

Practice Problems

Final Exam - Form E

Directions: Choose the correct answer.

1. Find the sine, cosine and tangent of 360° .

- a. 1, 0, 1 b. 0, 1, 0 c. 1, 0, undefined d. undefined, 0, 1

2. Let $(1, -3)$ be on the terminal side of an angle θ in standard position. Find the six trigonometric functions of θ . (Answers are given in order: $\sin \theta$, $\cos \theta$, $\tan \theta$, $\csc \theta$, $\sec \theta$, $\cot \theta$.)

a. $-\frac{3\sqrt{10}}{10}, -\frac{\sqrt{10}}{10}, 3, -\frac{\sqrt{10}}{3}, -\sqrt{10}, \frac{1}{3}$ b. $-\frac{\sqrt{10}}{10}, -\frac{3\sqrt{10}}{10}, 3, -\sqrt{10}, -\frac{\sqrt{10}}{3}, \frac{1}{3}$

c. $-\frac{3\sqrt{10}}{10}, \frac{\sqrt{10}}{10}, -3, -\frac{\sqrt{10}}{3}, \sqrt{10}, -\frac{1}{3}$ d. $\frac{3\sqrt{10}}{10}, \frac{\sqrt{10}}{10}, 3, \frac{\sqrt{10}}{3}, \sqrt{10}, \frac{1}{3}$

3. Perform the indicated operation: $\frac{\sin \theta}{\cos \theta} + \frac{4}{\sin \theta}$

- a. $4\sin \theta$ b. $\frac{\sin \theta + 4\cos \theta}{\sin \theta \cos \theta}$ c. $4\tan \theta$ d. $\frac{\sin^2 \theta + 4\cos \theta}{\sin \theta \cos \theta}$

4. If $\tan \theta = \frac{5}{3}$ and θ terminates in QIII, find $\sin \theta$, $\cos \theta$, and $\cot \theta$.

a. $-\frac{5\sqrt{34}}{34}, -\frac{3\sqrt{34}}{34}, \frac{3}{5}$ b. $\frac{5\sqrt{34}}{34}, \frac{3\sqrt{34}}{34}, -\frac{3}{5}$ c. $-\frac{5}{4}, -\frac{3}{4}, \frac{3}{5}$ d. $\frac{5}{4}, \frac{3}{4}, -\frac{3}{5}$

5. Find the exact value of the sine, cosine, and tangent of 45° .

a. $\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}, 1$ b. $\frac{1}{2}, \frac{\sqrt{3}}{2}, 1$ c. $1, 1, -1$ d. $-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, 1$

6. Use your calculator to find $\cos 46^\circ 20'$.

- a. .7234 b. .6905 c. .5544 d. .6921

7. Use your calculator to find $\sec 23.7^\circ$.

- a. .0422 b. 1.0921 c. .9999 d. 1.0254

8. Use your calculator to find θ to the nearest tenth of a degree if θ terminates in QI and $\sin \theta = .4279$.

- a. 64.7° b. 23.6° c. 25.3° d. 66.4°

9. In right triangle ABC with $C = 90^\circ$, if $A = 28^\circ$ and $c = 16$ cm, find a (to the nearest tenth).

- a. 7.5 cm b. 34.1 cm c. 18.1 cm d. 14.1 cm

10. A 15 foot ladder is placed against a building so that its lower end is 3.8 feet from the base of the building. What angle does the ladder make with the ground?

- a. 15° b. 75° c. 60° d. 14°

11. Find the exact value of the sine, cosine, and tangent of 315° .

- a. $\frac{+\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}, 1$ b. $\frac{1}{2}, \frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{3}$ c. $\frac{\sqrt{3}}{2}, \frac{1}{2}, \frac{\sqrt{3}}{3}$ d. $\frac{-\sqrt{2}}{2}, \frac{+\sqrt{2}}{2}, -1$

12. Use your calculator to find θ to the nearest tenth of a degree if θ terminates in QII and $\cos \theta = -.2534$.

- a. 107.5° b. 43.2° c. 104.7° d. 14.7°

13. Find the exact value of $\sin \frac{5\pi}{3}$.

a. $\frac{\sqrt{3}}{2}$

b. $\frac{1}{2}$

c. $-\frac{\sqrt{3}}{2}$

d. $-\frac{1}{2}$

14. Find the length of the arc S cut off by a central angle of 150° in a circle of radius 12 cm.

a. 31.4 cm

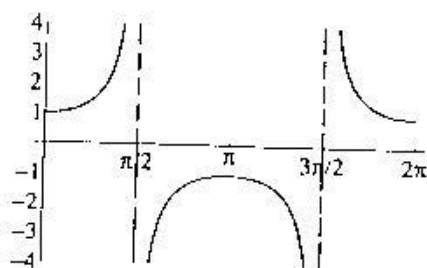
b. 10.0 cm

c. 27.3 cm

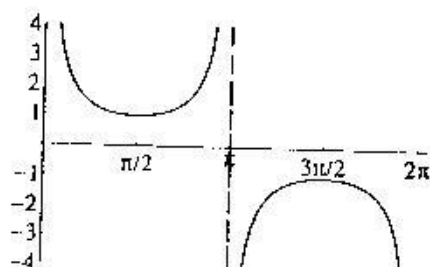
d. 5.0 cm

15. Identify the graph of $y = \sec x$ between $x = 0$ and $x = 2\pi$.

a.

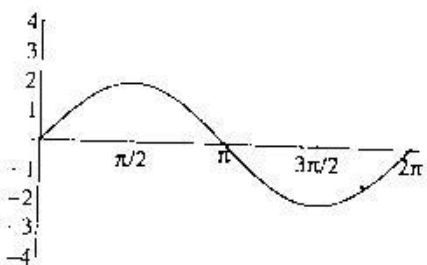


b.

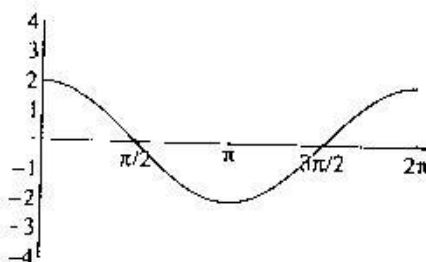


16. Identify one complete cycle of the graph of $y = 2\sin x$.

a.

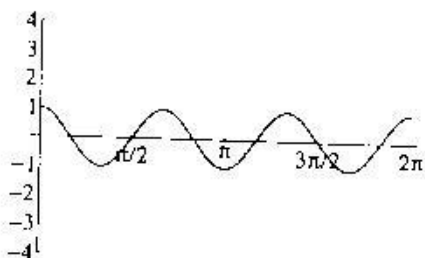


b.

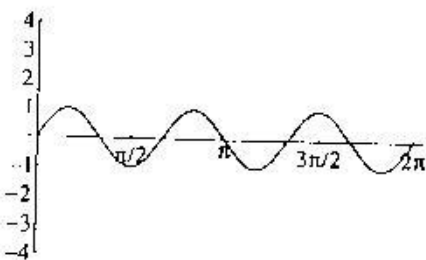


17. Sketch one complete cycle of the graph of $y = \sin 3x$.

a.



b.



18. Evaluate. $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

a. 300°

b. 60°

c. 45°

d. 120°

19. Evaluate without using a calculator. $\sin(\arccos \frac{3}{5})$

a. $\frac{3}{5}$

b. $\frac{4}{5}$

c. $\frac{3}{4}$

d. $\frac{4}{3}$

20. Prove the identity: $\frac{\sec \theta}{\sin \theta} - \frac{\sin \theta}{\cos \theta} = \cot \theta$

21. Given that $\cos \theta = \frac{2}{5}$, θ terminates in Q1, find $\sin 2\theta$.

a. $4\sqrt{21}$

b. $-4\sqrt{21}$

c. $-\frac{4\sqrt{21}}{25}$

d. $\frac{4\sqrt{21}}{25}$

22. Find θ if $0^\circ \leq \theta < 360^\circ$ and $\tan \theta + \sqrt{3} = 0$.

a. $0^\circ, 60^\circ$

b. $0^\circ, 120^\circ$

c. $120^\circ, 300^\circ$

d. $0^\circ, 120^\circ, 300^\circ$

23. Find θ if $0 \leq \theta < 2\pi$ and $\tan^2 \theta - \sec \theta - 1 = 0$.

a. $\frac{\pi}{3}$

b. $\frac{\pi}{3}, -\frac{\pi}{3}, -\pi$

c. $\frac{\pi}{3}, -\frac{\pi}{3}$

d. $-\pi$

24. Find θ if $0 \leq \theta < 2\pi$ and $\sin 3\theta = \frac{\sqrt{3}}{2}$.

a. $\frac{\pi}{3}, \frac{2\pi}{3}$

b. $\frac{\pi}{9}, \frac{2\pi}{9}$

c. $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}, \frac{13\pi}{3}, \frac{14\pi}{3}$

d. $\frac{\pi}{9}, \frac{2\pi}{9}, \frac{7\pi}{9}, \frac{8\pi}{9}, \frac{13\pi}{9}, \frac{14\pi}{9}$

25. In triangle ABC which is not necessarily a right triangle, if $A = 42^\circ$, $B = 89^\circ$, and $b = 10.6$ cm, find a .

a. 10.0 cm

b. 7.1 cm

c. 22.4 cm

d. 12.5 cm

26. In triangle ABC which is not necessarily a right triangle, if $a = 8.46$ ft, $b = 12.9$ ft, and $c = 17.6$ ft, find A .

a. 27.0°

b. 99.0°

c. 28.6°

d. 97.1°

27. Find the area of the triangle in problem number 26

a. 51.5 cm^2

b. 52.8 cm^2

c. 112.1 cm^2

d. 112.6 cm^2

28. Find the magnitude of the vector $2i - 5j$.

a. $\sqrt{27}$

b. $\sqrt{21}$

c. $\sqrt{29}$

d. 3

29. Perform the indicated operation. Write your answer in trigonometric form.

$$\frac{6(\cos 40^\circ + i \sin 40^\circ)}{3(\cos 10^\circ + i \sin 10^\circ)}$$

a. $3(\cos 30^\circ + i \sin 30^\circ)$

b. $2(\cos 4^\circ + i \sin 4^\circ)$

c. $2(\cos 30^\circ + i \sin 30^\circ)$

d. $3(\cos 4^\circ + i \sin 4^\circ)$

Answers to Final Exam

| | Form E | 1 |
|-----|--------|----|
| 1. | b | 1 |
| 2. | c | 2 |
| 3. | d | 3 |
| 4. | a | 4 |
| 5. | a | 5 |
| 6. | b | 6 |
| 7. | b | 7 |
| 8. | c | 8 |
| 9. | a | 9 |
| 10. | b | 10 |
| 11. | d | 11 |
| 12. | c | 12 |
| 13. | c | 13 |
| 14. | a | 14 |
| 15. | a | 15 |
| 16. | a | 16 |
| 17. | b | 17 |
| 18. | a | 18 |
| 19. | b | 19 |
| 20. | proof | 20 |
| 21. | d | 21 |
| 22. | c | 22 |
| 23. | b | 23 |
| 24. | d | 24 |
| 25. | b | 25 |
| 26. | a | 26 |
| 27. | a | 27 |
| 28. | c | 28 |
| 29. | c | 29 |