MATH 1720   Name_____

Exam 2 Review Problems

Be sure to review your homework, notes, and quizzes when preparing for the exam.
I will provide you with a formula sheet that has the identities that we covered in chapter 7.

Complete the table. Round answers to two decimal places.

1)	Distance, s (arc length)	Radius, r	Angle, θ	1) _____
	8 ft	_____	35 °

Solve.

2) A bicycle wheel rotates 44 times in 1 minute. Through how many degrees does a point on the tip of the wheel move in 15 seconds?

2) _____

3) A wheel is rotating at 3 radians/sec, and the wheel has a 81–inch diameter. To the nearest foot per minute, what is the linear speed of a point on the rim?

3) _____

4) A cylinder on John Lennon Guttenberg's printing press has a 48.2 cm diameter. The linear speed of a point on the cylinder's surface is 135 meters per minute. What is the angular speed of the cylinder in revolutions per hour? Round to the nearest tenth.

4) _____

Find the exact circular function value.

5) $\cos \dfrac{-2\pi}{3}$

5) _____

6) $\tan \dfrac{-7\pi}{4}$

6) _____

7) $\csc \dfrac{5\pi}{3}$

7) _____

Use a calculator to find a decimal approximation for the indicated function value. Round your answer to four decimal places.
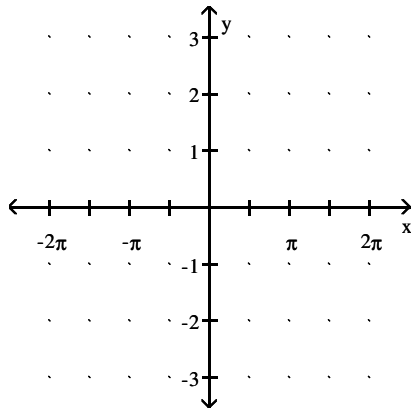
8) $\sin \dfrac{6\pi}{7}$

8) _____

9) sec 0.21

9) _____

Use a graphing calculator to graph the function using the given viewing window parameters.

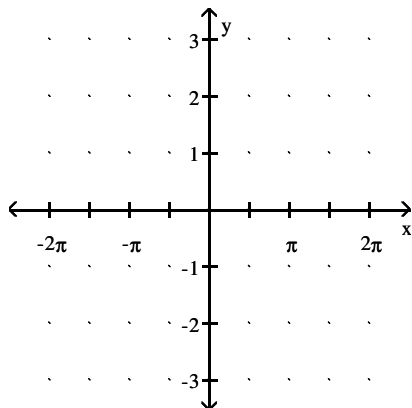10) $y = -2 \cos x$

10) _____

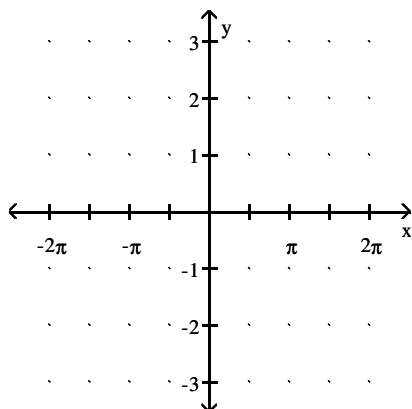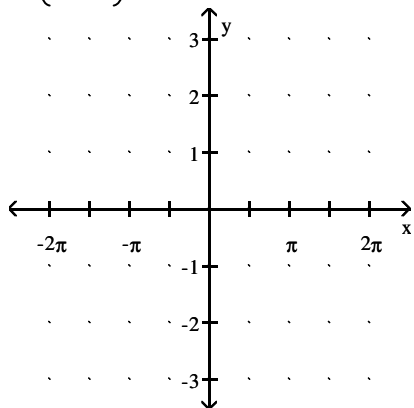11) $y = \dfrac{2}{3} \cos \dfrac{1}{4} x$

11) _____

12) $y = \sin x - 2$

12) _____

2

13) $y = \sin\left(x - \dfrac{\pi}{3}\right)$

13) _____

Find the amplitude, period or phase shift.

14) Find the amplitude of $y = -2\cos\left(4x + \dfrac{\pi}{2}\right)$.

14) _____

15) Find the period of $y = 3\sin\left(4x + \dfrac{\pi}{2}\right)$.

15) _____

16) Find the phase shift of $y = -4 - 2\sin\left(4x + \dfrac{\pi}{6}\right)$.

16) _____

Multiply and simplify.

17) $(\cos x - \sin x)^2$

17) _____

Factor and simplify.

18) $1 - 2\sin^2 x + \sin^4 x$

18) _____

19) $9\tan^2 y - 52\tan y - 12$

19) _____

Simplify the expression.

20) $\dfrac{\cos^2 x + 2\cos x + 1}{\cos x + 1}$

20) _____

21) $\dfrac{4\tan x \csc x - 2\csc x}{6\tan x \csc x - 2\csc x}$

21) _____

22) $\dfrac{\cos^4 x - \sin^4 x}{\cos^2 x - \sin^2 x}$

22) _____

23) $\dfrac{2\sin^7 x}{\cos^3 x} \cdot \left(\dfrac{\cos x}{2\sin x}\right)^3$

23) _____

3

24) $\dfrac{8 \sin \phi}{\cos^2 \phi} \cdot \dfrac{\cos^2 \phi - \cos \phi \sin \phi}{\cos^2 \phi - \sin^2 \phi}$

24) _____

25) $\left(\dfrac{\cos x}{\sin x}\right)^2 - \dfrac{1}{\sin^2 x}$

25) _____

Assume that $0 < \theta < \pi/2$. Find an expression for the indicated trigonometric function.

26) Let $x = 4 \sin \theta$ in $\sqrt{16 - x^2}$. Find $\cos \theta$.

26) _____

27) Let $x = 3 \tan \theta$ in $\sqrt{9 + x^2}$. Find $\sin \theta$.

27) _____

Use the given substitution to express the given radical expression as a trigonometric function without radicals. Assume that $0 < \theta < \pi/2$.

28) Let $x = 6 \cos \theta$ in $\dfrac{x^2}{\sqrt{36 - x^2}}$.

28) _____

29) Let $x = 4 \sec \theta$ in $\dfrac{\sqrt{x^2 - 16}}{x^2}$.

29) _____

Use the sum and difference identities to evaluate exactly.

30) $\cos 105°$

30) _____

31) $\tan 75°$

31) _____

Find the exact value.

32) Given that $\sin \theta = -\dfrac{4}{5}$ with θ in quadrant IV, find $\cos 2\theta$.

32) _____

A) $-\dfrac{24}{25}$ B) $\dfrac{24}{25}$ C) $-\dfrac{7}{25}$ D) $\dfrac{7}{25}$

33) Given that $\cos \theta = -\dfrac{5}{13}$ with θ in quadrant II, find $\tan 2\theta$.

33) _____

A) $\dfrac{169}{119}$ B) $\dfrac{169}{120}$ C) $\dfrac{119}{120}$ D) $\dfrac{120}{119}$

Find the exact value by using a half-angle identity.

34) $\sin 15°$

34) _____

Solve.

35) Given that $\sin \theta = 0.6035$ and that θ is in quadrant I, find $\cos\left(\dfrac{\theta}{2}\right)$.

35) _____

Simplify.

36) $(2\cos x - 2\sin x)^2 + 4 \sin 2x$

36) _____

4

37) $\dfrac{1 + \sin 2x + \cos 2x}{\cos x}$

37) _____

Find the exact value of y in radians.

38) $y = \cos^{-1}\left(\dfrac{1}{2}\right)$

38) _____

39) $y = \sin^{-1}\left(\dfrac{\sqrt{2}}{2}\right)$

39) _____

Give the degree measure of θ.

40) $\theta = \tan^{-1}\left(\sqrt{3}\right)$
    A) 60°   B) 120°   C) 300°   D) –60π

40) _____

Give the value of the function in decimal degrees. Round to the nearest hundredth of a degree.

41) $\sin^{-1}(-0.1517)$

41) _____

42) $\tan^{-1} 0.186$

42) _____

43) $\cos^{-1}(-0.6219)$

43) _____

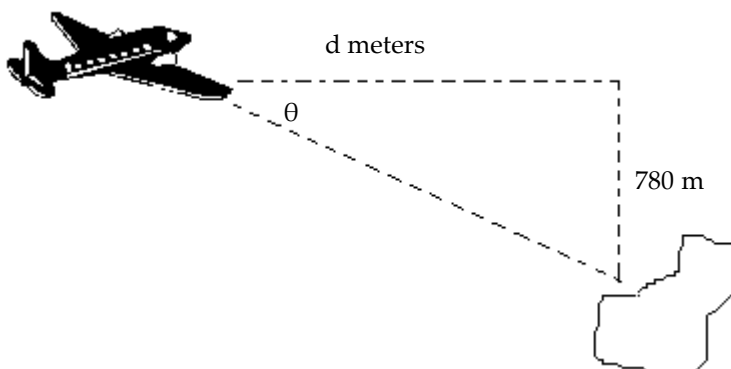**Give the value of the function in radians. Round your answer to three decimal places.**

44) $\cos^{-1} -0.4102$

44) _____

Solve.

45) An airplane is flying at an altitude of 780 m toward an island. The horizontal distance from the airplane to the island is d meters. Express θ, the angle of depression, as an inverse sine function

45) _____

d meters

θ

780 m

Solve, finding all solutions.

46) $\tan x = -1$ (Express your answer in radians.)

46) _____

47) $\sin x = \dfrac{\sqrt{3}}{2}$ (Express your answer in radians.)

47) _____

Solve, finding all solutions in [0, 2π).

48) $2 \cos x + 1 = 2.5675$

48) _____

Solve the equation for the interval [0, 2π).

49) $2 \sin^2 x = \sin x$

49) _____

50) $\sin^2 x - \cos^2 x = 0$

50) _____

Solve the equation in the interval [0°, 360°).

51) $3 \sin^2 \theta - \sin \theta - 4 = 0$

51) _____

Solve the equation, finding all solutions in [0°, 360°).
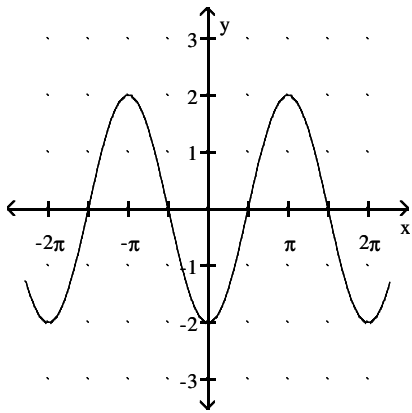
52) $10\cos^2 x + 7\cos x + 1 = 0$

52) _____

53) $20\sin^2 x - 3\sin x - 2 = 0$

53) _____

1) 13.10 ft
2) 3960°
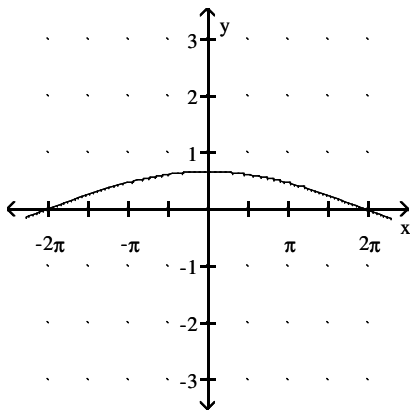3) 608 ft/min
4) 1.5 revolutions per hour
5) $-\dfrac{1}{2}$
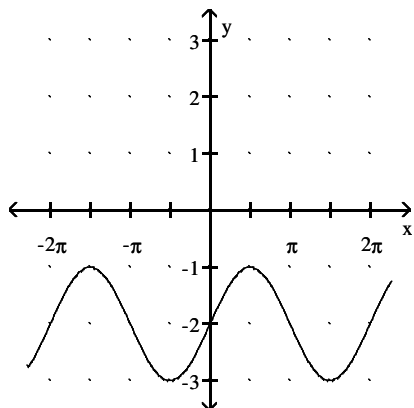6) 1
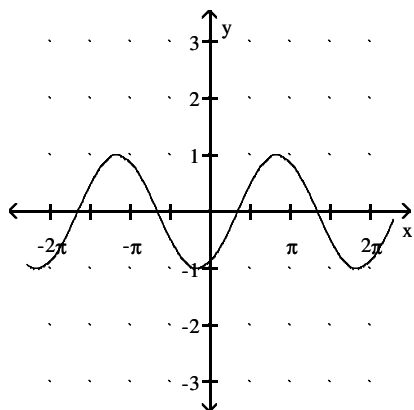7) $-\dfrac{2\sqrt{3}}{3}$
8) 0.4339
9) 1.0225
10)

11)

12)

13)

14) 2

15) $\dfrac{\pi}{2}$

16) $\dfrac{\pi}{24}$ to the left

17) $1 - 2 \sin x \cos x$

18) $\cos^4 x$

19) $(9\tan y + 2)(\tan y - 6)$

20) $\cos x + 1$

21) $\dfrac{2 \tan x - 1}{3 \tan x - 1}$

22) 1

23) $\dfrac{1}{4} \sin^4 x$

24) $\dfrac{8 \sin \phi}{(\cos \phi) \cdot (\cos \phi + \sin \phi)}$

25) -1

26) $\dfrac{\sqrt{16 - x^2}}{4}$

27) $\dfrac{x}{\sqrt{9 + x^2}}$

28) $6 \cos \theta \cot \theta$

29) $\frac{1}{4} \sin \theta \cos \theta$

30) $\frac{\sqrt{2} - \sqrt{6}}{4}$

31) $\sqrt{3} + 2$

32) C

33) D

34) $\frac{1}{2} \sqrt{2 - \sqrt{3}}$

35) $\cos\left(\frac{\theta}{2}\right) = 0.948$

36) 4

37) $2(\sin x + \cos x)$

38) $\frac{\pi}{3}$

39) $\frac{\pi}{4}$

40) A

41) $-8.73°$

42) $10.54°$

43) $128.45°$

44) 1.993

45) $\theta = \sin^{-1} \frac{780}{\sqrt{608,400 + d^2}}$

46) $\frac{3\pi}{4} + 2k\pi$ and $\frac{7\pi}{4} + 2k\pi$, where k is any integer

47) $\frac{\pi}{3} + 2k\pi$ and $\frac{2\pi}{3} + 2k\pi$, where k is any integer

48) $0.6701, 5.6131$

49) $0, \pi, \frac{\pi}{6}, \frac{5\pi}{6}$

50) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

51) $270°$

52) $101.54°, 258.46°,$
    $120°, 240°$

53) $194.48°, 345.52°,$
    $23.58°, 156.42°$