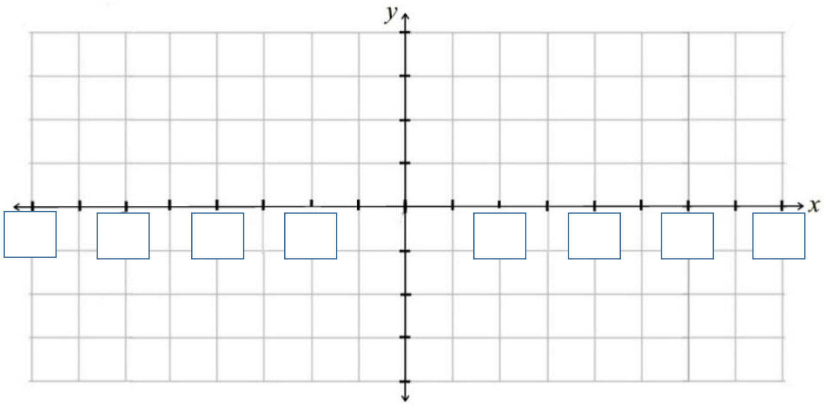
Name ______________________________

Chapter 6: Graphs of the Trigonometric Functions

1) State the amplitude, period, phase shift and vertical shift of $y = 3\cos(\frac{\theta}{3}) + 2$. Then graph it.



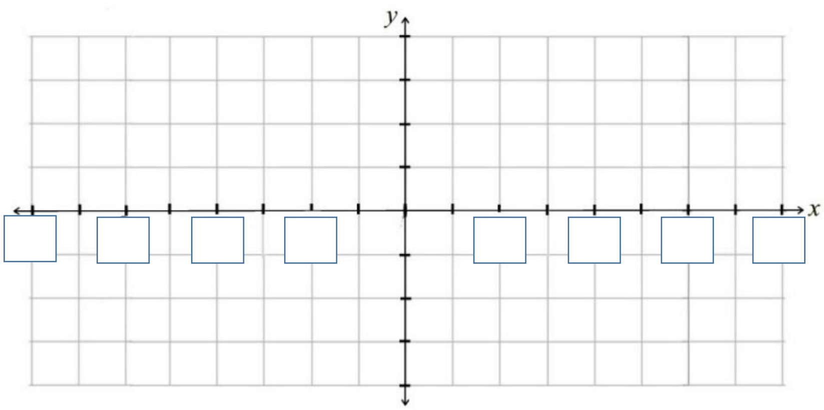
Find the amplitude. ________________

Find the period. ________________

Find the phase shift. ________________

Find the vertical translation. __________

2) State the amplitude, period, phase shift and vertical shift of $y = -2\sin(3\theta + \pi)$. Then graph it.



Find the amplitude. ________________

Find the period. ________________

Find the phase shift. ________________

Find the vertical translation. __________

3) Write an equation for the sine function with an amp 2.4, period 8.2, phase shift $\frac{\pi}{3}$, and a vertical shift 0.2.

Chapter 7: Trigonometric Identities and Equations

4) No Calculator: Solve $2\sin^2 x - \cos x - 1 = 0$, over the set of real numbers.

5) No Calculator: Simplify the expression and state the domain: $\sin x \sec x =$

6) No Calculator: Solve over the set of real numbers $(\sin x + 1)(\tan x - 1) = 0$

7) No Calculator: Solve over the set of real numbers $\cos 2x + 7\sin x - 4 = 0$

8) No Calculator: Solve over the set of real numbers $\cos x = 0$

9) No Calculator: Solve over the set of real numbers $\sin 2x = \frac{1}{2}$

10) Given $\frac{\pi}{2} \le x \le \pi$ and $\cos x = -\frac{5}{13}$, find csc *x*.

11) Suppose $\frac{\pi}{2} \le x \le \pi$ and $\sin x = \frac{5}{13}$. Also suppose $0 \le y \le \frac{\pi}{2}$ and $\cos y = \frac{3}{5}$.

a. Find $\sin(x - y)$.

b. Find $\cos(x - y)$.

12) Suppose x and y are on the intervals $\frac{\pi}{2} < x < \pi$ and with $0 < y < \frac{\pi}{2}$, with $\cos x = -\frac{1}{3}$ and $\sin y = \frac{2}{5}$.

a. Find cos(x + y)

b. Find sin (x – y)

c. Find sin (2x)

d. Find cos (2y)

e. Find tan y

13) Find $\cos\left(345^\circ\right)$.

14) $\tan^{-1}(-\frac{\sqrt{3}}{3})$

15) $\sin^{-1}(-\frac{\sqrt{3}}{2})$

16) $\cos^{-1}(-\frac{1}{2})$

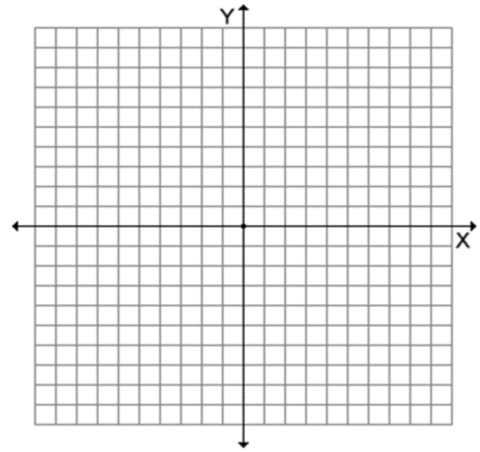
17) No calculator: Give the exact value of $\cos\frac{5\pi}{12}$

18) No calculator: Evaluate $\cos(\sin^{-1}\left(\frac{5}{7}\right))$

19) Give the exact value for $\sin(\sec^{-1}(-\frac{12}{7}))$

20) No Calculator: Evaluate $\tan(\sin^{-1}(-\frac{\sqrt{3}}{2}))$

Chapter 8: Vectors and Parametric Equations



21) Using the vector, v, from (8, 3) to (-2, -4), answer the following questions:

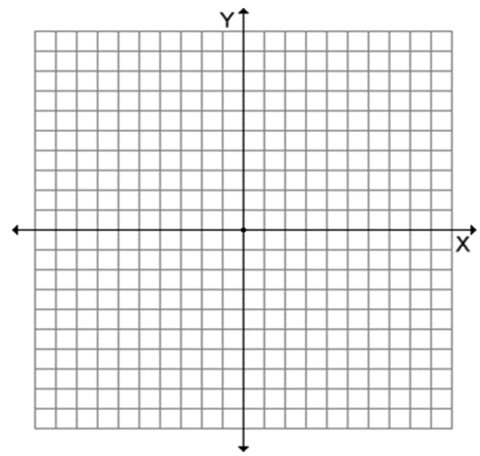
a) Draw the vector v.

b) Draw the vector in standard position.

c) Write the components of v.

d) Write v as the sum of unit vectors.

e) Write a vector that is orthogonal to v.



22) Graph the line with parametric equations: $x = 5 – 2t$ and $y = -3 + 4t$.

23) Write the parametric equations for the line through (1, -4) that is parallel to the line with parametric equations

$x = 3 – 4t$ and $y = -3 + 7t$.

24) Write the parametric equations for the line through (1, -4) that is orthogonal to the line with parametric equations

$x = 3 – 4t$ and $y = -3 + 7t$.

25) Find the magnitude and direction of the vector that has initial point (5, -3) and terminal point (6, 1) **Hint**: Put in
standard position first.

26) Find the measure of the angle between **s** = (-1, 3) and **t** = (-2, -8).

27) Given vector **k** = (-1, 2) and vector **v** = (10, 5), determine whether the two vectors are parallel, perpendicular, or
neither.

28) A boat travels at a speed of 75 mph at 26^{o} north of east. It encounters a 10 mph current going 32^{o} south of east.
Estimate the resultant speed of the boat.

Chapter 9: Polar Coordinates

29) Find the 3 other polar coordinates that represent [5, -30º].

30) Given the following polar coordinate, find it's equivalent rectangular coordinate. [-5, 45º].

31) Write (-2, -3) in the polar form.

Chapter 15A: Derivatives

32) The height (in feet) after t seconds of a batted ball with initial vertical velocity of 60 ft/sec is given by $h(t) = 60t - 16t^2$.

a. Find the average vertical velocity from time 2 seconds to time 3 seconds (include units).

b. Find a formula for the slope of the **secant** line from time t to time $t + \Delta t$.

c. Find a formula for instantaneous velocity.

d. What is the instantaneous velocity at t = 2? (Include units)

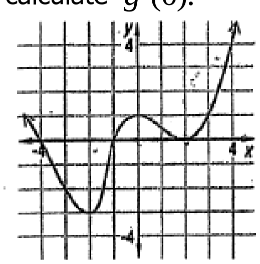
e. What is the instantaneous acceleration at t = 2? (Include units)

33) Given $f(x) = \frac{-8x^2}{\sin x}$, find $f'(x)$.

34) Use the limit definition of the derivative to calculate $f'(x)$ for $f(x) = 4x + 5$. Show all work.

35) Write the equation of the tangent line for the function $f(x) = 4x^3 + 5x^2 - 10$ at $x = 2$. Show all work in determining this equation.

36) Consider the function graphed at the right. Use the geometric definition of the derivative to calculate $g'(0)$.



37) Find a formula to calculate the slope of the line tangent to the function $f(x) = (6x + 8)\cos x$.

38) Given $f(x) = \ln(12x + 2x^2)$, find $f'(x)$.

Chapter 15B: Integrals

39) No Calculator: Evaluate each

A) $\int_3^7 (x+3)dx + \int_1^3 (-x)dx$

B) $\int_0^1 (\sqrt{1-x^2})dx + \int_0^6 (x^2)dx$

40) For the function f(x) = x^2 + 1 Estimate the area bounded by the x-axis, y-axis, f(x) and x = 20 by partitioning the interval from 0 to 20 into 4 equal subintervals of equal length and using $f(z_i)$ where z_i is the value of the right endpoint. Recalculate using z_i being the value of the left endpoint.

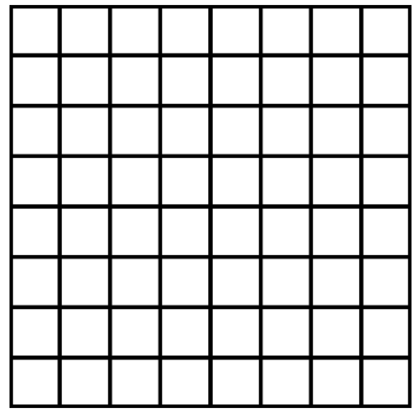
41) Given $\int_0^5 (x^2 + 3)dx - \int_0^4 (x^2 + 3)dx$.

a) Use the properties of integrals to write the expression as a single integral.

b) Evaluate the integral.

42) Given the velocity function $f(x) = .5x^2$ on the interval $0 \le x \le 2$:

a) Sketch a picture of the situation.



b) Use Riemann Sums to estimate $\sum_{i=1}^{4} (f(z_i)\Delta x$ where z_i is the right endpoint of the *i* the subinterval.

Chapter 11: Exponential and Logarithmic Functions

43. Simplify each expression:

a. $\sqrt{16x^2y^7}$

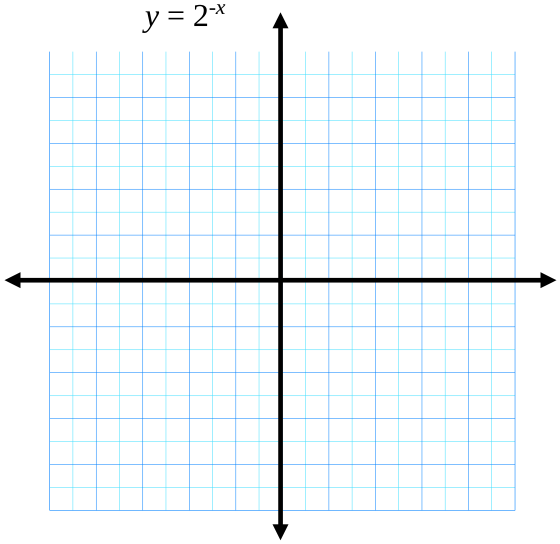
b. $\sqrt[3]{54a^4b^3c^8}$

c. $(3^2 c^3 d^5)^{\frac{1}{5}}$

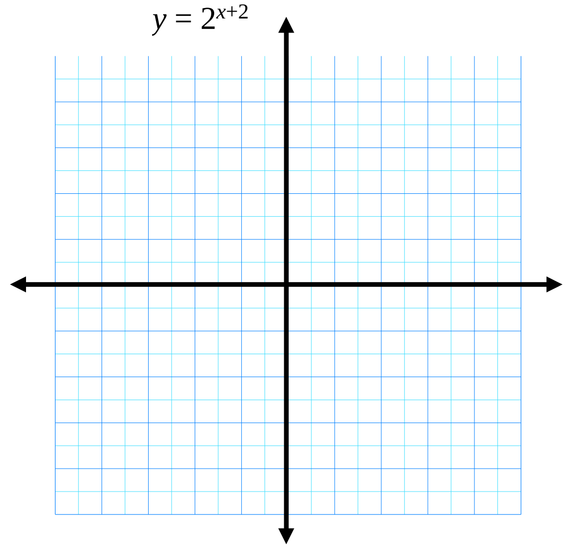
d. $(3x)^2 (3x^2)^{-2}$

44. Graph each exponential function:

$y = 2^{-x}$



$y = 2^{x+2}$



45. A city's population can be modeled by the equation $y = 17492e^{-0.027t}$, where t is the number of years since 1996.

a. What was the city's population in 1996?

b. What is the projected population in 2007?

46. Solve each equation:

a. $\log_x 36 = 2$

b. $\log_2 (2x) = \log_2 27$

c. $\log_5 x = \frac{1}{3} \log_5 64 + 2 \log_5 3$

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47. Find the value of each logarithm using the change of base formula.

a. $\log_6 431$

b. $\log_{0.5} 78$

48. Use natural logarithms to solve each equation.

a. $2.3^x = 23.4$

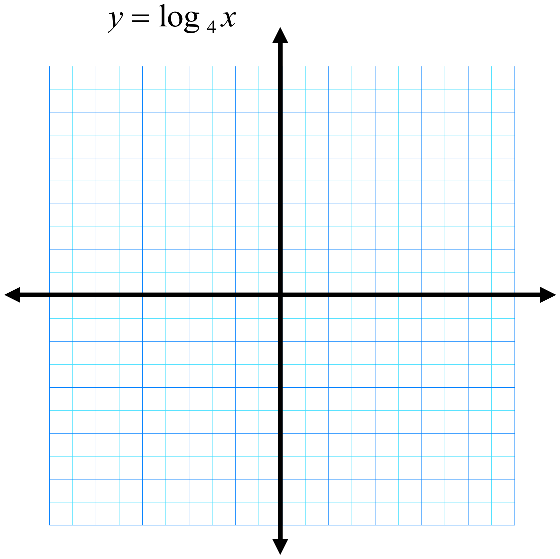
b. $\log_4 16 = x$

c. $5^{x-2} = 2^x$

d. $519 = 3e^{0.035t}$

49. Graph each logarithmic function:

$y = \log_4 x$



$y = \log_2 x$