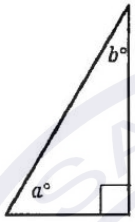
SATPREP

Assignment : *Trigonometry*

Easy

1. If $0 < \theta < 90^{o}$ and $cos(\theta) = \frac{5}{13}$, what is the value of $sin(\theta)$?

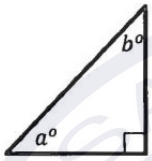
   a) $\frac{12}{13}$
   b) $\frac{5}{13}$
   c) $\frac{4}{5}$
   d) $\frac{5}{12}$



2. In the triangle above, the cosine of $b°$ is $\frac{12}{13}$. What is the cosine of $a°$?

   a) $\frac{5}{13}$
   b) $\frac{5}{12}$
   c) $\frac{13}{12}$
   d) $\frac{13}{5}$

3. A seven feet long ladder leans against a wall and makes an angle of 60° with the ground. How high up the wall does the ladder reach?
   a) $\frac{2\sqrt{3}}{7}$
   b) $\frac{7\sqrt{3}}{2}$
   c) $\frac{\sqrt{3}}{14}$
   d) $7\sqrt{3}$



4. In the triangle above, the sine of $b°$ is 0.8. What is the cosine of $a°$?
   a) 0.8
   b) 0.6
   c) 0.4
   d) 0.2

5. If $\sin(\frac{\pi}{2} - x) = 0.35$, what is $\cos x$?
   a) 0.35
   b) 0.43
   c) 0.45
   d) 0.53

6. If $\sin(x - \frac{\pi}{2}) = 0.2$, what is $\cos x$?
   a) 0.8
   b) 0.98
   c) -0.2
   d) 0.2

7. If $(\theta - 60°) = \cos(25°)$, what is the measure of θ?
   a) 96°
   b) 100°
   c) 125°
   d) 136°

8. If $a + b = 90°$, which of the following must be true?
    a) $cos\ a = cos\ b$
    b) $sin\ a = sin\ b$
    c) $sin\ a = cos\ b$
    d) $sin\ a = -cos\ b$

9. If $0° \leq A \leq 90°$, $0° \leq B \leq 90°$, and $sin\ A = cos\ B$, which o the following must be true?
    a) $A - B = 90$
    b) $A = B$
    c) $A = 90 - B$
    d) $A = B - 45$

10. $45°$ is equivalent to an angle measure of
    a) $\frac{1}{4}$ radians
    b) $\frac{\pi}{4}$ radians
    c) $\frac{\pi}{3}$ radians
    d) $\frac{\pi}{2}$ radians

11. How many degrees are in 1.65 radians?
    a) 94.54
    b) 78.56
    c) 10.88
    d) 0.029

12. $75°$ is equivalent to an angle measure of?
    a) $\frac{5\pi}{12}$ radians
    b) $\frac{1}{12\pi}$ radians
    c) $\frac{5\pi}{6}$ radians
    d) $\frac{2\pi}{3}$ radians

13. Find the degree measure for $\frac{3\pi}{4}$.

14. Which of the following trigonometric functions is (are) positive in the third Quadrant?
    a) $sin(x)$
    b) $cos\ (x)$
    c) $tan(x)$
    d) All of the above

Medium

15. Which of the following cofunctions is (are) true?
    a) $\sin(90° - x) = \cos x$
    b) $\cos(90° - x) = \sin x$
    c) $\tan(90° - x) = \cot x$
    d) All of the above

16. In triangle ABC, the measure of $\angle C$ is 90^o, $AB = 15$, and $BC = 12$. Triangle XYZ is similar to triangle ABC, where vertices X, Y, and Z correspond to vertices A, B, and C, respectively. If each side of triangle XYZ is $\frac{1}{3}$ the length of the corresponding side of triangle ABC, what is the value of $\sin X$?

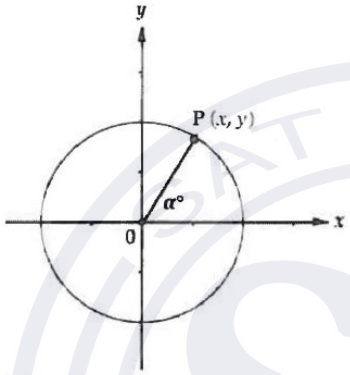
17. If $sin(\theta) = m$ and $0 < \theta < 90°$, what is the value of $cos(\theta)$?
    a) $\frac{m}{\sqrt{1-m^2}}$
    b) $\frac{1}{\sqrt{1-m^2}}$
    c) $\frac{\sqrt{1-m^2}}{m}$
    d) $\sqrt{1-m^2}$

18. If $sin(\theta) = n$ and $0 < \theta < 90°$, what is the value of $tan(\theta)$?
    a) $\frac{1}{n^2}$
    b) $\frac{n}{\sqrt{1-n^2}}$
    c) $\frac{1-n^2}{n}$
    d) $\frac{n}{1-n^2}$

Note: Figures not drawn to scale.

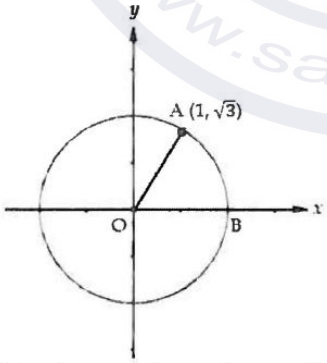
19. The angles shown above are acute, and $\sin(x^o) = \cos(y°)$. If $x = 3k - 11$ and $y = 2k - 9$, what is the value of k?
    a) 12
    b) 22
    c) 23.5
    d) 27.5

20. A ramp is 60 meters long and set at a 25° angle of inclination. If you walk up to the top of the ramp, how high off the ground will you be?
    a) 25.357 meters
    b) 26.561 meters
    c) 27.91 meters
    d) 28.13 meters

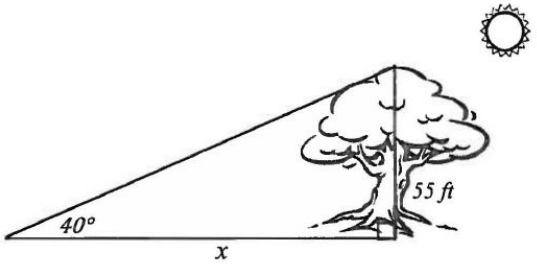


Note: Figure not drawn to scale.

21. On the unit circle above, if the values of sine and cosine of the angle $\alpha°$ are equal, what is the sum $x + y$?
    a) $2\sqrt{2}$
    b) $\sqrt{2}$
    c) $\frac{\sqrt{2}}{2}$
    d) $\frac{\sqrt{2}}{3}$



22. On the circle O in the xy-plane above, the measure of $\angle AOB$ is $\frac{\pi}{a}$ radians. What is the value of a?
    a) 4
    b) 3
    c) 2
    d) 1



23. When the Sun is 40° above the horizon, how long is the shadow cast by a tree 55 feet tall? (Round your answer to the nearest tenth.)

24. If an angle θ measured counter-clockwise from the positive x-axis terminates in the third Quadrant, which of the following is true?
    a) Both of $\sin(\theta)$ and $\cos(\theta)$ are negative.
    b) Both of $\sin(\theta)$ and $\cos(\theta)$ are positive.
    c) $\sin(\theta)$ is negative and $\cos(\theta)$ is positive.
    d) $\sin(\theta)$ is positive and $\cos(\theta)$ is negative.

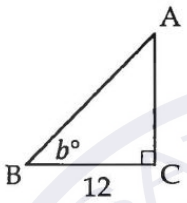
25. A ferris wheel with diameter of 52 feet revolves $\frac{9\pi}{2}$ radians every five minutes. What is the total distance a seat on the rim of the wheel travels in five minutes? (Round your answer to the nearest whole number.)

26. A shaft, pivoted at one end, spins through $\frac{4\pi}{3}$ radians. If the shaft is 15 centimeters long, what is the distance (in cm) that the shaft travels?
    a) 5π
    b) 10π
    c) 15π
    d) 20π

27. An hour hand of a clock rotates through $\frac{9\pi}{7}$ radians clockwise. If the hour hand is 4 inches long, what is the length of the arc that the tip of the hour hand moves through?
    a) 5π inches
    b) 5.14π inches
    c) 6.17π inches
    d) 8.78π inches

28. How many degrees does the minute hand of a clock turn every 20 minutes?

29. In the triangle below, if $\sin(b°) = 0.8$ and the BC = 12, what is the perimeter of the triangle?

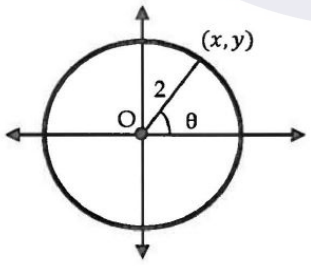


Note: Figure not drawn to scale.

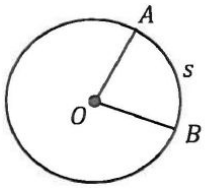
30. The graph of $y = 3\cos(2x) + 3$ intersects the y-axis at what value of y?

31. In a triangle, one angle measures $x°$, where $\sin(x°) = \frac{2}{5}$. What is $\cos(90° - x°)$?

32. In the xy-plane below, O is the center of the circle with a radius of 2, and the measure of $\angle\theta$ is $\frac{\pi}{3}$ radians. What is the value of $x + y$? (Round your answer to the nearest tenth.)



33. In the figure below, the circle has center O and radius 3. If the area of the minor sector $\widehat{AB}$ is between 5 and 10, what is one possible integer value of arc length s?



34. If the Leaning Tower of Pisa is 55 meters tall and the top edge of the tower leans 5 meters out from the bottom edge, what is *sine* of the angle created between the ground and the tower?
    a) 1
    b) 0.091
    c) 0.993
    d) 0.996

Hard

35. Every morning before breakfast, Jacques jogs 2.5 miles at 10 degrees north of east and then 1.5 miles at 18 degrees in the same direction. How many miles east from his starting point will he end up?
    a) 4 miles
    b) 3.89 miles
    c) 3.5 miles
    d) 3.43 miles

36. Which of the following trigonometric function(s) has (have) no end behavior (asymptotes)?

I. $\sin(x)$
II. $\cos(x)$
III. $\tan(x)$

a) I only
b) I and II only
c) III only
d) I, II, and III

37. As angle x increases from 0 to 2π radians, in which Quadrant(s) does $\tan(x)$ increase?

a) The first and third Quadrants only
b) The second and fourth Quadrants only
c) All four Quadrants
d) None of the above

38. What is the measure in radians of the smallest positive angle x that will give the maximum value for $y = 3 - \cos(2x)$?

a) 0
b) $\frac{\pi}{2}$
c) π
d) $\frac{3\pi}{2}$

39. Which of the following must be FALSE?

I. $\sin(-\theta) = -\sin(\theta)$
II. $\cos(-\theta) = -\cos(\theta)$
III. $\tan(-\theta) = -\tan(\theta)$

a) I only
b) II only
c) I and III only
d) I, II, and III