

Name: _____ Date: _____ Block: _____

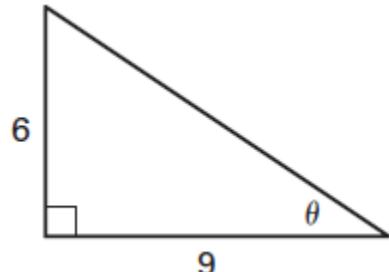
Trigonometry Functions and Unit Circle TEST STUDY GUIDE

Test covers:

- Given a right triangle, find 6 trig functions.
- Given the value of one trig ratio, find the other 5 trig ratios.
- Given a point on the unit circle, find the 6 trig ratios relative to the angle formed.
- Solve right triangles.
- Find arc lengths and sector areas of circles.
- Solve angle of elevation and depression problems.
- Convert angles from degrees to radians and vice versa.
- Determine if angles are coterminal, and find coterminal angles
- Unit circle – be able to fill-in a blank unit circle chart (exactly like one attached here)
- WITHOUT a calculator, evaluate trig and inverse trig values (know your unit circle!!)
- Solve trig equations for given intervals

Practice Questions:

- 1) Evaluate the six trigonometric functions of the angle
- θ
- .



- 2) Let
- θ
- be an acute angle of a right triangle. Find the other five trigonometric functions of
- θ
- :

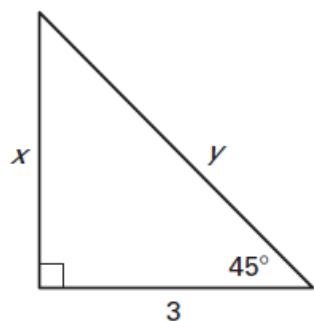
a) $\sin \theta = \frac{5}{13}$

b) $\tan \theta = 3$

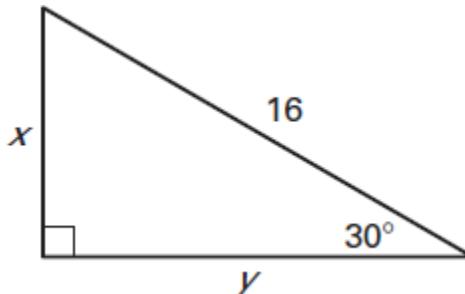
c) $\cos \theta = \frac{4}{7}$

- 3) Find the exact values of
- x
- and
- y
- .

a)

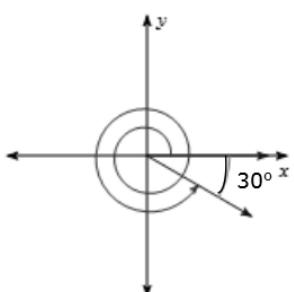


b)

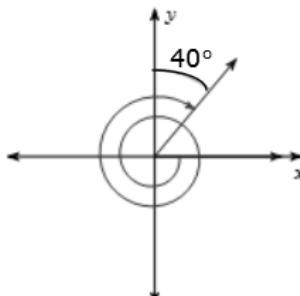


4) Find the measure of the angle in degrees.

a)



b)



5) Are the angles coterminal?

a) $35^\circ, -685^\circ$

b) $180^\circ, 720^\circ$

c) $\frac{\pi}{3}, -\frac{7\pi}{3}$

d) $\frac{3\pi}{2}, \frac{11\pi}{2}$

6) Find one positive and negative angle coterminal with the given angle.

a) 260°

b) -458°

c) $\frac{9\pi}{5}$

d) $-\frac{7\pi}{4}$

7) Convert the degree measure to radians or the radian measure to degrees.

a) -225°

b) 85°

c) 675°

d) -15°

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

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

g) $-\frac{5\pi}{36}$

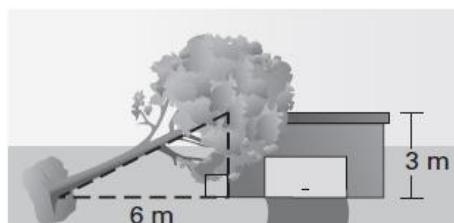
h) $\frac{15\pi}{8}$

8) Find the exact arc length and area of a sector with a radius of 2 meters and a central angle of $\theta = 120^\circ$ (answer in terms of π).

9) A child on the outer edge of a merry-go-round spins for 7 revolutions. The merry-go-round has radius 2 meters. How far did the child travel?

10) An escalator ascends 45 feet over a horizontal distance of 30 feet. What is the angle of elevation?

11) A storm knocked over a tree onto a 3 meter tall garage. The base of the tree is 6 meters from the garage. What is the angle of elevation that the tree makes with the ground?



12) Use the given point on the terminal side at angle θ in standard position to evaluate the six trigonometric functions of θ .

a) $(4, -3)$

b) $(-5, 8)$

c) $(-1, -2)$

13) Evaluate the expression without using a calculator.

a) $\sin(-210^\circ)$

b) $\tan 135^\circ$

c) $\cos 240^\circ$

d) $\sec(-270^\circ)$

e) $\cot 150^\circ$

f) $\csc 90^\circ$

g) $\csc(-495^\circ)$

h) $\sec 225^\circ$

14) Evaluate the expression WITHOUT using a calculator. Give your answer in **both** radians and degrees.

a) $\sin^{-1}(-1)$

b) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

c) $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right)$

d) $\sec^{-1}(2)$

15) Solve the equation for θ on the given interval. Answer using radians or degrees as indicated.

a) $\tan \theta = 1$ on $[0, 2\pi]$
(radians)

b) $\cos \theta = -\frac{\sqrt{3}}{2}$ on $[0, 2\pi]$
(radians)

c) $\sin \theta = \frac{\sqrt{2}}{2}$ on $[0, 2\pi]$
(radians)

d) $\tan \theta = -\frac{\sqrt{3}}{3}$ on $[0, 2\pi]$
(radians)

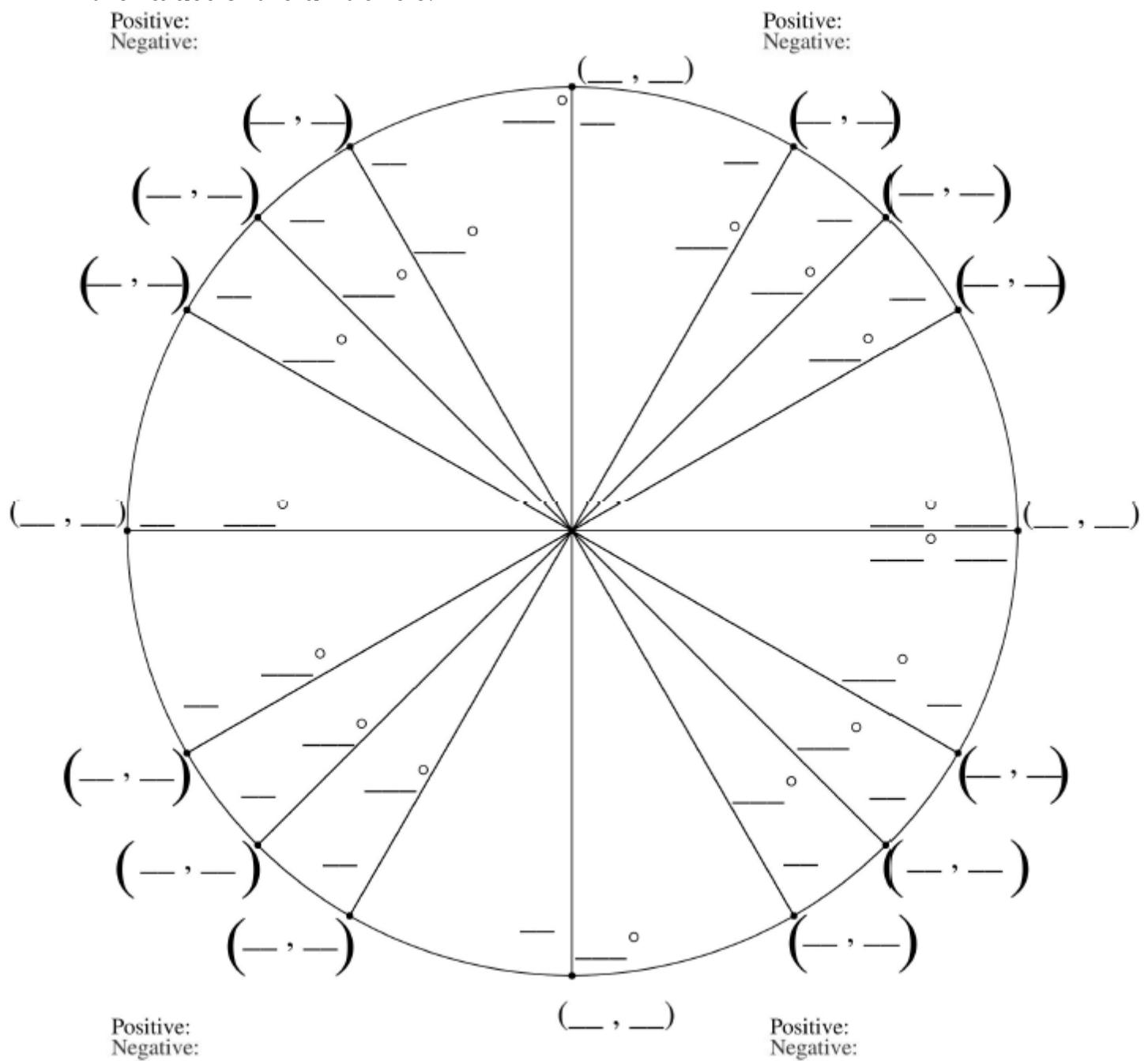
e) $\sin \theta = \sqrt{3}$ on $[0, 2\pi]$
(radians)

f) $\tan \theta = 3.2$ for $180^\circ \leq \theta \leq 270^\circ$
(degrees)

g) $\sin \theta = -0.45$ for $180^\circ \leq \theta \leq 270^\circ$
(degrees)

h) $\cos \theta = -0.36$ for $90^\circ \leq \theta \leq 180^\circ$
(degrees)

16) Fill in the values of the unit circle:



STUDY GUIDE ANSWERS

1) $\sin \theta = \frac{2\sqrt{13}}{13}$, $\cos \theta = \frac{3\sqrt{13}}{13}$, $\tan \theta = \frac{2}{3}$, $\csc \theta = \frac{\sqrt{13}}{2}$, $\sec \theta = \frac{\sqrt{13}}{3}$, $\cot \theta = \frac{3}{2}$

2) a) $\cos \theta = \frac{12}{13}$, $\tan \theta = \frac{5}{12}$, $\csc \theta = \frac{13}{5}$, $\sec \theta = \frac{13}{12}$, $\cot \theta = \frac{12}{5}$

b) $\sin \theta = \frac{3\sqrt{10}}{10}$, $\cos \theta = \frac{\sqrt{10}}{10}$, $\csc \theta = \frac{\sqrt{10}}{3}$, $\sec \theta = \sqrt{10}$, $\cot \theta = \frac{1}{3}$

c) $\sin \theta = \frac{\sqrt{33}}{7}$, $\tan \theta = \frac{\sqrt{33}}{4}$, $\csc \theta = \frac{7\sqrt{33}}{33}$, $\sec \theta = \frac{7}{4}$, $\cot \theta = \frac{4\sqrt{33}}{33}$

3) a) $x = 3$; $y = 3\sqrt{2}$ b) $x=8$; $y = 8\sqrt{3}$

4) a) 690° b) -670°

5) a) yes b) no c) no d) yes

6) answers may vary: a) 620° ; -100° b) 262° ; -98° c) $\frac{19\pi}{5}$; $-\frac{\pi}{5}$ d) $\frac{\pi}{4}$; $-\frac{15\pi}{4}$

7) a) $-\frac{5\pi}{4}$ b) $\frac{17\pi}{36}$ c) $\frac{15\pi}{4}$ d) $-\frac{\pi}{12}$ e) 120° f) 405° g) -25° h) 337.5°

8) length: $\frac{4\pi}{3}$ m area: $\frac{4\pi}{3}$ m²

9) 28π meters

10) 56.3°

11) 26.6°

12) a) $\sin \theta = -\frac{3}{5}$, $\cos \theta = \frac{4}{5}$, $\tan \theta = -\frac{3}{4}$, $\csc \theta = -\frac{5}{3}$, $\sec \theta = \frac{5}{4}$, $\cot \theta = -\frac{4}{3}$

b) $\sin \theta = \frac{8\sqrt{89}}{89}$, $\cos \theta = -\frac{5\sqrt{89}}{89}$, $\tan \theta = -\frac{8}{5}$, $\csc \theta = \frac{\sqrt{89}}{8}$, $\sec \theta = -\frac{\sqrt{89}}{5}$, $\cot \theta = -\frac{5}{8}$

c) $\sin \theta = -\frac{2\sqrt{5}}{5}$, $\cos \theta = -\frac{\sqrt{5}}{5}$, $\tan \theta = 2$, $\csc \theta = -\frac{\sqrt{5}}{2}$, $\sec \theta = -\sqrt{5}$, $\cot \theta = \frac{1}{2}$

13) a) $\frac{1}{2}$ b) -1 c) $-\frac{1}{2}$ d) undefined e) $-\sqrt{3}$ f) 1 g) $-\sqrt{2}$ h) $-\sqrt{2}$

14) a) $-\frac{\pi}{2}$; 90° b) $-\frac{\pi}{4}$, -45° c) $-\frac{\pi}{6}$, -30° d) $\frac{\pi}{3}$, 60°

15) a) $\frac{\pi}{4}, \frac{5\pi}{4}$ b) $\frac{5\pi}{6}, \frac{7\pi}{6}$ c) $\frac{\pi}{4}, \frac{3\pi}{4}$ d) $\frac{5\pi}{6}, \frac{11\pi}{6}$ e) undefined f) 252.6° g) 206.7° h) 111.1°

16) (see below)

Positive: sin, csc
Negative: cos, tan, sec, csc

Positive: sin, cos, tan, sec, csc, cot
Negative: none

