Quiz + Practice Test2 Math 1600/Trig Instructor: Koshal Dahal

Name: _____

Multiple Choice Questions
SHOW ALL WORK, EVEN FOR MULTIPLE CHOICE QUESTIONS, TO RECEIVE CREDIT.

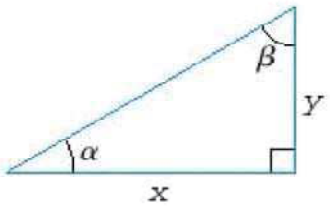
____ 1. Find the degree measure of the angle: 1.6 rad.
   a. 104.02°
   b. 128.35°
   c. 54.99°
   d. 91.67°

____ 2. Find the degree measure of the angle: $\frac{\pi}{15}$ rad.
   a. 27°
   b. 16°
   c. 12°
   d. 6°

____ 3. The measure of the angle 330° in standard position is given. Find two positive angles and two negative angles that are coterminal with the given angle.
   a. 710°, 1020°, –50°, –360°
   b. 426°, 786°, –294°, –654°
   c. 670°, 1060°, –70°, –345°
   d. 690°, 1050°, –30°, –390°

____ 4. Find an angle between 0° and 360° that is coterminal with the angle 2595°.
   a. 43°
   b. 75°
   c. 49°
   d. 95°

____ 5. Find sin a and cos β if $x = 4$, and $y = 1$.

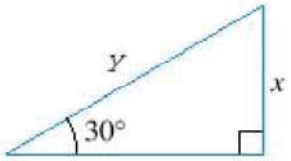


a. $\sin a = \frac{4}{\sqrt{17}}, \cos \beta = \frac{4}{\sqrt{17}}$

b. $\sin a = \frac{1}{\sqrt{17}}, \cos \beta = \frac{1}{\sqrt{17}}$

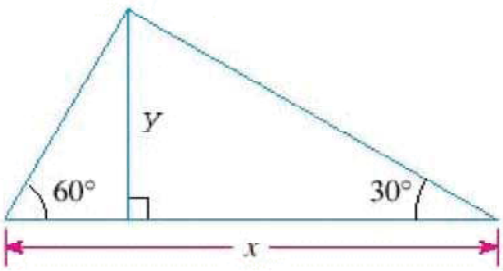
c. $\sin a = \frac{1}{\sqrt{17}}, \cos \beta = \frac{4}{\sqrt{17}}$

____ 6. What is the side labeled x equal to, if $y = 22$?



a. 44
b. 11
c. 22

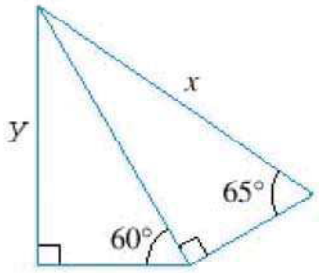
____ 7. Find x correct to one decimal place.



$y = 55$

a. 31.8
b. 95.3
c. 127

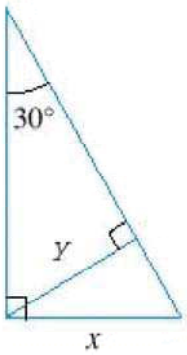
____ 8. Find x correct to one decimal place.



$y = 60$

a. 76.4
b. 66.2
c. 69.3

____ 9. Find x correct to one decimal place.



$y = 25$

a. 12.5
b. 14.4
c. 28.9

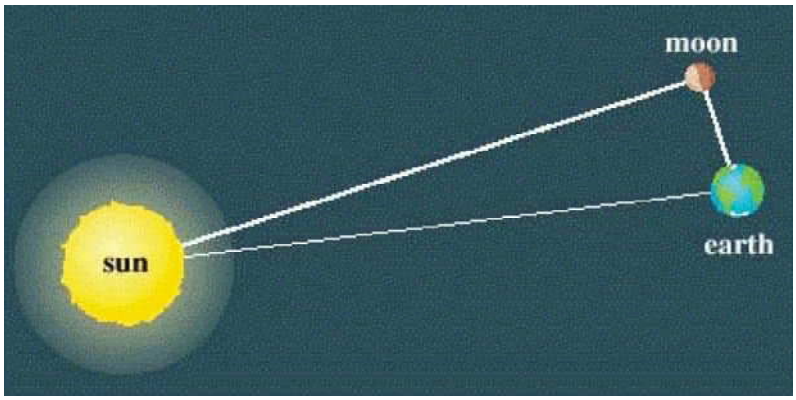
____ 10. The angle of elevation to the top of a particular skyscraper in New York is found to be 12° from the ground at a distance of 1.3 mi from the base of the building. Using this information, find the height of the skyscraper.

a. 1560 ft
b. 2918 ft
c. 1459 ft

____ 11. An airplane is flying at an elevation of 5,300 ft, directly above a straight highway. Two motorists are driving cars on the highway on opposite sides of the plane, and the angle of depression to one car is 31° and to the other is 53°. How far apart are the cars?

a. 9654 ft
b. 4827 ft
c. 12815 ft

____ 12. When the moon is exactly half full, the earth, moon, and sun form a right angle (see the illustration). At that time the angle formed by the sun, earth, and moon is measured to be 89.75°. If the distance from the earth to the moon is 235000 mi, estimate the distance from the earth to the sun.



a. 53858204 mi
b. 54093204 mi
c. 235000 mi
d. 53623204 mi

____ 13. Find the reference angle for the angle measuring $\frac{15\pi}{11}$.

a. $-\frac{4\pi}{11}$
b. $\frac{4\pi}{15}$
c. $\frac{11\pi}{4}$
d. $\frac{4\pi}{11}$

____ 14. Find sin 224°.

a. No correct answer
b. –0.6947
c. 0.6947

____ 15. Find the area of a triangle with sides of length 9 and 13 and included angle 56°.

a. No correct answer
b. 86.730
c. 48.499
d. 32.713

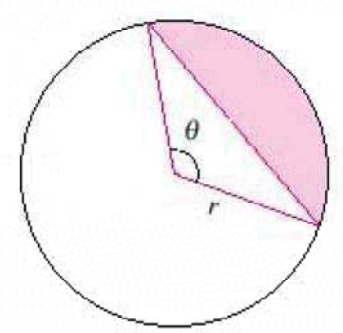
____ 16. Find the area of an equilateral triangle with sides of length 5.

a. 6.250
b. No correct answer
c. 10.825
d. 21.651

____ 17. A triangle has an area of 7 in^2, and two of the sides of the triangle have lengths 5 in. and 4 in. Find the angle included by these two sides.

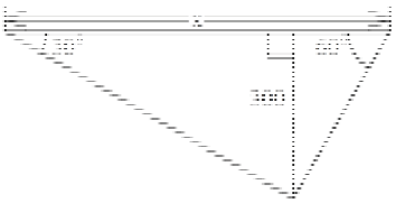
a. No correct answer
b. 0.795π
c. 44.427°
d. 45.573°

____ 18. Find the area of the shaded region in the figure if $r = 6$, and $\theta = 129°$.



a. 81.442
b. 54.515
c. 26.538
d. No correct answer

____ 19. Solve for x correct to one decimal place.



a. 519.6
b. 477.8
c. 692.8
d. 173.2
e. 367.6

____ 20. Find the exact value of the expression.

$(\cos 30°)^2 - (\sin 30°)^2$

a. $\frac{1}{2}$
b. $\frac{3}{4}$
c. $\frac{\sqrt{3}}{4}$
d. $\frac{3}{2}$
e. $\frac{1}{4}$

____ 21. A 78-ft tree casts a shadow that is 100 ft long. What is the angle of elevation of the sun?

a. 46.57°
b. 14.15°
c. 34.62°
d. 11.85°
e. none of these

____ 22. Find the exact value of the expression.

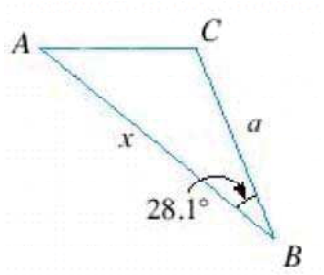
$\sin\left(\frac{\pi}{3}\right)\cos\left(\frac{\pi}{6}\right) + \sin\left(\frac{\pi}{6}\right)\cos\left(\frac{\pi}{3}\right)$

a. $\frac{\sqrt{3}}{4}$
b. $\frac{1}{4}$
c. $\frac{3}{2}$
d. $\frac{3}{4}$
e. 1

____ 23. A 84-ft tree casts a shadow that is 47 ft long. What is the angle of elevation of the sun?

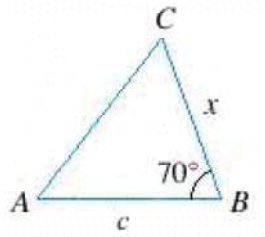
a. 19.96°
b. 10.97°
c. 10.42°
d. 60.77°
e. 21.05°

____ 24. Use the Law of Sines to find x. Let $a = 85$, $\angle A = 34.6°$.



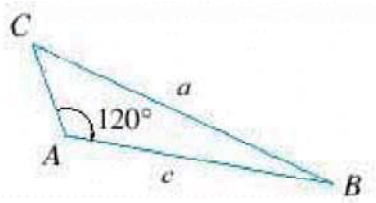
a. 132
b. 135
c. 134
d. 133

____ 25. Use the Law of Sines to find x. Let $c = 21$, $\angle A = 58°$.



a. 24
b. 23
c. 46
d. 25

____ 26. Use the Law of Sines to find angle C. Let $a = 28$, and $c = 13$.

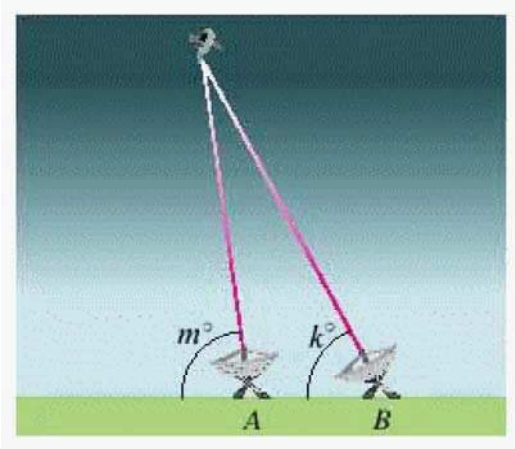


a. 23°
b. 30°
c. 25°
d. 24°

____ 27. Use the Law of Sines to solve for all possible triangles that satisfy $a = 45$, $c = 24$, $\angle A = 123°$ conditions.
a. $\angle B = 30°$, $\angle C = 27°$, $b = 27$
b. $\angle B = 30°$, $\angle C = 27°$, $b = 33$
c. $\angle B = 32°$, $\angle C = 26°$, $b = 26$
d. $\angle B = 27°$, $\angle C = 30°$, $b = 31$

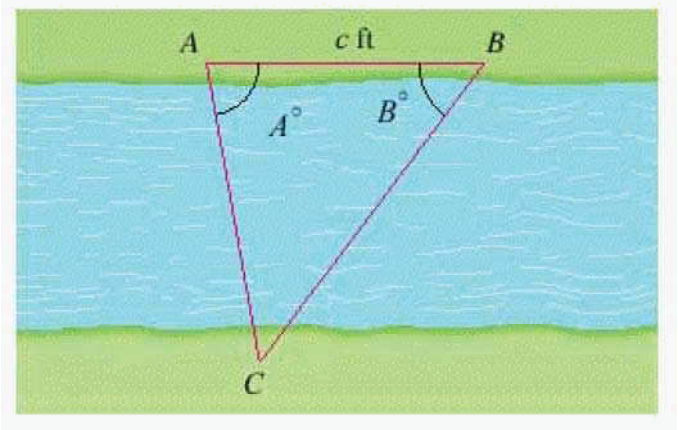
____ 28. The path of a satellite orbiting the earth causes it to pass directly over two tracking stations A and B, which are 51 mi apart. When the satellite is on one side of the two stations, the angles of elevation at A and B are measured to be $\angle m = 85.5°$, $\angle k = 79.8°$.

(a) How far is the satellite from station A?
(b) How high is the satellite above the ground?



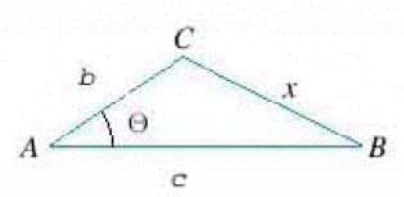
a. The distance of the satellite from station A = 511.4, the satellite is high above the ground as 493.8.
b. The distance of the satellite from station A = 473.4, the satellite is high above the ground as 481.8.
c. The distance of the satellite from station A = 505.4, the satellite is high above the ground as 503.8.
d. The distance of the satellite from station A = 525.4, the satellite is high above the ground as 514.8.

____ 29. To find the distance across a river, a surveyor chooses points A and B, which are 197 ft apart on one side of the river (see the figure). She then chooses a reference point (C) on the opposite side of the river and finds that $\angle A = 47°$ and $\angle B = 70°$. Approximate the distance from A to C.



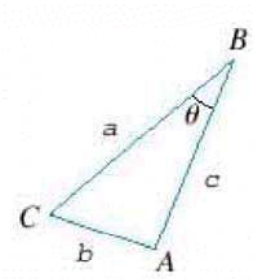
a. 206 ft
b. 208 ft
c. 207 ft
d. 209 ft

____ 30. Use the Law of Cosines to determine side x if $b = 9$, $c = 18$, and $\theta = 27°$.



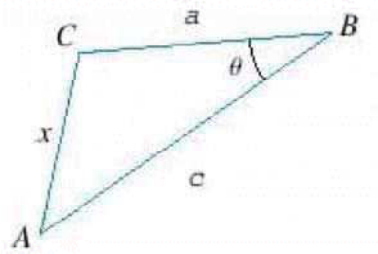
a. No correct answer
b. 26.34
c. 10.78

____ 31. Use the Law of Cosines to determine angle θ if $a = 69.19$, $b = 35.97$, $c = 42.82$.



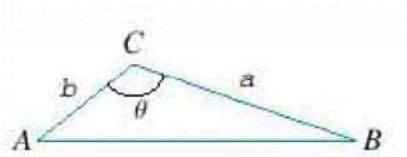
a. 63.29°
b. No correct answer
c. 25.97°
d. 44.21°

____ 32. Use the Law of Cosines to determine side x if $a = 30$, $c = 36$ and $\theta = 25°$ correct to two decimal places.



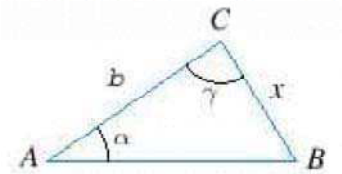
a. 15.44
b. 7.42
c. 26.98

____ 33. Solve triangle ABC, if $a = 17$, $b = 10$, and $\angle C = 117°$.



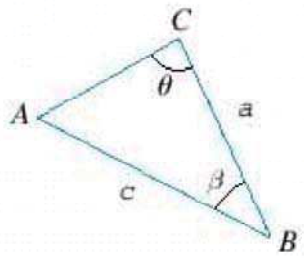
a. $c = 23.31$, $\angle A = 40.53°$, $\angle B = 22.47°$
b. $c = 28.31$, $\angle A = 43.53°$, $\angle B = 22.47°$
c. $c = 23.31$, $\angle A = 35.02°$, $\angle B = 27.98°$
d. $c = 23.31$, $\angle A = 40.53°$, $\angle B = 19.47°$

____ 34. Find the indicated side x if $b = 6$, $a = 33°$, $y = 70°$. (Use either the Law of Sines or the Law of Cosines, as appropriate.)



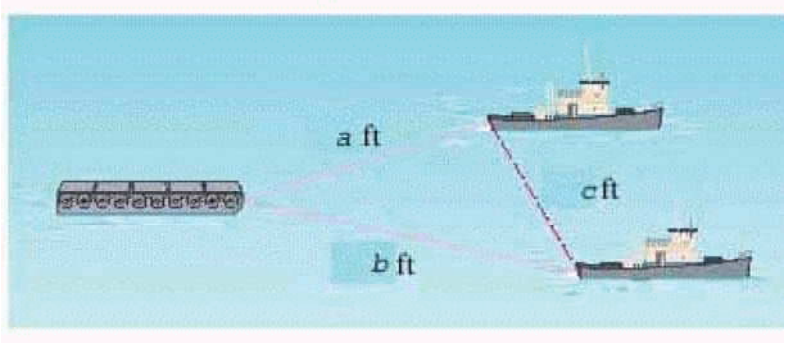
a. 14.527
b. 5.164
c. 22.369
d. 3.354

____ 35. Find the indicated angle θ if $a = 120$, $c = 135$, $\beta = 33°$. (Use either the Law of Sines or the Law of Cosines, as appropriate.)



a. 81°
b. 85°
c. 95°

____ 36. Two tugboats that are 118 ft apart pull a barge, as shown. If the length of one cable is 206 and the length of the other is 227, find the angle formed by the two cables.



a. 31.15°
b. 28.03°
c. 37.38°
d. 43.61°

____ 37. Write the following trigonometric expression in terms of sine and cosine, and then simplify.

$\cos x \tan x$

a. $\cos x$
b. $\sin x$
c. $\tan x$
d. 1

____ 38. Find the equivalent expression.

$\tan^4 x - \sec^4 x$

a. $-\cot^2 x - \csc^2 x$
b. $\csc^2 x + \cot^2 x$
c. $\csc^2 x + \tan^2 x$
d. $-\tan^2 x - \sec^2 x$
e. $\sec^2 x + \tan^2 x$

____ 39. Write the following trigonometric expression in terms of sine and cosine, and then simplify.

$\sin^2 x (1 + \cot^2 x)$

a. $\cos x$
b. $\sin x$
c. $\cot x$
d. 1

____ 40. Simplify the following trigonometric expression.

$$\frac{\cos x \sec x}{\cot x}$$

a. $\tan x$
b. $\cot x$
c. $\cos x$
d. 1

____ 41. Simplify the following trigonometric expression.

$$\frac{\sec^2 x - 1}{\sec^2 x}$$

a. 1
b. $\sin x$
c. $\sin^2 x$
d. $\sec^2 x$

____ 42. Simplify the following trigonometric expression.

$\tan x \cos x \csc x$
a. $\cot x$
b. $\sin x$
c. $\sin^2 x$
d. 1

____ 43. Simplify the following trigonometric expression.

$\sin(z) + \cos(-z) + \sin(-z)$
a. $\sin z$
b. $\cos z$
c. $2\sin z - \cos z$
d. $2\sin z$

____ 44. Simplify the following trigonometric expression as much as possible.

$$\frac{\cot x \sec x}{\csc x}$$

a. $\sec x$
b. $\csc x$
c. 1
d. $\cot x$

____ 45. Simplify the following trigonometric expression as much as possible.

$\cos B + \sin B \tan B$
a. $\cos B$
b. $\sec B$
c. $\tan B$
d. $\sin B$

____ 46. Find the equivalent expression.

$\left(\cos\beta - 1\right)\left(\cos\beta + 1\right)$

a. $-\dfrac{1}{\sec^2\beta}$

b. $-\dfrac{1}{\csc^2\beta}$

c. $\dfrac{1}{\sec^2\beta}$

d. $\dfrac{1}{\tan^2\beta}$

e. $\dfrac{1}{\csc^2\beta}$

____ 47. Simplify the following trigonometric expression as much as possible.

$\dfrac{\csc x - \sin x}{\csc x}$

a. $\sin x$
b. $\cos^2 x$
c. $\sin^2 x$
d. $\csc x$

____ 48. Simplify the following trigonometric expression as much as possible.

$(1 - \cos^2 x)(1 + \cot^2 x)$

a. $\sin^2 x$
b. 1
c. $\cot x$
d. $\sin x$

____ 49. Simplify the following trigonometric expression as much as possible.

$\sin^2 t + \cos^2 t + \tan^2 t$

a. $\tan x$
b. $\sec^2 x$
c. $\sec x$
d. $\tan^2 x$

____ 50. Find the equivalent expression.

$$\frac{\csc x}{\csc x - \cot x}$$

a. $\sec x(\sec x + \cot x)$
b. $\sec x(\sec x + \tan x)$
c. $\csc x(\csc x - \cot x)$
d. $\sec x(\sec x - \tan x)$
e. $\csc x(\csc x + \cot x)$

____ 51. Simplify the following trigonometric expression as much as possible.

$$\frac{\cos A}{1 - \sin A} - \tan A$$

a. $\tan A$
b. $\sin A$
c. $\sec A$
d. $\cos A$

____ 52. Simplify the following trigonometric expression as much as possible.

$$\frac{1 - \cos x}{\sin x} + \frac{\sin x}{1 - \cos x}$$

a. $2 \sin x$
b. $\cos x$
c. $\sin x$
d. $2 \csc x$

____ 53. Simplify the following trigonometric expression as much as possible.

$$\frac{\csc x - \cot x}{\sec x - 1}$$

a. $\csc x$
b. $\sec^2 x$
c. $\cot x$
d. $2 \csc x$

____ 54. Simplify the following trigonometric expression as much as possible.

$$\frac{\sec^2 y - \tan^2 y}{\csc^2 y}$$

a. $\csc x$
b. $\tan x$
c. $\sin^2 x$
d. $\sec^2 x$

____ 55. Find the equivalent expression.

$$\frac{1-\tan x}{1+\tan x}$$

a. $\dfrac{\sec x-\csc x}{\sin x+\cos x}$

b. $\dfrac{\cos x-\sin x}{\cos x+\sin x}$

c. $\dfrac{\cos x+\sin x}{\cos x-\sin x}$

d. $\dfrac{\sin x+\cos x}{\sin x-\cos x}$

e. $\dfrac{\sin x-\cos x}{\sin x+\cos x}$

____ 56. Simplify the following trigonometric expression as much as possible.

$$\frac{\cos^2 t+\tan^2 t-1}{\sin^2 t}$$

a. $2\cos x$

b. $\sin x$

c. $\tan^2 x$

d. $\tan x$

____ 57. Simplify the following trigonometric expression as much as possible.

$$\frac{1}{\csc x+\cot x}+\frac{1}{\csc x-\cot x}$$

a. $2\csc x$

b. $\cot x$

c. $\cot^2 x$

d. $\csc x$

____ 58. Find the equivalent expression.

$$\frac{1+\sin x}{1-\sin x}-\frac{1-\sin x}{1+\sin x}$$

a. $-4\tan x\sec x$

b. $-4\cot x\sec x$

c. $4\cot x\csc x$

d. $-4\cot x\csc x$

e. $4\tan x\sec x$

____ 59. Find the equivalent expression.

$(\sin a - \tan a)(\cos a + \cot a)$

a. $(1 - \cos a)(\sin a - 1)$
b. $(\cos a - 1)(\sin a + 1)$
c. $(\cos a + 1)(\sin a + 1)$
d. $(\cos a - 1)(\sin a - 1)$
e. $(\cos a + 1)(1 - \sin a)$

____ 60. Make the indicated trigonometric substitution in the given algebraic expression and simplify. Assume $0 \le 1 < \frac{\pi}{2}$.

$\frac{x}{\sqrt{1 - x^2}}$, $x = \sin t$

a. $\sin t$
b. 1
c. $\tan t$
d. $\cos t$

____ 61. Make the indicated trigonometric substitution in the given algebraic expression and simplify. Assume $0 \le t < \frac{\pi}{2}$.

$\sqrt{x^2 - 1}$, $x = \sec t$

a. 1
b. $\cos t$
c. $\tan t$
d. $\sec t$

____ 62. Use an addition or subtraction formula to find the exact value of the expression.

$\tan(255°)$

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

____ 63. Use an addition or subtraction formula to find the exact value of the expression.

$\cos\left(\frac{\pi}{12}\right)$

a. $\frac{-\sqrt{6}-\sqrt{2}}{4}$

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

c. $\frac{\sqrt{6}-\sqrt{2}}{4}$

d. $\frac{\sqrt{2}-\sqrt{6}}{4}$

____ 64. Use an addition or subtraction formula to write the expression as a trigonometric function of one number.

$\sin 34° \cos 56° + \cos 34° \sin 56°$

a. $\sin(90°)$

b. $\cos(180°)$

c. $\cos(-90°)$

d. $\sin(-90°)$

____ 65. Use an addition or subtraction formula to write the expression as a trigonometric function of one number.

$\cos\left(\frac{3\pi}{4}\right)\cos\left(\frac{\pi}{8}\right) - \sin\left(\frac{3\pi}{4}\right)\sin\left(\frac{\pi}{8}\right)$

a. $\cos\left(\frac{7\pi}{8}\right)$

b. $\sin\left(\frac{7\pi}{8}\right)$

c. $-\sin\left(\frac{7\pi}{8}\right)$

d. $-\cos\left(\frac{7\pi}{8}\right)$

____ 66. Simplify the following expression as much as possible.

$\csc\left(\frac{3\pi}{2} - u\right)$

a. $\sec(u)$

b. $-\sec(u)$

c. $-\csc(u)$

d. $\csc(u)$

____ 67. Simplify the following expression.

$$\sin\left(u - \frac{\pi}{2}\right)$$

a. $\sin u$
b. $-\cos u$
c. $\cos u$
d. $-\sin u$

____ 68. Simplify the following expression.

$\sin(v + x) - \sin(v - x)$
a. $2\cos(v)\cos(x)$
b. $2\sin(x)\sin(v)$
c. $2\cos(v)\sin(x)$
d. $2\cos(x)\sin(v)$

____ 69. Simplify the following expression

$\cos(p + z) - \cos(p - z)$
a. $-2\cos(p)\cos(z)$
b. $2\cos(p)\cos(z)$
c. $2\sin(p)\sin(z)$
d. $-2\sin(p)\sin(z)$

____ 70. Simplify the expression.

$\tan p - \tan x$
a. $\dfrac{\sin(p + x)}{\cos p \cos x}$
b. $\dfrac{\cos(p - x)}{\cos p \cos x}$
c. $\dfrac{\sin(p - x)}{\cos p \cos x}$

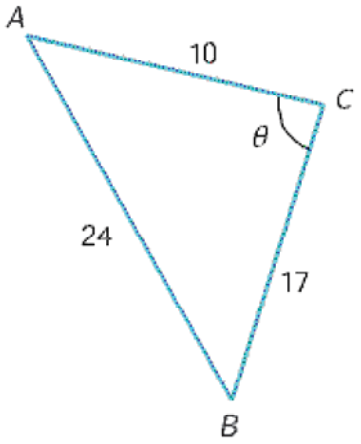
____ 71. Simplify the following expression as much as possible.

$$\frac{\sin(p + z) - \sin(p - z)}{\cos(p + z) + \cos(p - z)}$$

a. $\tan z$
b. $\tan p$
c. $\cot p$
d. $\cot z$

Numeric Response

72. Use the Law of Cosines to determine the indicated angle θ. Please round the answer to the nearest hundredth.



$\theta =$ _____ °