

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Evaluate the function at the given value of the independent variable and simplify.

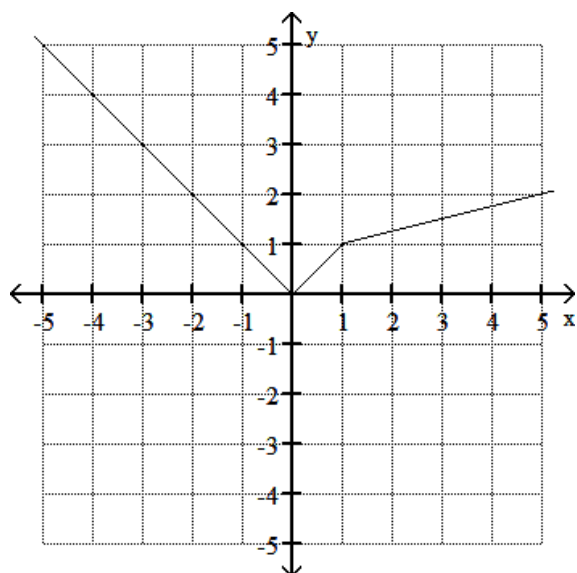
1) $f(x) = x^2 - 5$; $f(x - 4)$

1) _____

Use the graph to find the indicated function value.

2) $y = f(x)$. Find $f(-2)$

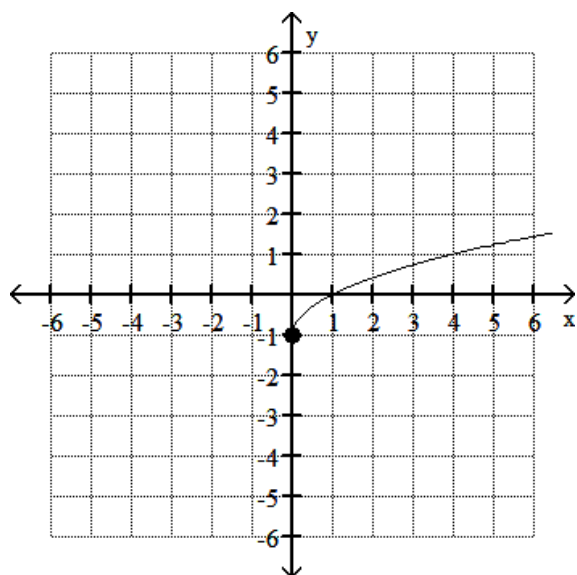
2) _____



Use the graph to determine the function's domain and range.

3)

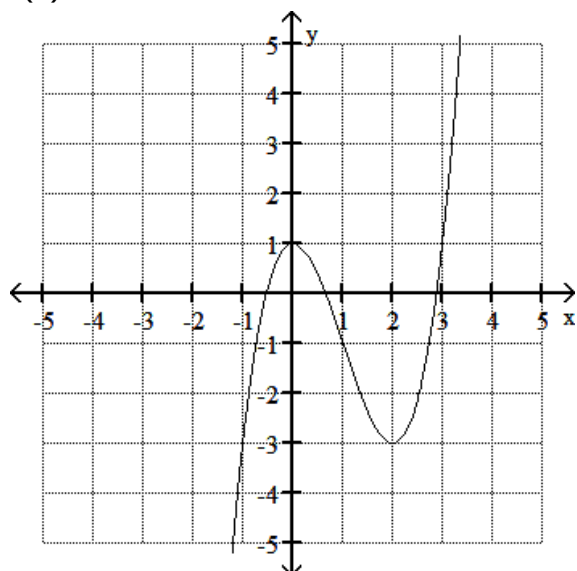
3) _____



Use the graph of the given function to find any relative maxima and relative minima. State where $f(x)$ increases and decreases

4) $f(x) = x^3 - 3x^2 + 1$

4) _____



Find and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$ for the given function.

5) $f(x) = x^2 + 7x + 3$

5) _____

Use the given conditions to write an equation for the line in slope-intercept form.

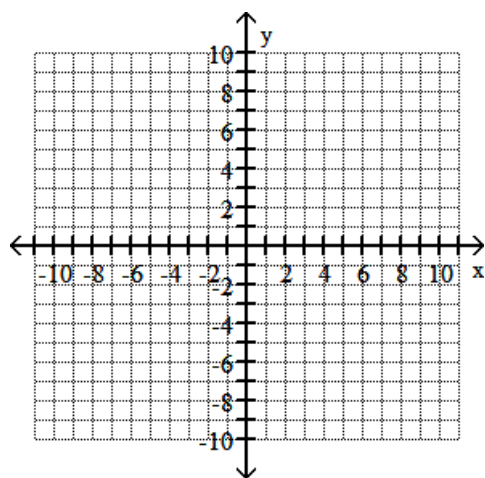
6) Passing through (2, 5) and (1, 8)

6) _____

Begin by graphing the standard quadratic function $f(x) = x^2$. Then use transformations of this graph to graph the given function.

7) $g(x) = -\frac{1}{2}(x+2)^2 + 3$

7) _____



For the given functions f and g , find the indicated composition.

8) $f(x) = \frac{7}{x+4}$, $g(x) = \frac{4}{5x}$

8) _____

$(f \circ g)(x)$

Find the inverse of the one-to-one function.

9) $f(x) = \frac{3}{2x + 1}$

9) _____

Complete the square and write the equation in standard form. Then give the center and radius of the circle.

10) $x^2 - 10x + 25 + y^2 - 8y + 16 = 64$

10) _____

Find the product and write the result in standard form.

11) $(8 - 3i)(-2 - 3i)$

11) _____

Divide and express the result in standard form.

12) $\frac{5}{8 - i}$

12) _____

Solve the quadratic equation using the quadratic formula. Express the solution in standard form.

13) $4x^2 - 3x + 1 = 0$

13) _____

Find the coordinates of the vertex for the parabola defined by the given quadratic function.

14) $f(x) = 5x^2 + 10x - 5$

14) _____

Solve the problem.

- 15) The cost in millions of dollars for a company to manufacture x thousand automobiles is given by the function $C(x) = 5x^2 - 20x + 36$. Find the number of automobiles that must be produced to minimize the cost.

15) _____

Find the zeros of the polynomial function.

16) $f(x) = x^3 + 4x^2 - 4x - 16$

16) _____

Divide using long division or synthetic division

17) $\frac{3m^3 + 18m^2 - 74m + 63}{m + 9}$

17) _____

Find a rational zero of the polynomial function and use it to find all the zeros of the function.

18) $f(x) = x^3 - 8x^2 + 19x - 14$

18) _____

Find the domain of the rational function.

19) $h(x) = \frac{x + 2}{x^2 - 49x}$

19) _____

Find the vertical asymptotes, if any, of the graph of the rational function.

20) $\frac{x - 64}{x^2 - 15x + 54}$

20) _____

Find the horizontal asymptote, if any, of the graph of the rational function.

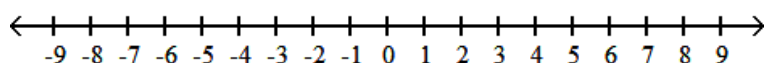
21) $g(x) = \frac{8x^2}{2x^2 + 1}$

21) _____

Solve the polynomial inequality and graph the solution set on a number line. Express the solution set in interval notation.

22) $x^2 + 3x - 4 > 0$

22) _____



Solve the exponential equation. Express the solution set in terms of natural logarithms.

23) $e^{2x} = 7$

23) _____

Solve the exponential equation. Use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

24) $5^{x+7} = 8$

24) _____

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

25) $\log_5(x+2) = -3$

25) _____

26) $2 \ln(7x) = 18$

26) _____

Solve the problem.

27) The formula $A = 238e^{0.032t}$ models the population of a particular city, in thousands, t years after 1998. When will the population of the city reach 317 thousand?

27) _____

Find the exact value of the expression.

28) $\sin \frac{-2\pi}{3}$

28) _____

29) $\sec \frac{-5\pi}{4}$

29) _____

Find the exact value of the expression.

30) $\sin^{-1} \frac{\sqrt{2}}{2}$

30) _____

Find the exact value of the expression.

31) $\cos \left(\sin^{-1} \frac{4}{5} \right)$

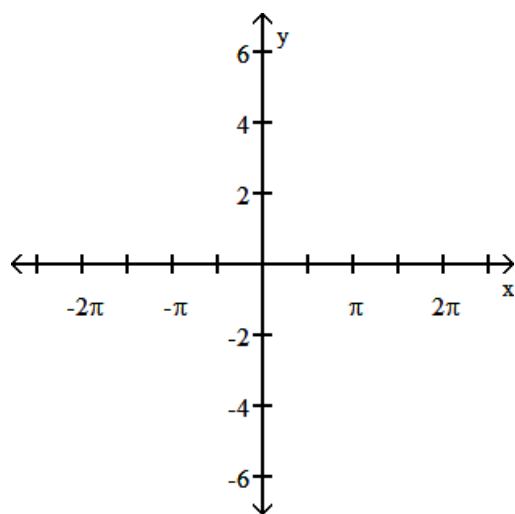
31) _____

Use a right triangle to write the expression as an algebraic expression. Assume that x is positive and in the domain of the given inverse trigonometric function.

32) $\sin(\tan^{-1} x)$ 32) _____

Use a transformations to graph the function.

33) $y = 2 \cos \frac{1}{2}x + 2$ 33) _____



Use the given information to find the exact value of the expression.

34) $\sin \theta = \frac{15}{17}$, θ lies in quadrant I Find $\cos 2\theta$. 34) _____

Find all solutions of the equation.

35) $2 \cos x - 1 = 0$ 35) _____

Solve the equation on the interval $[0, 2\pi)$.

36) $\cos x + 2 \cos x \sin x = 0$ 36) _____

Solve the equation on the interval $[0, 2\pi)$.

37) $2 \cos^2 x + \sin x - 2 = 0$ 37) _____

Polar coordinates of a point are given. Find the rectangular coordinates of the point.

38) $(-7, 120^\circ)$ 38) _____

The rectangular coordinates of a point are given. Find polar coordinates of the point. Express θ in radians.

39) $(5\sqrt{3}, 5)$ 39) _____

Write the partial fraction decomposition of the rational expression.

40) $\frac{7x + 31}{x^2 + 8x + 15}$ 40) _____

Solve the problem.

41) A vendor sells hot dogs and bags of potato chips. A customer buys 5 hot dogs and 4 bags of potato chips for \$15.50. Another customer buys 2 hot dogs and 5 bags of potato chips for \$8.75. Find the cost of each item. 41) _____

Solve the system

42) $x - 2y = 3$

$x^2 - xy = 20$

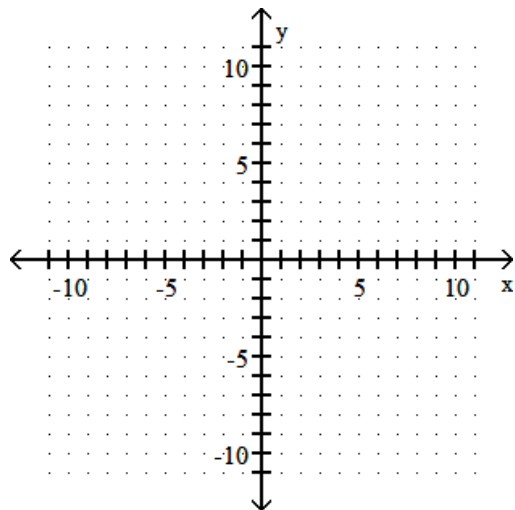
42) _____

Graph the solution set of the system of inequalities or indicate that the system has no solution.

43) $x^2 + y^2 \leq 25$

$y > 3^x$

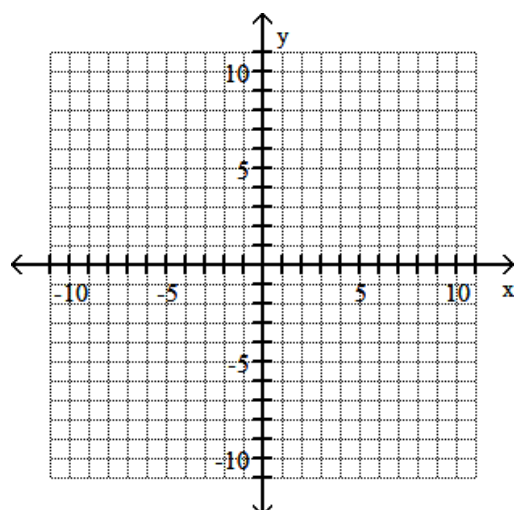
43) _____



Graph the ellipse

44) $\frac{x^2}{49} + \frac{y^2}{16} = 1$

44) _____



Find the center and radius of the circle whose equation is given.

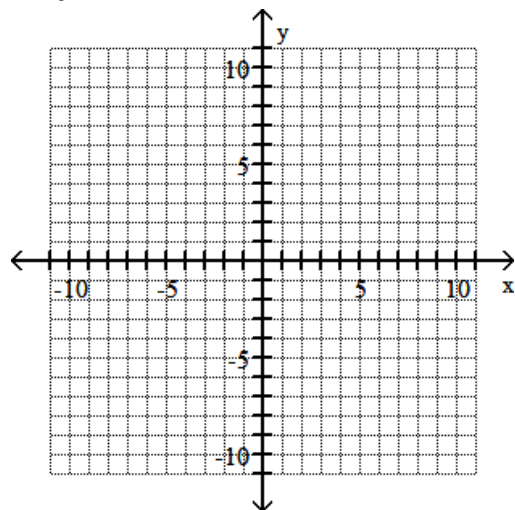
45) $x^2 + y^2 - 4x + 6y - 3 = 0$

45) _____

Use vertices and asymptotes to graph the hyperbola.

46) $9x^2 - 4y^2 = 36$

46) _____



Find the vertex, focus, and directrix of the parabola with the given equation.

47) $(y + 2)^2 = 16(x + 1)$

47) _____

Convert the equation to the standard form for a parabola by completing the square on x or y as appropriate.

48) $x^2 - 6x - 6y - 21 = 0$

48) _____

Find the indicated sum.

49) $\sum_{i=3}^6 8i$

49) _____

Express the sum using summation notation. Use a lower limit of summation not necessarily 1 and k for the index of summation.

50) $9 + 11 + 13 + 15 + \dots + 25$

50) _____

Write a formula for the general term (the nth term) of the geometric sequence.

51) $8, 16, 32, 64, 128, \dots$

51) _____

Solve the problem.

52) A theater has 38 rows with 25 seats in the first row, 29 in the second row, 33 in the third row, and so forth. How many seats are in the theater?

52) _____

Find the sum of the infinite geometric series, if it exists.

53) $5 + \frac{5}{2} + \frac{5}{4} + \frac{5}{8} + \dots$

53) _____

Write the first three terms in the binomial expansion, expressing the result in simplified form.

54) $(x + 2)^4$

54) _____

Find the x-intercepts of the polynomial function. State whether the graph crosses the x-axis, or touches the x-axis and turns around, at each intercept. State the end behavior

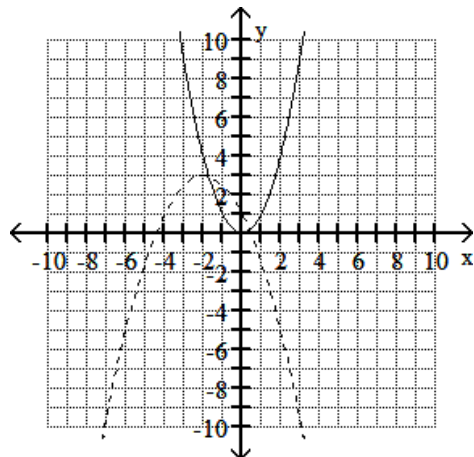
55) $f(x) = -x^3(x + 4)^2(x - 8)$

55) _____

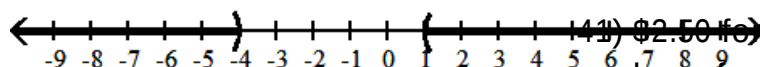
Answer Key

Testname: FINAL REVIEW INCLUDE POLY_F16

- 1) $x^2 - 8x + 11$
- 2) 2
- 3) domain: $[0, \infty)$
range: $[-1, \infty)$
- 4) maximum: (0, 1); minimum: (2, -3)
- 5) $2x + h + 7$
- 6) $y = -3x + 11$
- 7)



- 8) $\frac{35x}{4 + 20x}$
- 9) $f^{-1}(x) = \frac{3}{2x} - \frac{1}{2}$
- 10) $(x - 5)^2 + (y - 4)^2 = 64$
(5, 4), $r = 8$
- 11) $-25 - 18i$
- 12) $\frac{8}{13} + \frac{1}{13}i$
- 13) $\left\{ \frac{3}{8} \pm i\frac{\sqrt{7}}{8} \right\}$
- 14) $(-1, -10)$
- 15) 2 thousand automobiles
- 16) $x = -4, x = -2, x = 2$
- 17) $3m^2 - 9m + 7$
- 18) $\{2, 3 + \sqrt{2}, 3 - \sqrt{2}\}$
- 19) $\{x | x \neq 0, x \neq 49\}$
- 20) $x = 9, x = 6$
- 21) $y = 4$
- 22) $(-\infty, -4) \cup (1, \infty)$



- 23) $\left\{ \frac{\ln 7}{2} \right\}$
- 24) -5.71
- 25) $\left\{ -\frac{249}{125} \right\}$

$$26) \left\{ \frac{e^9}{7} \right\}$$

$$27) 2007$$

$$28) -\frac{\sqrt{3}}{2}$$

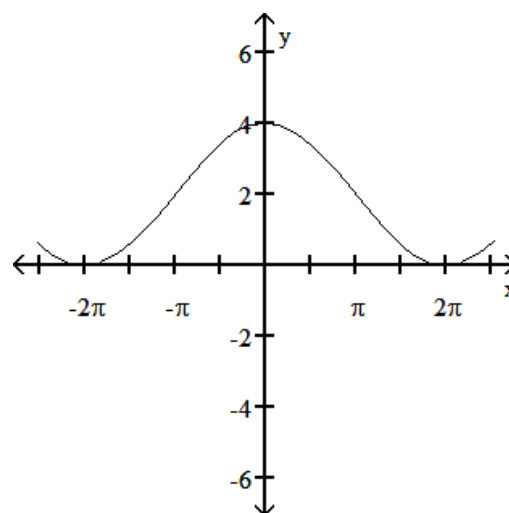
$$29) -\sqrt{2}$$

$$30) \frac{\pi}{4}$$

$$31) \frac{3}{5}$$

$$32) \frac{x\sqrt{x^2 + 1}}{x^2 + 1}$$

$$33)$$



$$34) -\frac{161}{289}$$

$$35) x = \frac{\pi}{3} + 2n\pi \text{ or } x = \frac{5\pi}{3} + 2n\pi$$

$$36) \frac{\pi}{2}, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}$$

$$37) 0, \pi, \frac{\pi}{6}, \frac{5\pi}{6}$$

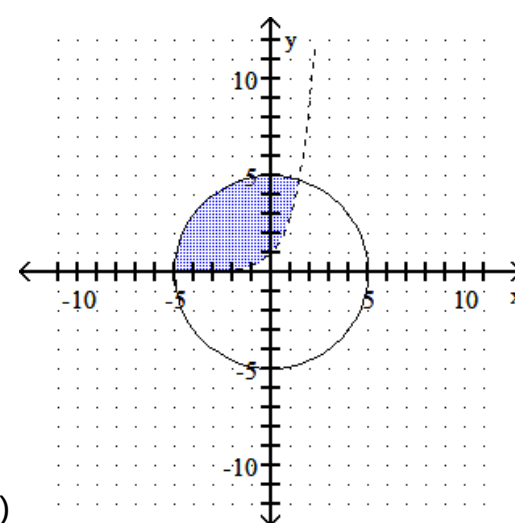
$$38) \left\{ \frac{7}{2}, \frac{-7\sqrt{3}}{2} \right\}$$

$$39) \left[10, \frac{\pi}{6} \right)$$

$$40) \frac{2}{x+5} + \frac{5}{x+3}$$

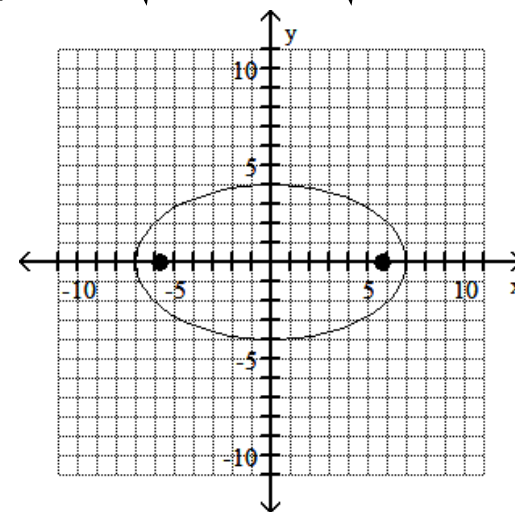
$$41) \$2.50 for a hot dog; $0.75 for a bag of potato chips$$

$$42) \left\{ (5, 1), \left(-8, -\frac{11}{2}\right) \right\}$$



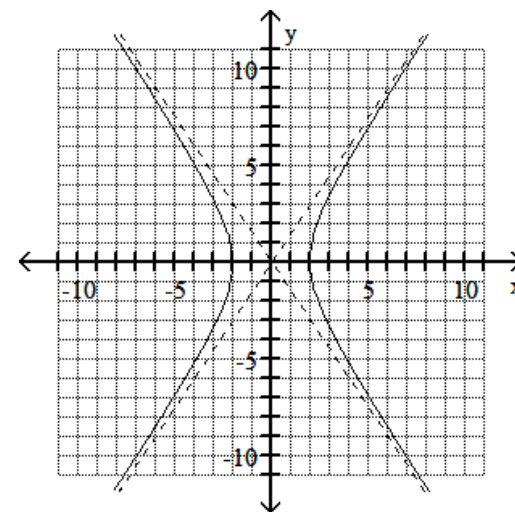
$$43)$$

$$44) \sqrt{\quad} \quad \sqrt{\quad}$$



$$45) \text{ center: } (2, -3) \text{ radius } 4$$

$$46) \text{ vertices: } (2, 0) \text{ and } (-2, 0)$$



$$47) \text{ vertex: } (-1, -2)$$

$$\text{ focus: } (3, -2)$$

$$\text{ directrix: } x = -5$$

$$48) (x - 3)^2 = 6(y + 5)$$

$$49) 144$$

$$50) \sum_{k=2}^{10} 2k + 5$$

Answer Key

Testname: FINAL REVIEW INCLUDE POLY_F16

51) $a_n = 8(2)^n - 1$

52) 3762 seats

53) 10

54) $x^4 + 8x^3 + 24x^2$

55) 0, crosses the x-axis;

-4, touches the x-axis and
turns around;

8, crosses the x-axis as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$ and as $x \rightarrow -\infty$, $f(x) \rightarrow \infty$