None of these.

10. Give the domain, D, and the range, R, of $f(x) = \cos x$.
    A. D = set of all real numbers, R=[–1, 1]
    B. $D = [0, \infty)$, R = set of all real numbers.
    C. $D = [0, 2\pi]$, $R = [-1, 1]$
    D. D = set of all real numbers, $R = [0, 2\pi]$
    E. None of these.

11. From a point *P* on level ground the angle of elevation of the top of the tower is 26°50′. From a point 25.0 meters closer to the tower and on the same line with *P* and the base of the tower, the angle of elevation of the top of the tower is 43°30′. Find the height of the tower correct to one decimal place.

A.39.3 meters B. 12.6 meters C. 27.1 meters D.23.7 meters E. None of these.

12. The expression $\frac{\tan^2 x}{1+\sec x}$ is identically equal to:

A. 1 B. $\sec x - 1$ C. $\tan x + \sin x$ D. $\tan^2 x + \sin x \tan x$ E. $\csc x + \sin x$

13. Simplify $\frac{\tan x \cos x \csc x}{\cot x \sec x \sin x}$:

A. $\tan^2 x \cos^2 x$ B. 1 C. $\csc^2 x$ D. 0 E. $\tan^2 x$

14. Reduce to a single term: cos(2*A*) cos *B* + sin (2*A*) sin *B*

A.sin (2*A* + *B*) B. sin (2*A* – *B*) C. cos (2*A* – *B*) D.cos (2*A* + *B*) E. None of these.

15. Find all the solutions of $3\cos^2 x + 2\sin x + 2 = 0$ in the interval $[0, 2\pi)$

A. $x = 0, \frac{\pi}{2}$ B. $x = \frac{\pi}{4}, \frac{\pi}{2}$ C. $x = \frac{\pi}{2}$ D. $x = \frac{\pi}{4}$ E. None of these.

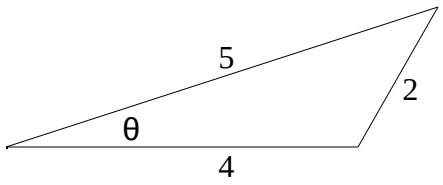
16. How many solutions of the equation $\sin 2\theta = \cos\theta$ lie in the interval $[0, 2\pi)$?

A. 2. B. 3 C. 4 D. 1 E. None of these.

17. Find $\cos\theta$ in the figure given on the right.

A. $\frac{37}{20}$ B. $\frac{7}{40}$ C. $\frac{5}{16}$

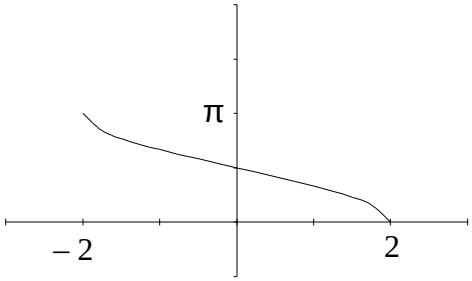
D. $\frac{37}{40}$ E. None of these



18. Given $\cos\theta = \frac{3}{4}$ and $270° < \theta < 360°$, find $\sin 2\theta$

A. $\frac{-3\sqrt{7}}{8}$ B. $\frac{-\sqrt{7}}{4}$ C. $-\frac{1}{8}$ D. $\frac{1}{8}$ E. $\frac{3\sqrt{7}}{8}$

19. Which equation best describes the graph given below?



A. $y = 2\sin^{-1}(x)$ B. $y = \cos^{-1}\left(\frac{x}{2}\right)$

C. $y = 2\cos^{-1}(x)$ D. $y = \sin^{-1}\left(\frac{x}{2}\right)$

E. $y = \cos^{-1}(2x)$

20. Find the $\cos\left(2\arcsin\left(-\frac{4}{5}\right)\right)$. Do not use a calculator.

A. $\frac{7}{25}$ B. $-\frac{7}{25}$ C. $\frac{32}{25}$ D. $-\frac{32}{25}$ E. None of these.

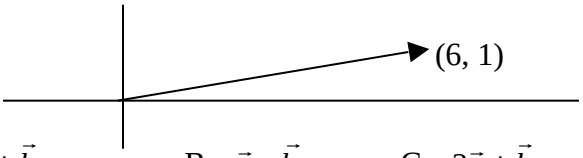
21. Point A is 2.0 miles north of B. The bearing from A to C is S 35° W and the bearing from B to C is S 86° W. Find the distance from A to C correct to one decimal place.

A. 2.6 miles B. 1.6 miles C. 1.5 miles D. 3.5 miles E. None of these.

22. Find the magnitude of the vector $\langle 2,3\rangle$

A. $\sqrt{6}$ B. 6. C. 5 D. $\sqrt{13}$ E. None of these.

23. If $\vec{a}=\langle 2,2\rangle$ and $\vec{b}=\langle -2,3\rangle$, the sketch below corresponds to:

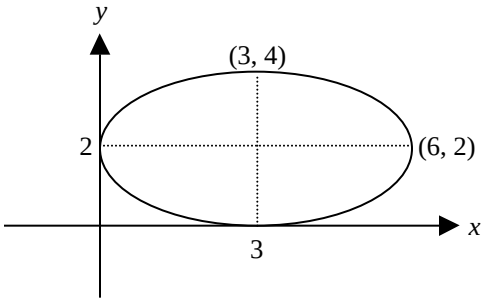


A. $\vec{a}+\vec{b}$ B. $\vec{a}-\vec{b}$ C. $2\vec{a}+\vec{b}$ D. $2\vec{a}-\vec{b}$ E. None of these.

24. If 6.0 lb, 110° is the magnitude and direction of one force and 2.0 lbs, 200° is the magnitude and direction of a second force, calculate the magnitude (to one decimal place) and the direction (to the nearest degree) of the resultant.

A. 6.3 lb, 128° B. 5.7 lb, 182° C. 6.3 lb, 182° D.8.0 lb, 182° E. None of these.

25. Which equation best describes that graph given below?



A. $\frac{(x-6)^2}{3}+\frac{(y-4)^2}{2}=1$ B. $\frac{(x-6)^2}{9}+\frac{(y-4)^2}{9}=1$

C. $\frac{(x-3)^2}{9}+\frac{(y-2)^2}{4}=1$ D. $\frac{(x-3)^2}{4}+\frac{(y-2)^2}{9}=1$

E. $\frac{(x-2)^2}{9}+\frac{(y-3)^2}{4}=1$

26. Classify the equations given below.

I. $x^2 - y^2 + 2x = 15$ II. $x^2 + 3y^2 + 4x - 2y - 5 = 0$ III. $x^2 - 4x + y - 7 = 0$

A. *I. ellipse*, *II. parabola*, *III. hyperbola*

B. *I. hyperbola*, *II. ellipse*, *III. parabola*

C. *I. parabola*, *II. hyperbola*, *III. ellipse*

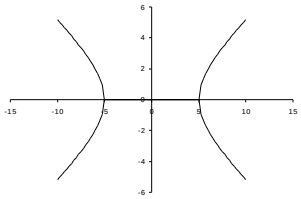
D. *I. hyperbola*, *II. parabola*, *III. ellipse*

E. *I. parabola*, *II. ellipse*, *III. hyperbola*

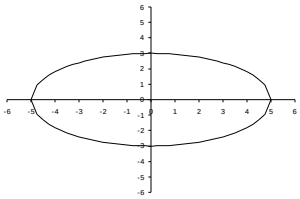
F. *I. ellipse*, *II. hyperbola*, *III. parabola*

27. The graph of $9x^2 - 25y^2 = 225$ most closely resembles which graph sketched below?

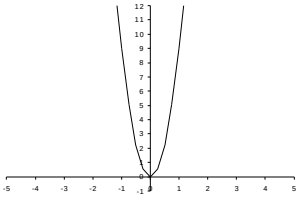
A.



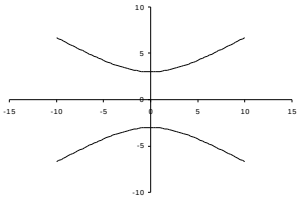
B.



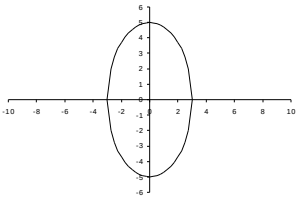
C.



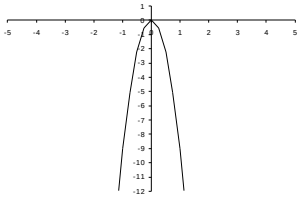
D.



E.



F.



28. Find the vertex of the parabola $y^2 - 4y - 2x - 4 = 0$

A. (–2. 2) B. (–4, 2) C. (2, –4) D. (4, –2) E. (2, –2)

29. An arch of a bridge over a roadway is semielliptical with major axis horizontal. The base of the arch is 30 feet across and highest part of the arch is 10 feet above the horizontal roadway. Find the height of the arch 10 feet from the center of the base.

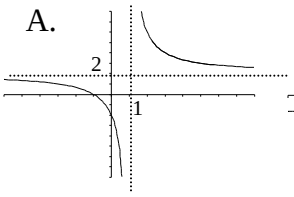
A. 9.4 feet B. 8.9 feet C. 7.5 feet D. 10.0 feet E. 9.9 Feet

30. List all places where the graph of $f(x) = \dfrac{x^2 - 9}{x^2 + 2x}$ has vertical asymptotes.

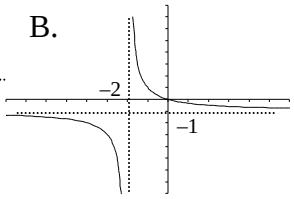
A. $x = 0$ B. $x = 2$ C. $x = 0, x = -2$ D. $x = 3, x = -3$ E. None of these.

31. The graph of $f(x) = \dfrac{x - 2}{x + 2}$ most closely resembles which graph sketched below?

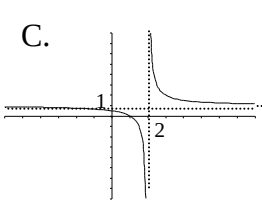
A.



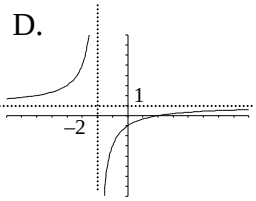
B.



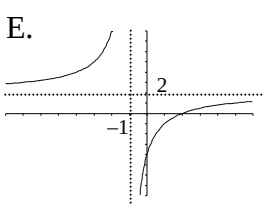
C.



D.



E.



32. Find the reference angle for $\theta = -156°$

A. $\theta_R = 156°$ B. $\theta_R = 204°$ C. $\theta_R = 66°$ D. $\theta_R = 24°$ E. None of these.

33. Find the reference angle for $\theta = \dfrac{4\pi}{3}$

A. $\theta_R = \dfrac{\pi}{3}$ B. $\theta_R = \dfrac{4\pi}{3}$ C. $\theta_R = \dfrac{2\pi}{3}$ D. $\theta_R = -\dfrac{2\pi}{3}$ E. None of these.

34. Find all the values of θ in the interval $[0, 2\pi)$ that satisfies the equation $\sin\theta = -0.5873$. Round your answer to two decimals.

A. –0.63, 3.77 B. 0.63, 2.51 C. 3.77, 5.66 D. 5.34, 2.20 E. None of these.

Answers:

1	C	18	A
2	E	19	B
3	C	20	B
4	C	21	A
5	E (-4/3)	22	D
6	A	23	D
7	B	24	A
8	D	25	C
9	B	26	B
10	A	27	A
11	C	28	B
12	B	29	C
13	B	30	C
14	C	31	D
15	E (3π/2)	32	D
16	C	33	A
17	D	34	C