Name: _____ Class: _____ Date: _____ ID: A

Trig Midterm Review

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

____ 1. Change 360.43° to degrees, minutes, and seconds.
a. 360° 55′ 56″
b. 360° 25′ 48″
c. 360° 56′ 80″
d. 360° 53′ 55″

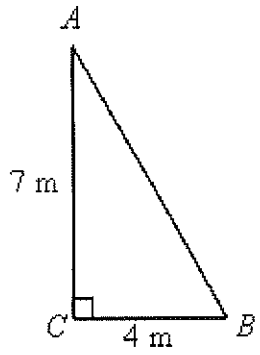
____ 2. Write 87° 26′ 3″ as a decimal to the nearest thousandth.
a. 87.437°
b. 87.444°
c. 87.484°
d. 87.434°

____ 3. Give the angle measure represented by 120° rotations clockwise.
a. 43199°
b. –43203°
c. –43200°
d. 43201°

____ 4. Find the least positive angle measurement that is coterminal with –230°.
a. 140°
b. 135°
c. 130°
d. 132°

Find the values of the sine, cosine, and tangent for ∠A.

____ 5.



a. $\sin A = \frac{4\sqrt{65}}{65}, \cos A = \frac{7\sqrt{65}}{65}, \tan A = \frac{4}{7}$

b. $\sin A = \frac{\sqrt{65}}{7}, \cos A = \frac{\sqrt{65}}{4}, \tan A = \frac{4}{7}$

c. $\sin A = \frac{\sqrt{65}}{4}, \cos A = \frac{\sqrt{65}}{7}, \tan A = \frac{7}{4}$

d. $\sin A = \frac{7\sqrt{65}}{65}, \cos A = \frac{4\sqrt{65}}{65}, \tan A = \frac{7}{4}$

____ 6. If $\tan\theta = \frac{3}{4}$, find $\sin\theta$.

a. $\sin\theta = \frac{1}{2}$

b. $\sin\theta = \frac{3}{5}$

c. $\sin\theta = 2$

d. $\sin\theta = \frac{8}{5}$

____ 7. Find $\cos\theta$ if θ is an angle in standard position and the point with coordinates (–12, 5) lies on the terminal side of the angle.

a. $\frac{5}{13}$

b. $-\frac{5}{12}$

c. $-\frac{13}{12}$

d. $-\frac{12}{13}$

____ 8. Find the values of the six trigonometric functions of an angle in standard position if the point with coordinates (6, 8) lies on its terminal side.

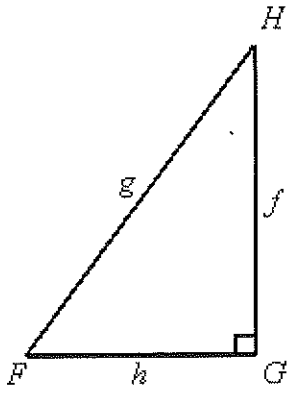
a. $\sin\alpha = \frac{5}{4}$, $\cos\alpha = \frac{5}{3}$, $\tan\alpha = \frac{3}{4}$
$\csc\alpha = \frac{4}{5}$, $\sec\alpha = \frac{3}{5}$, $\cot\alpha = \frac{4}{3}$

b. $\sin\alpha = \frac{4}{3}$, $\cos\alpha = \frac{3}{4}$, $\tan\alpha = \frac{4}{5}$
$\csc\alpha = \frac{3}{4}$, $\sec\alpha = \frac{4}{3}$, $\cot\alpha = \frac{5}{4}$

c. $\sin\alpha = \frac{3}{5}$, $\cos\alpha = \frac{4}{5}$, $\tan\alpha = \frac{4}{3}$
$\csc\alpha = \frac{5}{3}$, $\sec\alpha = \frac{5}{4}$, $\cot\alpha = \frac{3}{4}$

d. $\sin\alpha = \frac{4}{5}$, $\cos\alpha = \frac{3}{5}$, $\tan\alpha = \frac{4}{3}$
$\csc\alpha = \frac{5}{4}$, $\sec\alpha = \frac{5}{3}$, $\cot\alpha = \frac{3}{4}$

____ 9. If $g = 26.4$ and $F = 35°$, find h. Round to the nearest tenth.



a. $h = 22.6$

b. $h = 21.6$

c. $h = 24.6$

d. $h = 20.6$

Solve the equation if $0° \le x \le 360°$.

____ 10. $\cos x = -\frac{1}{2}$

a. 135°, 225°
c. 150°, 210°
b. 210°, 330°
d. 120°, 240°

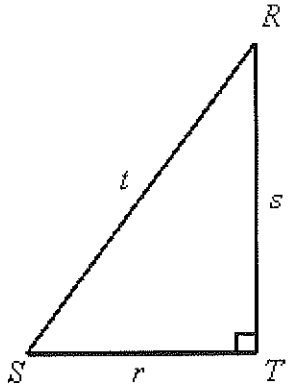
____ 11. Name four angles whose tangent equals 0.

a. 45°, 135°, 405°, 495°
c. 0°, 180°, 360°, 540°
b. 90°, 270°, 450°, 630°
d. 90°, 450°, 810°, 1170°

____ 12. Evaluate $\sec\left(\sin^{-1}\frac{\sqrt{3}}{2}\right)$. Assume that all the angles are in Quadrant I.

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

____ 13. If $t = 38.5$ and $s = 31.4$, find S. Round to the nearest tenth.



a. $S = 53.6°$
c. $S = 54.6°$
b. $S = 56.6°$
d. $S = 55.6°$

____ 14. In right triangle ABC, $A = 28°$, $b = 7$, and $\angle C$ is the right angle. Solve the triangle.

a. $B = 62°$, $a = 3.3$, $c = 7.7$
c. $B = 62°$, $a = 3.7$, $c = 7.9$
b. $B = 62°$, $a = 7.9$, $c = 3.7$
d. $B = 62°$, $a = 6.2$, $c = 9.4$

____ 15. In right triangle ABC, $b = 6$, $c = 13$, and $\angle C$ is the right angle. Solve the triangle.

a. $A = 63°$, $B = 27°$, $a = 11.5$
c. $A = 65°$, $B = 25°$, $a = 14.3$
b. $A = 27°$, $B = 63°$, $a = 11.5$
d. $A = 25°$, $B = 63°$, $a = 14.3$

____ 16. In right triangle ABC, $B = 75°$, $c = 14$, and $\angle C$ is the right angle. Solve the triangle.

a. $A = 15°$, $a = 13.2$, $b = 4.7$
c. $A = 15°$, $a = 13.5$, $b = 3.7$
b. $A = 15°$, $a = 4.7$, $b = 13.2$
d. $A = 15°$, $a = 3.7$, $b = 13.5$

____ 17. Given a triangle with $a = 19$, $A = 43°$, and $B = 26°$, what is the length of c? Round to the nearest tenth.

a. 26
c. 27
b. 25
d. 28

____ 18. Find the area of the triangle with $A = 60°$, $b = 11$ feet, and $c = 8$ feet. Round to the nearest tenth.

a. $22\ \text{ft}^2$
c. $44\ \text{ft}^2$
b. $38.1\ \text{ft}^2$
d. $12.4\ \text{ft}^2$

____ 19. How many triangles are there that satisfy the conditions $a = 14$, $b = 2$, $\alpha = 66°$?

a. impossible to determine
c. 0
b. 2
d. 1

____ 20. Given a triangle with $b = 7$, $c = 3$, and $A = 37°$ what is the length of a? Round to the nearest tenth.

a. 4.9
c. 5.5
b. 5.9
d. 4.3

____ 21. Find the area of the triangle with $a = 18.8$, $b = 11.6$, $c = 13.8$. Round to the nearest tenth.

a. $79.1\ \text{units}^2$
c. $82.7\ \text{units}^2$
b. $79.7\ \text{units}^2$
d. $80.1\ \text{units}^2$

____ 22. Change 1.96 radians to degree measure. Round to the nearest tenth.

a. 472.3°
c. 292.3°
b. 112.3°
d. 202.3°

____ 23. Change 290° to radian measure in terms of π.

a. $\frac{29}{27}\pi$
c. $\frac{29}{36}\pi$
b. $\frac{29}{18}\pi$
d. $\frac{29}{9}\pi$

____ 24. Find the area of a sector with a central angle of 32° and a radius of 8.5 millimeters. Round to the nearest tenth.

a. $40.4\ \text{mm}^2$
c. $20.2\ \text{mm}^2$
b. $2.4\ \text{mm}^2$
d. $9.5\ \text{mm}^2$

____ 25. A pulley of radius 10 cm turns at 6 revolutions per second. What is the linear velocity of the belt driving the pulley in meters per second?

a. 376.99 m/s
c. 166.67 m/s
b. 1.67 m/s
d. 3.77 m/s

____ 26. Use a graph of the sine function to find the value of θ for which $\sin\theta = 0$.

a. $\theta = \pi k$
c. $\theta = \frac{\pi}{2} + \pi k$
b. $\theta = \frac{\pi}{2} + 2\pi k$
d. $\theta = 2\pi k$

____ 27. Find the amplitude, period, and phase shift of $f(x) = -4\sin(7x + 2)$.

a. amplitude = –4
period = $\frac{2\pi}{7}$
phase shift = $\frac{2}{7}$

b. amplitude = 4
period = $\frac{2\pi}{7}$
phase shift = $-\frac{2}{7}$

c. amplitude = 8
period = $\frac{\pi}{7}$
phase shift = $-\frac{2}{7}$

d. amplitude = –4
period = 2π
phase shift = $\frac{2}{7}$

____ 28. Write an equation of the cosine function with amplitude 2 and period 4π.

a. $y = 2\cos\left(\frac{1}{2}x\right)$

b. $y = -2\cos\left(\frac{1}{4}x\right)$

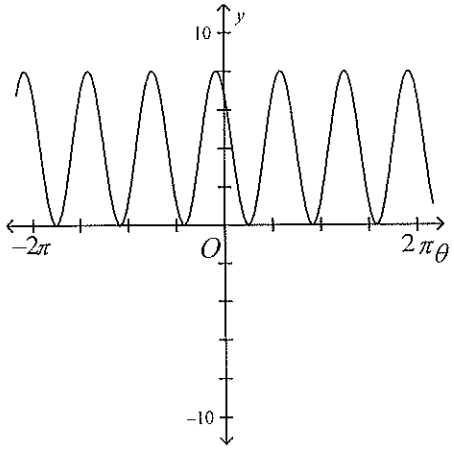
c. $y = -\frac{1}{2}\cos\left(\frac{1}{2}x\right)$

d. $y = \frac{1}{2}\cos\left(\frac{1}{4}x\right)$

____ 29. Graph the function. Which choice gives the amplitude, period, phase shift, and vertical shift for the function?

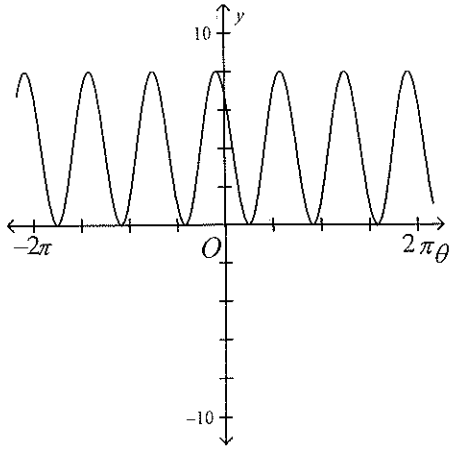
$y = 4\cos\left(3\theta + \frac{3}{4}\pi\right) + 4$

a.



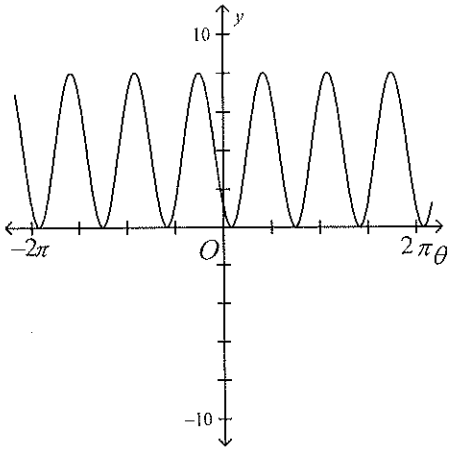
$4; \frac{2}{3}\pi; -\frac{1}{4}\pi\ ; 4$

c.



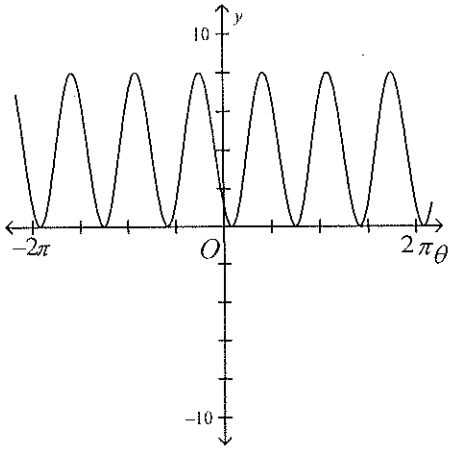
$-4; \frac{2}{3}\pi; -\frac{1}{4}\pi\ ; 4$

b.



$4; \frac{2}{3}\pi; -\frac{1}{4}\pi\ ; 4$

d.



$-4; \frac{2}{3}\pi; -\frac{1}{4}\pi\ ; -4$

____ 30. Write an equation of the cosine function with the given amplitude, period, phase shift, and vertical shift.

amplitude: 3, period = π, phase shift = $-\frac{3}{4}\pi$, vertical shift = –3

a. $y = \pm 3\cos\left(\frac{1}{2}\theta - \frac{3}{2}\pi\right) - 3$

b. $y = \pm 3\cos\left(\frac{1}{2}\theta + \frac{3}{2}\pi\right) + 3$

c. $y = \pm 3\cos\left(2\theta - \frac{3}{2}\pi\right) + 3$

d. $y = \pm 3\cos\left(2\theta + \frac{3}{2}\pi\right) - 3$

____ 31. The normal monthly temperatures (°F) for Omaha, Nebraska, are recorded below.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
t	1	2	3	4	5	6	7	8	9	10	11	12
Temp.	21°	27°	39°	52°	62°	72°	77°	74°	65°	53°	39°	25°

a. Write a sinusoidal function that models Omaha's monthly temperature variation.
b. Use the model to estimate the normal temperature during the month of April.

a. a. $y = 28\sin\left(\frac{t}{2}\pi - \frac{\pi}{6}\right) + 49$
b. $y(4) = 49°$

b. a. $y = 49\sin\left(\frac{t}{12}\pi + \frac{\pi}{6}\right) + 28$
b. $y(4) = 28°$

c. a. $y = 28\sin\left(\frac{t}{6}\pi - \frac{\pi}{2}\right) + 49$
b. $y(4) = 49°$

d. a. $y = 56\sin\left(\frac{t}{6}\pi - \frac{\pi}{2}\right) + 28$
b. $y(4) = 56°$

____ 32. Write an equation for the given function given the period, phase shift, and vertical shift.

tangent function, period $= \frac{1}{3}\pi$, phase shift $= -\frac{1}{4}\pi$, vertical shift $= -5$

a. $y = \tan\left(3\theta + \frac{3}{4}\pi\right) - 5$

b. $y = \tan\left(\frac{1}{3}\theta + \frac{3}{4}\pi\right) + 5$

c. $y = \tan\left(\frac{1}{3}\theta - \frac{3}{4}\pi\right) + 5$

d. $y = \tan\left(3\theta - \frac{3}{4}\pi\right) - 5$

Write the equation for the inverse of the function.

____ 33. $y = \cos 2x$

a. $y = \text{Cos}^{-1} 2x$

b. $y = \frac{1}{2}\text{Cos}^{-1} 2x$

c. $y = \text{Cos}^{-1}\frac{x}{2}$

d. $y = \frac{1}{2}\text{Cos}^{-1} x$

____ 34. $y = \text{Arctan}\left(x + \frac{\pi}{2}\right)$

a. $y = \tan x + \frac{\pi}{2}$

b. $y = \tan x - \frac{\pi}{2}$

c. $y = \tan x\left(x - \frac{\pi}{2}\right)$

d. $y = \tan x\left(x + \frac{\pi}{2}\right)$

____ 35. $y = \frac{\pi}{4} + \sin x$

a. $y = \frac{\pi}{4} - \text{Arcsin}\, x$

b. $y = \text{Arcsin}\left(x + \frac{\pi}{4}\right)$

c. $y = \text{Arcsin}\left(x - \frac{\pi}{4}\right)$

d. $y = \frac{\pi}{4} + \text{Arcsin}\, x$

____ 36. $y = \text{Cos}^{-1}(x - \pi)$

a. $y = \pi - \cos x$

b. $y = \cos(x - \pi)$

c. $y = \pi + \cos x$

d. $y = \cos(x + \pi)$

____ 37. $y = \text{Arcsin}\, 3x$

a. $y = \sin\frac{x}{3}$

b. $y = 3\sin x$

c. $y = \frac{1}{3}\sin x$

d. $y = \sin 3x$

____ 38. Find the value of $\tan\left(\sin^{-1}\left(\frac{1}{2}\right)\right)$.

a. $\sqrt{3}$

b. $-\sqrt{3}$

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

d. $-\frac{\sqrt{3}}{3}$

____ 39. What basic trigonometric identity would you use to verify that $\tan x \cos x = \sin x$?

a. $\cos x = \frac{1}{\sec x}$

b. $\sin x = \frac{1}{\csc x}$

c. $\cos^2 x + \sin^2 x = 1$

d. $\tan x = \frac{\sin x}{\cos x}$

____ 40. What basic trigonometric identity would you use to verify that $\cot x \sin x = \cos x$?

a. $\cos^2 x + \sin^2 x = 1$

b. $\cot x = \frac{\cos x}{\sin x}$

c. $\cos x = \frac{1}{\sec x}$

d. $\sin x = \frac{1}{\csc x}$

____ 41. What basic trigonometric identity would you use to verify that $\frac{\sin^2 x + \cos^2 x}{\cos x} = \sec x$?

a. $\sin x = \frac{1}{\csc x}$

b. $1 + \cot^2 x = \csc^2 x$

c. $\cos^2 x + \sin^2 x = 1$

d. $\cos x = \frac{1}{\sec x}$

____ 42. What basic trigonometric identity would you use to verify that $\frac{\sin x + 1}{\sin x} = 1 + \csc x$?

a. $\sin x = \cos x \tan x$
c. $\csc x = \frac{1}{\sin x}$
b. $\cos^2 x + \sin^2 x = 1$
d. $1 + \cot^2 x = \csc^2 x$

____ 43. What basic trigonometric identity would you use to verify that $\sin x \cos x \tan x = 1 - \cos^2 x$?

a. $\tan x = \frac{\sin x}{\cos x}$
c. $\sin x = \cos x \tan x$
b. $\cos^2 x + \sin^2 x = 1$
d. $1 + \tan^2 x = \sec^2 x$

____ 44. Find $\cos x$ if $\sin x \cot x = 4$.

a. 4 b. 2 c. 1 d. $\sqrt{2}$

____ 45. Find $\cot x$ if $\sin x \cot x \csc x = \sqrt{2}$.

a. 4 b. $\sqrt{2}$ c. 1 d. 2

____ 46. Find $\cos x$ if $\frac{\sin^2 x - 1}{\cos x} = -1$.

a. -1 b. 2 c. 1 d. 0

____ 47. Find $\csc x$ if $\sin x + \cot x \cos x = \sqrt{3}$.

a. 9 b. 3 c. $\frac{\sqrt{3}}{2}$ d. $\sqrt{3}$

____ 48. Find the exact value of $\cos 15°$.

a. $\frac{\sqrt{2}}{4}$ b. $\frac{\sqrt{2}+\sqrt{6}}{4}$ c. $\frac{\sqrt{2}}{2}$ d. $\frac{\sqrt{6}}{4}$

____ 49. If α and β are the measures of two first quadrant angles and $\sin \alpha = \frac{4}{5}$ and $\sin \beta = \frac{5}{13}$, find $\sin(\alpha + \beta)$.

a. $\frac{63}{65}$ b. $\frac{33}{65}$ c. $\frac{16}{65}$ d. $\frac{56}{65}$

____ 50. Which sum or difference identity would you use to verify that $\cos(180° - \theta) = -\cos\theta$?

a. $\sin(\alpha - \beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$
b. $\cos(\alpha - \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$
c. $\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$
d. $\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$

____ 51. Which sum or difference identity would you use to verify that $\sin(90° + \theta) = \cos\theta$?

a. $\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$
b. $\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$
c. $\sin(\alpha - \beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$
d. $\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$

____ 52. If $\sin\theta = \frac{3}{5}$ and θ terminates in the first quadrant, find the exact value of $\cos 2\theta$.

a. $\frac{3}{5}$ b. $\frac{9}{25}$ c. $\frac{3}{10}$ d. $\frac{7}{25}$

____ 53. If $\sin\theta = -\frac{3}{5}$ and θ terminates in the fourth quadrant, find the exact value of $\tan 2\theta$.

a. $-\frac{7}{24}$ b. $-\frac{24}{7}$ c. $-\frac{9}{25}$ d. $-\frac{25}{9}$

____ 54. Use a half-angle identity to find the exact value of $\tan 105°$.

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

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

____ 55. Which double-angle or half-angle identity would you use to verify that $\frac{\sin 2x}{2\sin^2 x} = \cot x$?

a. $\sin\frac{x}{2} = \pm\sqrt{\frac{1-\cos x}{1+\cos x}}$ c. $\cot 2x = \frac{2\sin x}{1-\sin^2 x}$

b. $\tan 2x = \frac{2\tan x}{1-\tan^2 x}$ d. $\sin 2x = 2\sin x\cos x$

____ 56. Which double-angle or half-angle identity would you use to verify that $1+\cos 2\alpha = \frac{2}{1+\tan^2\alpha}$?

a. $\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$ c. $\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$

b. $\tan\frac{\alpha}{2} = \pm\sqrt{\frac{1-\cos\alpha}{1+\cos\alpha}}$ d. $\cos 2\alpha = 2\cos^2\alpha - 1$