1. Model the following situation with a linear equation in slope-intercept form.
   The gas tank in a truck holds 15 gallons. The truck uses $\frac{4}{7}$ gallon per mile.

2. Evaluate the function at the specified value(s) of the independent variable and simplify.
   $g(x)=\frac{x^2-5}{2x};\ g(n-3)$

3. A publishing company estimates that the average cost (in dollars) for one copy of a new scenic calendar it plans to produce can be approximated by the function
   $C(x)=\frac{1.75x+500}{x}$
   where x is the number of calendars printed. Find the average cost per calendar when the company prints 100 calendars.

4. Find the domain of the function.
   $f(x)=\sqrt{4x+7}$

5. Use a graphing utility to find any relative minimum or maximum values of the function.
   $f(x)=x^3-12x+6$

6. Describe the transformation that occurs in the function.
   $g(x)=(x-5)^2+3$

7. If $f(x)=2-5x$ and $g(x)=4x-2$, find (a) $(g\circ f)(x)$ and (b) $(f\circ g)(x)$.

8. Find an equation that represents y as a function of x.

   [A] $x=10$

   [B] $x=-7$

   [C] $y=-8x^2$

   [D] $-8x^2-7y^2=0$

9. Find a set of ordered pairs $(x,\ y)$ that represents y as a function of x.

   [A] $\{(-1,\ -3),\ (8,\ 1),\ (8,\ -1),\ (1,\ 8)\}$

   [B] $\{(-1,\ -3),\ (-3,\ -1),\ (1,\ 1)\}$

   [C] $\{(-1,\ -3),\ (-3,\ 8),\ (-1,\ 1)\}$

   [D] $\{-1,\ -3,\ 8,\ 1\}$

10. Construct a model of the relation $\{(-6,-2),(-3,1),(6,1),(7,6)\}$. Determine whether the relation is a function.

11. Evaluate the function at the specified value(s) of the independent variable and simplify.
$f(x)=3x^2-\sqrt{2x}\;;\; f(9)$

12. Find the domain of the function.
$h(x)=\dfrac{5x}{x(x^2-36)}$

13. Find $(f+g)(x)$ and $(f+g)(4)$ for $f(x)=x^2-2x-5$ and $g(x)=-1-4x+5x^2$.

14. If $f(x)=|2x|$ and $g(x)=5x$, find $(f\circ g)(x)$.

15. Find the inverse of the function.
$f(x)=\{(-5,\ -8),\ (-8,\ -5),\ (8,\ -9)\}$

16. The table shows Christine's best javelin throws each year. Use a graphing utility to determine an equation for the line of best fit for the data. Use $x=0$ for 1989.

Year	1989	1990	1991	1992	1993	1994	1995	1996
Distance (m)	36.25	34.75	34.5	36.5	37.75	39	40.25	40.5

17. Find the equation of a quadratic function whose graph opens upward.

[A] $f(x)=8(2x+11)$

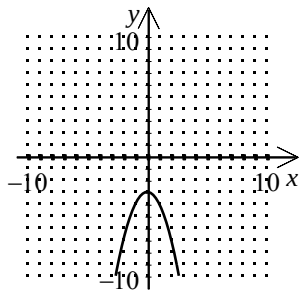
[B] $f(x)=8x^2+9$

[C] $f(x)=-9(-5x+9)^2$

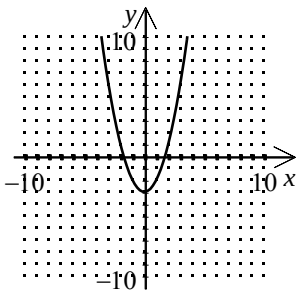
[D] $f(x)=-9x^2+2$

18. Find the graph of the quadratic function.
$f(x)=x^2-3$

[A]



[B]



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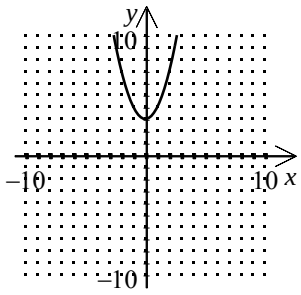

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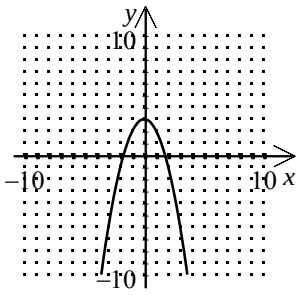
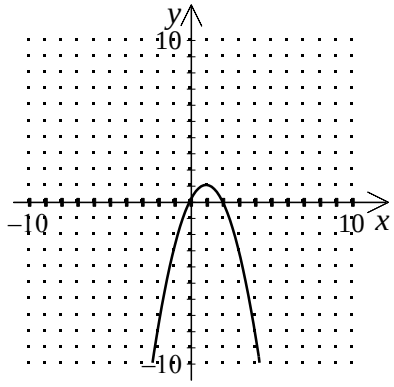


19. Sketch the graph of the quadratic function and list any *x*-intercepts.
$f(x) = x^2 + 2x - 3$

20. Write the equation of the quadratic function in standard form and find the vertex of the graph.
$f(x) = -8x - 7 - 2x^2$

21. Upco Manufacturing estimates that its profit *P* in hundreds of dollars is
$P = -x^2 + 6x + 1$
where *x* is the number of units produced in thousands. How many units must be produced to obtain the maximum profit?

22. Find the equation of the function graphed below.



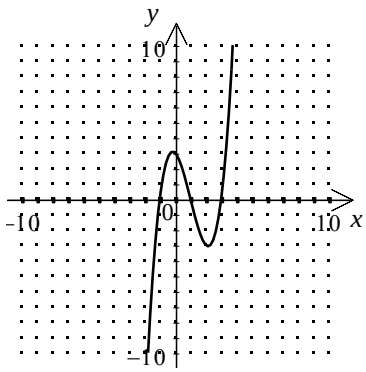
[A] $f(x) = -x^3 + 2x^2$

[C] $f(x) = x^3 + 2x^2$

[B] $f(x) = x^2 + 2x$

[D] $f(x) = -x^2 + 2x$

23. Find a polynomial function that has zeros at 1, 3, and –1 and matches the graph below.



[A] $f(x) = x^3 - 3x^2 - x + 3$

[C] $f(x) = x^2 + x - 3$

[B] $f(x) = -x^2 - 3x + 1$

[D] $f(x) = -x^3 + 3x^2 + x + 3$

24. Factor $3x^3 - 8x^2 - 33x - 10$ given that $x + 2$ is one of its factors.

25. Find the standard form of the given complex number.
$-12i + 4i^2$

26. Find all the zeros of the function.
$f(x) = x^4 + 4x^3 - 4x^2 - 36x - 45$

27. Determine the domain of the function.
$f(x) = \dfrac{(x-1)}{(x-8)(x+6)}$

28. Find the horizontal asymptotes, if any, of the graph of $f(x) = \dfrac{3x^2 + 4}{4x^2 + 3x + 9}$.

29. Find the vertical asymptote(s), if any, for $f(x) = \dfrac{5x - 3}{x^2 + 3x - 4}$.

30. The population of an endangered animal species is given by
$f(x) = 720(0.83)^t$
where 720 is the number of animals currently in the population and *t* is the time in years. The population is decreasing at an annual rate of 17%. What is the estimated number of animals in this population in 5 years?

31. Sketch the graph of the function.
$f(x) = 2^x + 1$

32. Sketch the graph of the logarithmic function.

$f(x) = \log_2(x+6)$

33. Use the properties of logarithms to expand the expression. (Assume all variables are positive.)

$\log_8 \dfrac{x^6}{\sqrt[3]{y}}$

34. Solve the exponential equation algebraically.

$6e^{0.04x} + 41 = 71$

Find the value of *x*.

35. $\log_6(4x+3) = 4$

36. $\log_2(x+3) - \log_2 x = 3$

Find the value of *x*.

37. $5\ln(6x) = 11$

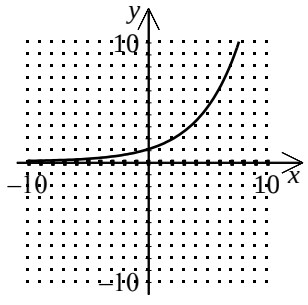
38. An automobile manufacturer is introducing a new fuel-efficient model and estimates the demand for the car as

$N = 57{,}000 \ln(6t+7)$

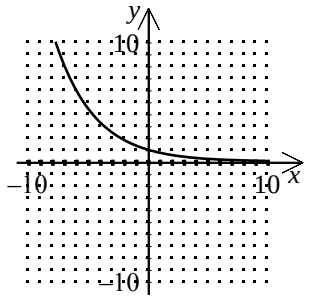
where *N* is the estimated number of cars to be sold and *t* is the number of years after the car is introduced. When will the demand be 215,000 cars?

39. Find a graph that models an exponential growth function.

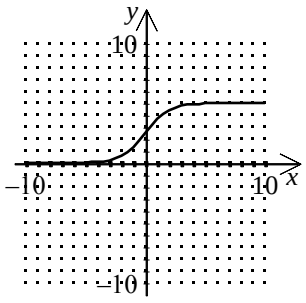
[A]



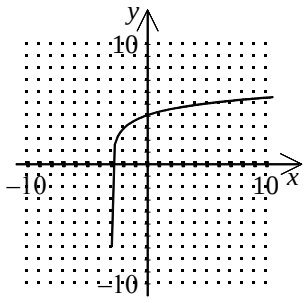
[B]



[C]



[D]



40. Early in the 1900s, an airplane manufacturer was able to increase the time its planes could stay aloft by constantly refining its techniques. Use a graphing utility to find an exponential equation that best models the data. Assume x is the number of years after 1910 and y is the time aloft in hours.

Years after 1910	1	2	3	4	5	6
Time aloft (h)	0.73	1.3	2.5	3.8	4.4	5.8

41. Solve the system by the method of substitution.

$$\begin{cases} x + 2y = 8 \\ x + y = 3 \end{cases}$$

42. Solve the system by elimination.

$$\begin{cases} 6x + 6y = 42 \\ 3x - 6y = 3 \end{cases}$$

43. Use back-substitution to solve the system of linear equations.

$$\begin{cases} -7x - 7y - z = -5 \\ 9y + z = 5 \\ z = 4 \end{cases}$$

44. Solve the system of linear equations using Gaussian elimination.

$$\begin{cases} 7x - 3y - 2z = 6 \\ 5x - 5y - z = -12 \\ 3x - 3y + 2z = -2 \end{cases}$$

45. Determine the order of the matrix.

$$\begin{bmatrix} 4 & 12 \\ 6 & -8 \\ -3 & 19 \\ -7 & 1 \end{bmatrix}$$

46. Find a matrix that is equal to the matrix below.

$$\begin{bmatrix} 7^2 & \sqrt{7} & 4 \\ \sqrt{25} & \frac{1}{4} & 2 \\ 0.21 & 25 & \frac{1}{5} \end{bmatrix}$$

[A] $\begin{bmatrix} 49 & \sqrt{7} & 4 \\ 5 & 0.25 & 2 \\ 0.21 & 25 & 0.2 \end{bmatrix}$

[B] $\begin{bmatrix} 14 & 49 & 4 \\ 5 & 0.25 & 2 \\ 0.21 & 25 & 0.2 \end{bmatrix}$

[C] $\begin{bmatrix} 49 & \sqrt{7} & 4 \\ 625 & 0.1 & 2 \\ 0.21 & 25 & 0.2 \end{bmatrix}$

[D] $\begin{bmatrix} 49 & \sqrt{7} & 4 \\ 5 & 0.25 & 2 \\ 0.21 & \sqrt{5} & 0.02 \end{bmatrix}$

47. Evaluate the expression.

$4A - 7B$

$$A = \begin{bmatrix} 1 & 2 & -5 \\ 3 & 4 & 0 \\ 7 & 10 & -3 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & 5 & 7 \\ 8 & -6 & -1 \\ -5 & -4 & 6 \end{bmatrix}$$

48. Find the inverse of the matrix (if it exists).

$$\begin{bmatrix} -4 & -5 & 2 \\ 0 & 0 & 1 \\ 0 & 0 & 3 \end{bmatrix}$$

49. Find the determinant of the matrix.

$$\begin{bmatrix} 3 & -4 & -5 \\ -2 & 5 & 4 \\ -1 & 1 & 2 \end{bmatrix}$$

50. Find the product, if possible.

$$AB, \text{ if } A = \begin{bmatrix} 0 & -4 & 1 \\ 2 & -1 & 0 \end{bmatrix}, \quad B = \begin{bmatrix} 1 & -5 \\ 0 & 1 \\ -3 & -1 \end{bmatrix}$$