Review for Spring Exam

Entire Review must be completed with a passing grade in order to be eligible for a retest.

Due on day of final exam.

ALL PROBLEMS ARE TO BE WORKED ON SEPARATE PAPER. NO WORK NO CREDIT!

Solve the equation.

1) $\log_9 x^2 = 4$

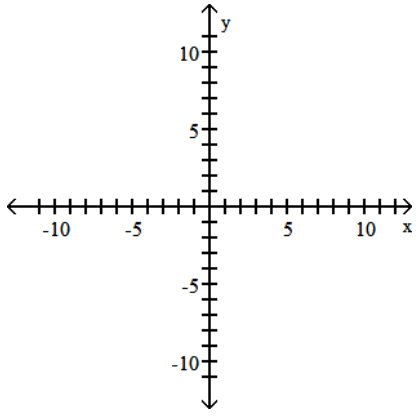
2) $\log_3 x + \log_3(x - 24) = 4$

3) $9^{7x + 3} = 27$

4) $4^{(9 - 2x)} = 1024$

Use transformations to graph the function. Determine the domain, range, and horizontal asymptote of the function.

5) $f(x) = -2^{x+3} + 4$



Solve the problem.

6) Which of the two rates would yield the larger amount in 1 year: 4.9% compounded semiannually or 4.8% compounded quarterly?

Solve the equation.

7) $\log (5 + x) - \log (x - 5) = \log 3$

8) $\log_5 125 = x$

Use the properties of logarithms to find the exact value of the expression. Do not use a calculator.

9) $\ln e^{\sqrt{5}}$

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results.

10) $b = 5, c = 8, B = 65°$

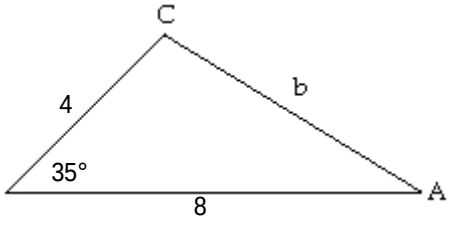
Solve the problem.

11) A painter needs to cover a triangular region 65 meters by 69 meters by 70 meters. A can of paint covers 70 square meters. How many cans will be needed?

Solve the triangle.

12) a = 80, b = 12, C = 110°

13)



Solve the problem.

14) A guy wire to the top of a tower makes an angle of 65° with the level ground. At a point 33 feet farther from the base of the tower and in line with the base of the wire, the angle of elevation to the top of the tower is 22°. What is the length of the guy wire?

Two sides and an angle are given. Determine whether the given information results in one triangle, two triangles, or no triangle at all. Solve any triangle(s) that results.

15) a = 22, b = 15, B = 10°

Find the area of the triangle. If necessary, round the answer to two decimal places.

16) a = 12, b = 15, C = 52°

An object attached to a coiled spring is pulled down a distance a from its rest position and then released. Assuming that the motion is simple harmonic with period T, write an equation that relates the displacement d of the object from its rest position after t seconds. Also assume that the positive direction of the motion is up.

17) a = 5; T = 10 seconds

The displacement d (in meters) of an object at time t (in seconds) is given. Describe the motion of the object. What is the maximum displacement from its resting position, the time required for one oscillation, and the frequency?

18) d = 6 sin (3t)

Solve the problem.

19) A rocket tracking station has two telescopes A and B placed 2.1 miles apart. The telescopes lock onto a rocket and transmit their angles of elevation to a computer after a rocket launch. What is the distance to the rocket from telescope B at the moment when both tracking stations are directly east of the rocket telescope A reports an angle of elevation of 20° and telescope B reports an angle of elevation of 50°?

Solve the triangle.

20) A = 30°, B = 60°, a = 2

21) a = 60, b = 9, C = 125°

22) a = 8, b = 5, c = 4

The letters r and θ represent polar coordinates. Write the equation using rectangular coordinates (x, y).

23) $r = \dfrac{5}{1 + \cos\theta}$

The polar coordinates of a point are given. Find the rectangular coordinates of the point.

24) $\left(5, \dfrac{3\pi}{4}\right)$

The rectangular coordinates of a point are given. Find polar coordinates for the point.

25) (4, -4)

The letters x and y represent rectangular coordinates. Write the equation using polar coordinates (r, θ).

26) $x^2 = 4y$

The letters r and θ represent polar coordinates. Write the equation using rectangular coordinates (x, y).

27) $r = 10 \sin\theta$

Solve the problem.

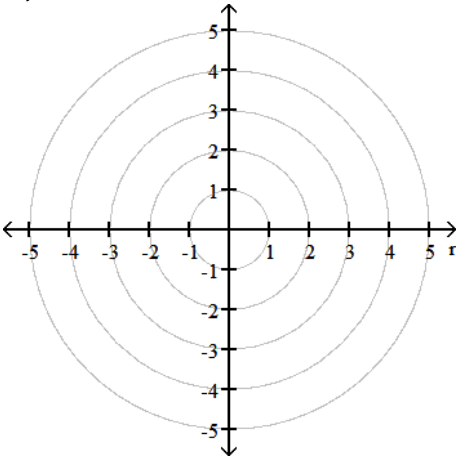
28) If $u = -11i - 2j$ and $v = -6i + 7j$, find $u - v$.

Write the vector v in the form ai + bj, given its magnitude $\|v\|$ and the angle α it makes with the positive x-axis.

29) $\|v\| = 14$, $\alpha = 90°$

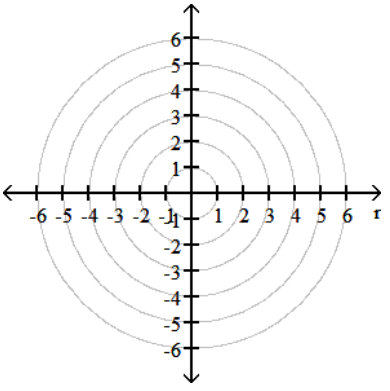
Plot the point given in polar coordinates.

30) $\left(3, \dfrac{7\pi}{6}\right)$



Transform the polar equation to an equation in rectangular coordinates. Then identify and graph the equation.

31) $r = 5$



The rectangular coordinates of a point are given. Find polar coordinates for the point.

32) $(-3, 3)$

Find an equation for the hyperbola described.

33) Vertices at $(0, \pm 4)$; asymptotes at $y = \pm \frac{2}{5}x$

Find the asymptotes of the hyperbola.

34) $\frac{(x - 2)^2}{9} - \frac{(y + 3)^2}{4} = 1$

Find the equation of the parabola described.

35) Focus at $(2, -4)$; directrix the line $y = 0$

Use a graphing utility to find the sum of the geometric sequence. Round answer to two decimal places, if necessary.

36) $6 + 12 + 24 + 48 + 96 + \cdots + 6 \cdot 2^{10}$

Use the Binomial Theorem to find the indicated coefficient or term.

37) The coefficient of x in the expansion of $(5x + 4)^5$

38) The 5th term in the expansion of $(x - 3y)^{12}$

Find the sum of the sequence.

39) $\sum_{k=1}^{8} 3$

The given pattern continues. Write down the nth term of the sequence $\{a_n\}$ suggested by the pattern.

40) $-1, 1, 3, 5, 7, \ldots$

Find the indicated term of the arithmetic sequence.

41) The thirteenth term of the arithmetic sequence 28, 22, 16, . . .

Evaluate the factorial expression.

42) $\frac{9!}{7!\,2!}$

Approximate the area under the curve and above the x-axis using n rectangles. Let the height of each rectangle be given by the value of the function at the right side of the rectangle.

43) $f(x) = 2x^2 + x + 3$ from $x = -2$ to $x = 1$; $n = 3$

Solve the problem.

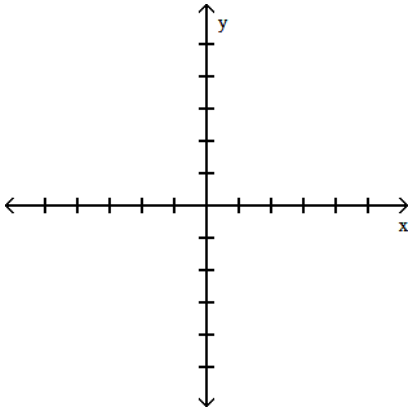
44) The volume of a rectangular box with square base and a height of 5 feet is $V(x) = 5x^2$, where x is the length of a side of the base. Find the instantaneous rate of change of volume with respect to x when x = 3 feet.

Use a table to find the indicated limit.

45) $\lim_{x \to 2} (x^2 + 8x - 2)$

Graph the function. Use the graph to find the indicated limit, if it exists.

46) $\lim_{x \to -2} f(x)$, $f(x) = 4x - 3$

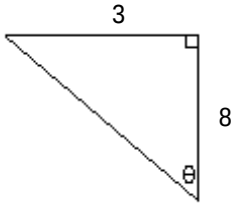


Solve the problem. Round your answer to three decimals.

47) How long will it take for an investment to double in value if it earns 11.25% compounded continuously?

Find the value of the indicated trigonometric function of the angle θ in the figure. Give an exact answer with a rational denominator.

48)



Find cot θ.

Solve the problem.

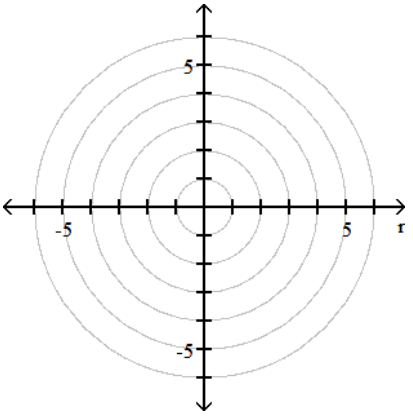
49) A photographer points a camera at a window in a nearby building forming an angle of 42° with the camera platform. If the camera is 52 m from the building, how high above the platform is the window, to the nearest hundredth of a meter?

Find the direction angle of the vector v. Round to the nearest tenth if necessary.

50) $v = -i - 7j$

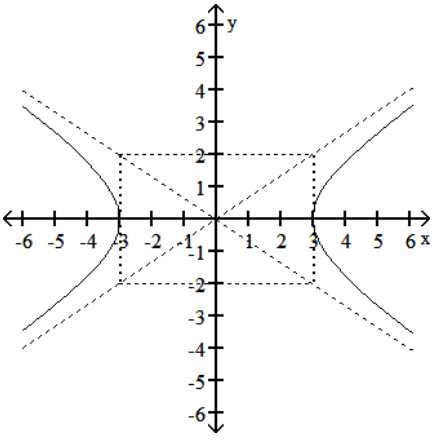
Identify and graph the polar equation.

51) $r = 2 + 2 \sin \theta$



Write an equation for the hyperbola.

52)



Find an equation for the ellipse.

53) Foci at $(0, \pm 2)$; $a = 6$

Use the Binomial Theorem to find the indicated coefficient or term.

54) The coefficient of x^8 in the expansion of $(x^2 - 3)^7$

Find the sum of the sequence.

55)

$$\sum_{k=1}^{9} (-k)$$

Find the sum.

56) $1 + 3 + 5 + \ldots + 1163$

Solve the problem.

57) The logistic growth model $P(t) = \dfrac{910}{1 + 17.2e^{-0.359t}}$ represents the population of a bacterium in a culture tube after t hours. When will the amount of bacteria be 690?

58) Austin invested $12,000 in an account at 11% compounded quarterly. Find the amount in Austin's account after a period of 7 years.

59) How long does it take $1700 to double if it is invested at 5% interest, compounded monthly? Round your answer to the nearest tenth.

60) A tree casts a shadow of 26 meters when the angle of elevation of the sun is 24°. Find the height of the tree to the nearest meter.

Find an equation for the ellipse.

61) Focus at (0, -2); vertices at (0, ±3)

Evaluate the expression.

62) $\binom{5}{5}$

Find the area of the triangle. If necessary, round the answer to two decimal places.

63) A = 40°, b = 10, c = 9

Find the sum.

64) $\sum_{k=1}^{5} \binom{4}{3} (4)^k$

Use a table to find the indicated limit.

65) $\lim_{h \to -3} \left(\dfrac{h^2 - 9}{h^2 + 3h} \right)$