Pre - Calculus Mathematics 40S

Standards Test Practice Exam

Trigonometry I

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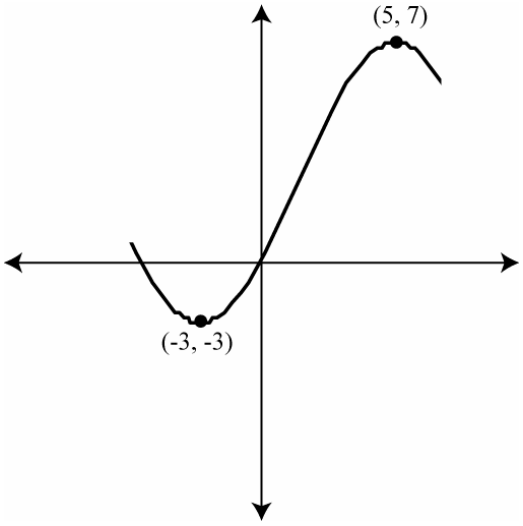
1. The minimum and the maximum of a trigonometric function are shown in the diagram.

a) Write a cosine equation for the function



b) Determine the value of the y – intercept, correct to three decimal places

2. Convert $\frac{11\pi}{18}$ to degrees

3. Find the exact value of $\sin\theta$ if $\cos\theta = \frac{1}{\sqrt{7}}$, and the terminal arm is in Quadrant I.

4. What is the period in the function $f(x) = 3\sin(5x) - 2$

5. Given the point (-3, -4), determine the exact values of $\cos\theta$ and $\sin\theta$

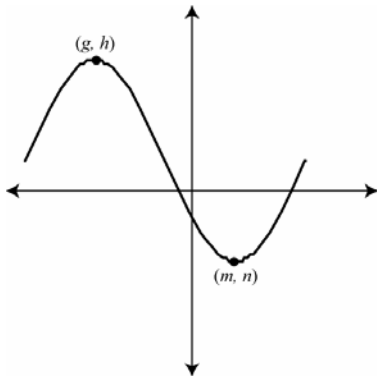
6. The length of arc swept out by an angle θ is 50 cm. If the radius of the circle is 18 cm, determine the measure of θ in radians.

7. Determine a value for x that would make the function $f(x) = 3\csc x$ undefined in the domain $[0, 2\pi)$

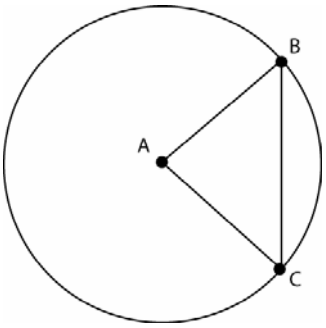
8. Determine the value of $f(10)$ in the function $f(x) = 4\sin\left[\pi(x-2)\right] + 3$

9. The graph of $y = 6\cos\left(x + \frac{3\pi}{4}\right) + 1$ is illustrated below.

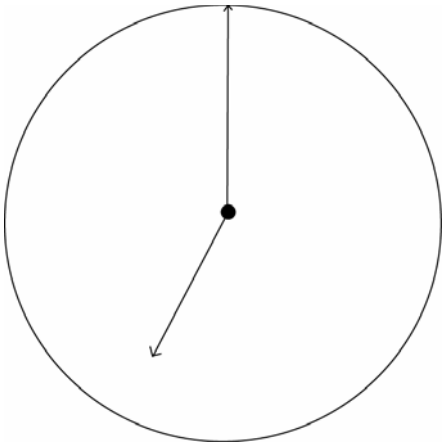
Determine the exact values of *g, h, m & n*.



10. If the measure of the central angle is $\frac{\pi}{4}$, determine the measures of the other two angles within the triangle.

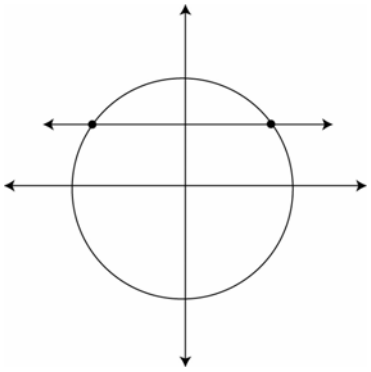


11. Determine the number of radians between the hour hand and the minute hand at 7:00.



12. Determine the value of $\cos\left(-\frac{7\pi}{4}\right)$

13. The circle $x^2 + y^2 = 1$ is drawn below, along with the line $y = \frac{\sqrt{3}}{2}$.
Determine the coordinates of the two intersection points.



14. The graph of $f(x) = 6\sin x + d$ touches the *x*-axis once (*but does not pass through*) on the interval $0 \le x \le 2\pi$. A possible value for *d* is:

15. a) Graph $y = \cos x$

b) Graph $y = \cos^{-1} x$

c) State the domain of $f^{-1}(x)$

16. The maximum point on a trigonometric graph is at the point (-4, 6), and the minimum point is at (2, -2). If the graph is of the form $y = a\cos\left[b(x+c)\right] + d$, then determine possible values for each of the parameters.

17. An angle of 15° is equivalent to _____ radians. (*exact value*)

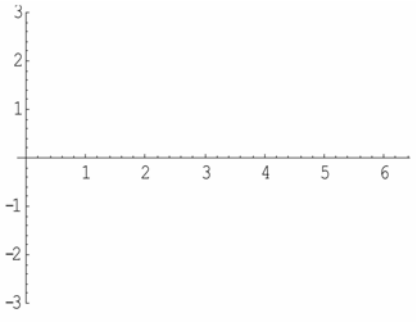
18. The exact value of $\cos^{-1}\left(\cos\frac{5\pi}{6}\right)$ is

19. Write the general equation of a vertical asymptote in the graph of $y = \csc x$

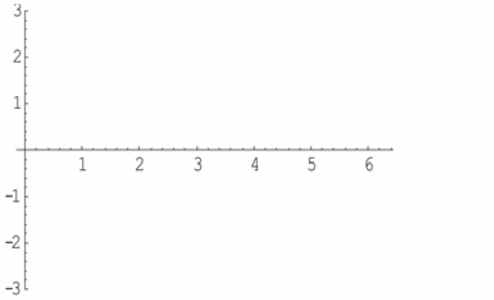
20. If $\csc\theta = 2$ and $\tan\theta < 0$, determine the value of $\cos\theta$

21. Given the function $f(x) = 2\sin\left[\frac{\pi}{2}(x-2)\right]$

a) Sketch the graph



b) Sketch $y = |f(x)|$



22. If the coordinates of a point $P(\theta)$ on the unit circle is (a, b), then the coordinates of the point $P[\theta + 180^o]$ are

23. State the period of the graph of $y = \csc\theta$

24. Convert $\frac{3\pi}{5}$ to degrees. Express answer to one decimal place.

25. Given the function $f(x) = \tan x$

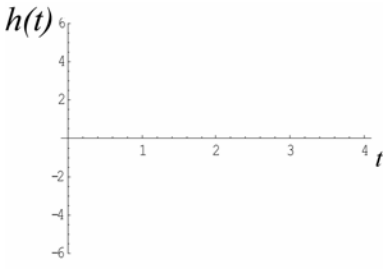
a) Sketch $y = f(x)$ on the domain $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

b) State the domain of $f(x)$

c) Sketch the graph of $f^{-1}(x)$

26. A floating ball in a lake goes up and down with the tide.
At 1 second, the ball has a minimum height of 5 cm below surface level.
At 3 seconds, the ball has a maximum height of 5 cm above surface level.

a) Sketch a graph for the first 4 seconds of motion



b) Write an equation for the function

27. If the product of $\cos x$ and $\sin x$ is negative, then which quadrant is the angle in?

28. The value of $\sin^{-1}\left(\frac{1}{2}\right)$ is

29. The exact value of $\sin\left(\cos\frac{\pi}{2}\right)$ is

30. If the coordinates of a point $P(\theta)$ on the unit circle are $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$, then the coordinates of the point $P\left[\theta + 180^{o}\right]$ are

31. A tire rolls 3π metres while turning 240°. Determine the area of the wheel.

MULTIPLE CHOICE SECTION

1. Given $\csc\theta = \frac{5}{4}$, the exact value of $\tan\theta$ is

a) $\frac{5}{4}$

b) $\frac{3}{5}$

c) $\pm\frac{3}{4}$

d) $\pm\frac{4}{3}$

2. A tire has a radius of $\frac{\pi}{5}$ m. The tire is rolled and travels a total distance of 28π m. By the time the tire stops, it has rolled through an angle of

a) 28π

b) $140°$

c) $\frac{28}{5}$ rad

d) $8021.41°$

3. Given the trigonometric function $f(x) = \cos x$, the statement which is true is

a) $f(x) = -f(x)$

b) $f(x) = f(-x)$

c) $f(x) = f^{-1}(x)$

d) $f(x) = -f(-x)$

4. If $90^0 < \theta < 180^0$, a true statement is

a) $0^0 < \theta < 90^0$

b) $\cos\theta \le \tan\theta$

c) $0 < \sin\theta < 1$

d) $0 < \cos\theta < 1$

5. Given the function $f(x)=12\cos(2x)$, and the transformation $g(x)=\frac{1}{4}f(x)$, then the amplitude of $g(x)$ is

a) 2
b) 3
c) 4
d) 12

6. The function $f(x)=2\sec x$ has a range of

a) $(-2,2)$
b) $(-\infty,-2]\cup[2,\infty)$
c) $\left[-\frac{1}{2},\frac{1}{2}\right]$
d) $(-\infty,\infty)$

7. A wheel turns through an angle of 16 radians. This angle measurement in degrees is

a) $\frac{\pi^0}{8}$
b) $\frac{18^0}{\pi}$
c) $8\pi^0$
d) $\frac{2800^0}{\pi}$

8. A sine function has a range of [-6, 2] and a period of 4. A trigonometric equation with these properties is

a) $y=8\sin\left(\frac{\pi}{2}\theta\right)+2$
b) $y=4\sin(4\theta)-2$
c) $y=4\sin\left(\frac{\pi}{2}\theta\right)-2$
d) $y=4\sin\left(\frac{2}{\pi}\theta\right)-2$

9. The angle $\frac{24\pi}{3}$ is co-terminal to an angle of

a) 0°

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

c) $\frac{5\pi}{6}$

d) $\frac{7\pi}{3}$

10. The exact value of $\csc\left(\frac{7\pi}{4}\right)$ is

a) $-\sqrt{2}$

b) $-\frac{\sqrt{2}}{2}$

c) $\frac{\sqrt{2}}{2}$

d) $\sqrt{2}$

11. Given that $\cos\theta = \frac{4}{5}$ and $\sin\theta = -\frac{3}{5}$, then the terminal arm is located in quadrant

a) I
b) II
c) III
d) IV

12. The period of the function g(x) is 8. If $g(0) = 12,\ g(4) = 6,$ and $g(8) = 12$, then the value of $g(12)$ is

a) 0
b) 6
c) 12
d) 18

13. An angle of $\frac{3\pi}{2}$ on the unit circle has coordinates of

a) $\frac{1}{2}, \frac{\sqrt{3}}{2}$

b) $-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}$

c) (0, -1)

d) (-1, 0)

14. If $\sec\theta > 0$ and $\sin\theta < 0$, then θ terminates in quadrant

a) I

b) II

c) III

d) IV

15. The period and phase shift for the trigonometric equation $y = \frac{1}{2}\sin 4\left(\theta - \frac{\pi}{3}\right)$ are

a) period = 4 ; phase shift = $\frac{\pi}{3}$ left

b) period = 4 ; phase shift = $\frac{\pi}{3}$ right

c) period = $\frac{\pi}{2}$; phase shift = $\frac{\pi}{3}$ left

d) period = $\frac{\pi}{2}$; phase shift = $\frac{\pi}{3}$ right

16. The equation of an asymptote on the graph of $y = \csc x$ is

a) $x = \frac{\pi}{4}$

b) $x = \frac{\pi}{2}$

c) $x = \pi$

d) $x = \frac{3\pi}{2}$

17. If $\tan x \sin x < 0$, then x terminates in quadrants

a) II or III
b) II or IV
c) I or IV
d) III or IV

18. The value of $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$ is:

a) $\frac{\pi}{4}$
b) $\frac{5\pi}{4}$
c) $\frac{4\pi}{3}$
d) $\frac{11\pi}{6}$