



Colorado Rocky Mountain School

Carbondale, CO

- 1) Beginning Algebra
 - a) Order of operations
 - b) Simplifying algebraic expressions
- 2) Equations and Inequalities
 - a) Multi-step equations
 - b) word problems
 - c) Distance, rate, time word problems
 - d) Absolute value equations
 - e) Multi-step inequalities
 - f) Compound inequalities
- 3) Relations and Introduction to Functions
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 - b) Continuous relations
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- 4) Linear Relations and Functions
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 - b) Graphing absolute value equations
 - c) Graphing linear inequalities
- 5) Systems of Equations and Inequalities
 - a) Graphing systems of linear inequalities
 - b) Solving systems by graphing, eliminating and substituting (2 variables)
 - c) Systems of equations word problems (2 variables)
- 6) Complex Numbers
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 - d) Evaluating rational exponent expressions
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 - i) Domain and range of radical functions
- 11) Conic Sections
 - a) Parabolas, graphing & properties
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- 13) Exponential and Logarithmic Expressions
 - a) Graphing exponential functions
 - b) Properties of logarithms
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 - d) Graphing logarithmic functions
 - e) Discrete and continuous exponential growth and decay word problems
- 14) Sequences and Series
 - a) General sequences, arithmetic sequences, geometric sequences
 - b) Arithmetic and geometric mean
 - c) General, arithmetic, geometric series
- 15) Trigonometry
 - a) Angles and angle measure, Radians and degrees
 - b) Right triangle trig: Finding ratios and angle measures, angles and sides
 - c) The Law of Sines and Cosines
 - d) Graphing trig functions
 - e) Equations

Algebra 2 Name _____

Date _____

Name _____

13. $-20 + 2k = -2(6k + 4) + 2k$

Evaluate each expression.

1. $(-9) - (-8) + (-4) - 2$

2. $(-8) + 2 \times 4 \times 3$

3. $\frac{24}{6} \cdot 2 - 1$

Simplify each and state the excluded values

4. $\frac{2v^2 + 10v}{v^2 + 10v + 25}$

5. $\frac{k^2 - k - 90}{k^2 - k - 90}$

6. $\frac{63r^2 - 63r}{18r^2 - 81r}$

7. $\frac{m^2 + 14m + 45}{9m^2 + 45m}$

8. $\frac{70x - 20}{70x + 70}$

Simplify:

9. $-4\sqrt[3]{189m^{10}}$

Solve each equation

10. $-6(5 - 5x) + 1 = 35 - 2x$

11. $7(2k + 4) = -38 + 3k$

12. $25 + 8n = 5(8 + n)$

14. What is the price per oz. of bleached flour if 2 oz. were mixed with 6 oz. of unbleached flour which costs \$2/oz. to make 8 oz. of baking flour which costs \$3/oz.?

15. How many oz. of arabica coffee beans which cost \$13/oz. must be added to 10 oz. of robusta coffee beans which cost \$11/oz. to make Bill's Premium Coffee Blend which costs \$12/oz.?

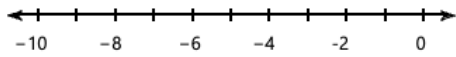
16. Dan left school and drove toward the lake. One hour later Jill left driving 10 km/h faster in an effort to catch up to him. After four hours Jill finally caught up. What was Dan's average speed?

17. Perry made a trip to the recycling plant and back. The trip there took five hours and the trip back took four hours. He averaged 15 km/h faster on the return trip than on the outbound trip. What was Perry's average speed on the outbound trip.

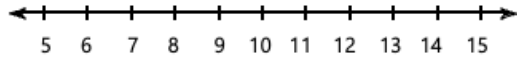
18. Chelsea left Kristin's house and drove toward the lake. Two hours later Rob left driving at 75 mph in an effort to catch up to Chelsea. After driving for four hours Rob finally caught up. What was Chelsea's average speed?

Solve each inequality and graph its solution.

19. $-108 \leq -3(6 - 6n)$

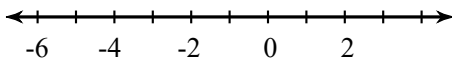


20. $115 < -5(1 - 3x)$

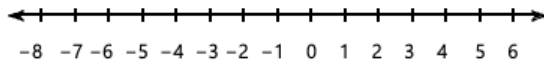


Solve each compound inequality and graph its solution.

21. $-7 > -11 + x \geq -15$

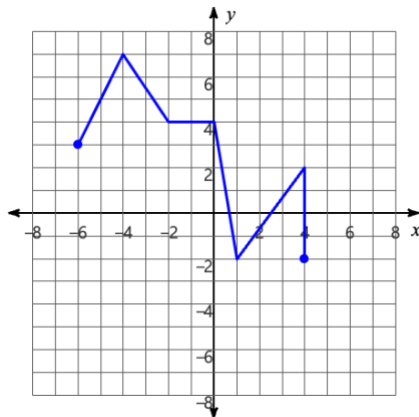


22. $3p + 7 \leq 16$ and $7p - 1 \geq -43$

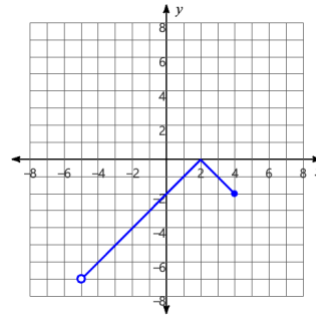


Each graph represents a relation. Determine the domain and range.

23.



24.



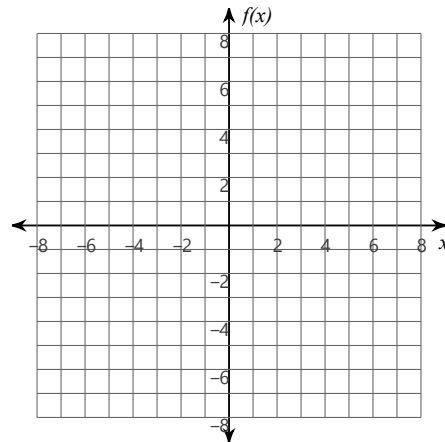
Evaluate each function for the given value.

25. $f(x) = -2|x - 3| + 7$; find $f\left(\frac{19}{2}\right)$

26. $f(x) = -|x - 2|$; find $f\left(-\frac{19}{3}\right)$

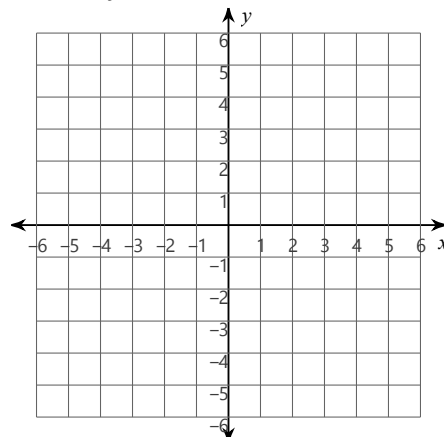
Graph the function for the given domain.

27. $f(x) = -2x + 4$ Domain $\{0, 3, 4, 5, 6\}$

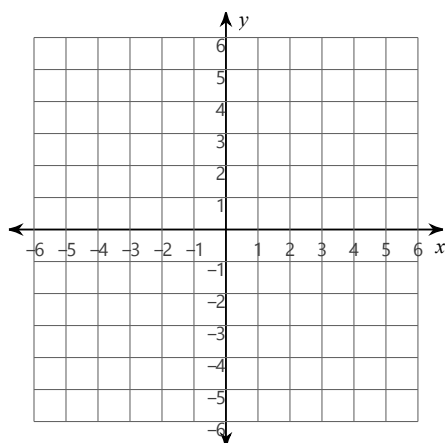


Sketch the graph of the line.

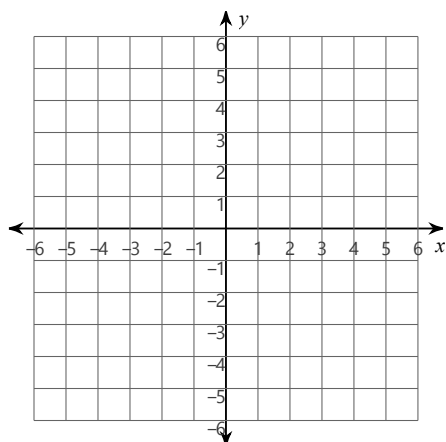
28. $y = 7x + 5$



29. $y = -2x - 5$



30. $-4y + x = -20$



Write the slope-intercept form of the equation of the line through the given point with the given slope.

31. Through $(-2, 2)$, slope $\frac{1}{2}$

32. Through $(4, 1)$, slope $\frac{2}{9}$

33. Through $(-1, 2)$, slope $\frac{4}{3}$

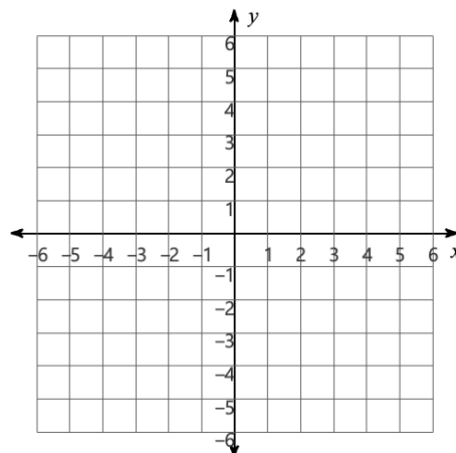
34. Through: $(5, 2)$, slope $= 0$

35. Through: $(2, 3)$, slope $= 3$

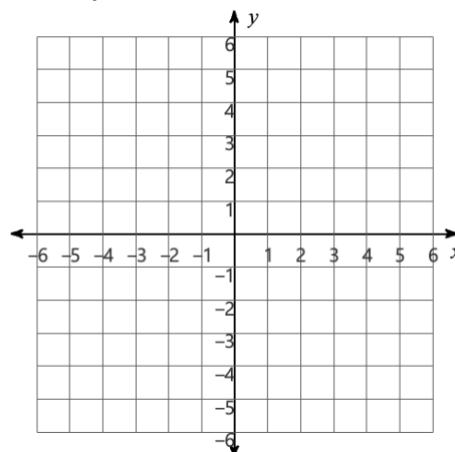
36. Through: $(-5, 1)$, slope $= -1$

Graph each equation.

37. $y = |3x - 2| - 2$

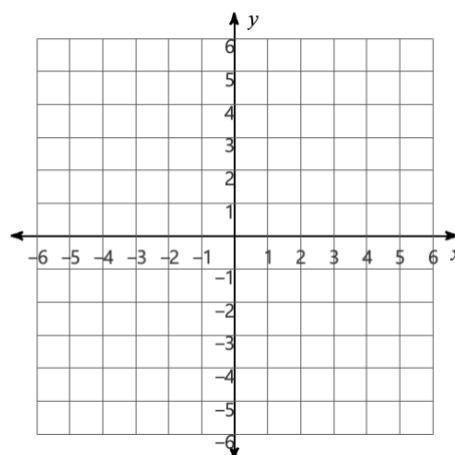


38. $y = |-3x - 1|$

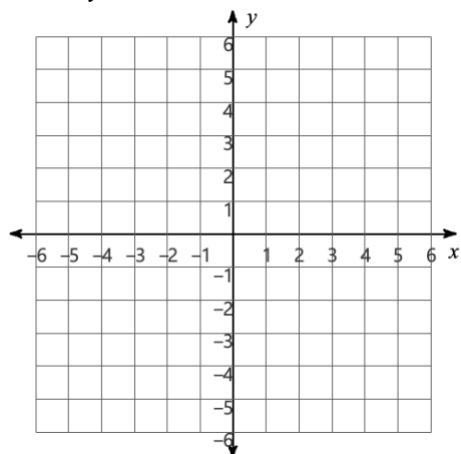


Sketch the graph of each linear inequality.

39. $y \leq -x - 1$

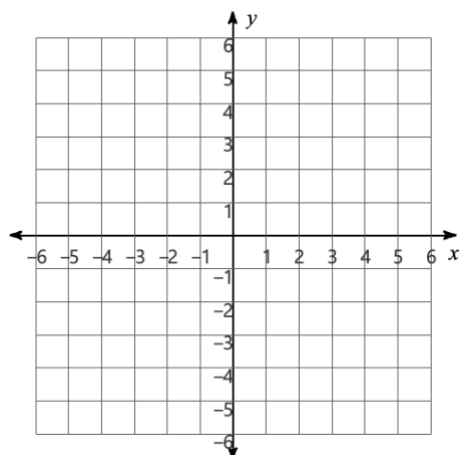


$$40. y \leq 3x - 4$$

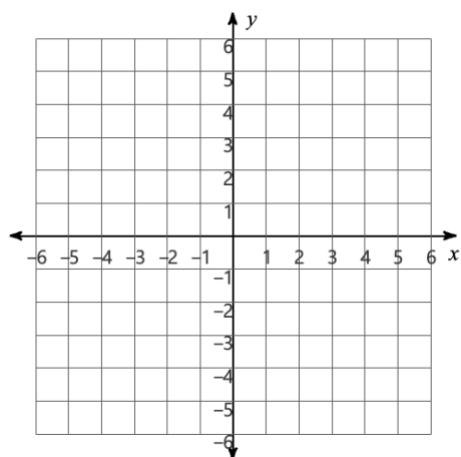


Solve each system by graphing.

$$41. y = -4x + 5 \text{ and } y = -4x + 9$$



$$42. y = \frac{5}{7}x - 7 \text{ and } x = -7$$



Solve each system by elimination.

$$43. -18x + 7y = -18 \text{ and}$$

$$-9x - 6y = -9$$

$$44. -3x - 4y = 28 \text{ and}$$

$$-7x - 2y = 14$$

$$45. y = -\frac{5}{4}x - 3 \text{ and}$$

$$y = \frac{5}{4}x + 7$$

Solve each system by substitution.

$$46. 6x + 5y = -8 \text{ and}$$

$$6x + y = 8$$

$$47. 7x - 4y = -24 \text{ and}$$

$$x - 2y = -2$$

48. The county fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 10 vans and 5 buses with 220 students. High School B rented and filled 5 vans and 2 buses with 94 students. Every van had the same number of students in it as did the buses. How many students can a van carry? How many students can a bus carry?

Simplify.

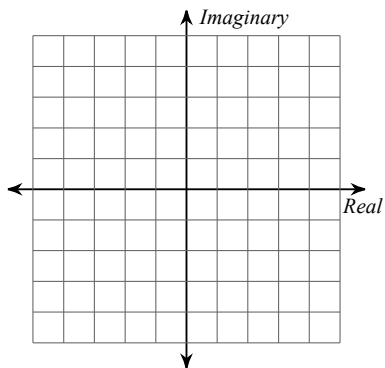
$$49. (-6i)(3 - 5i) + (5i)(-3 - 7i)$$

$$50. (2 + 3i) - (7 - 3i)$$

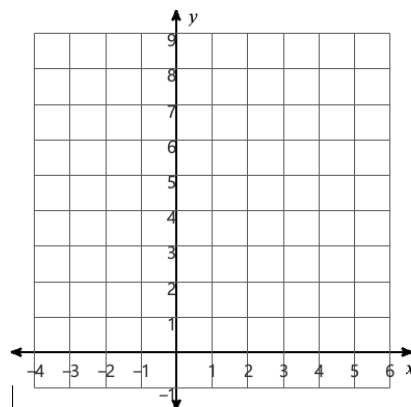
$$51. (1 - 4i)(-6 + 5i)$$

Graph the number in the complex plane.

52. $4 + i$



57. $y = 2x^2 + 8x + 11$



Find the absolute value of the complex number.

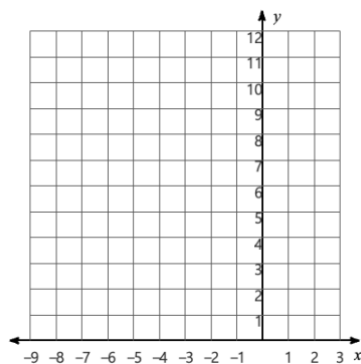
53. $|7 - i|$

Simplify.

54. $\frac{1}{7i}$

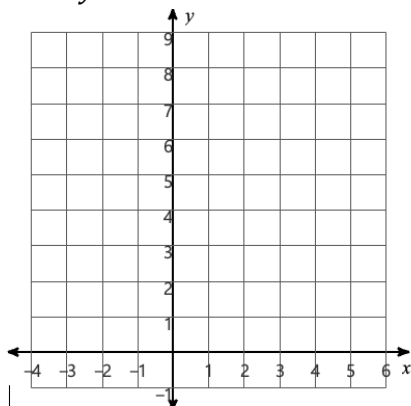
55. $\frac{9}{-7+3i}$

58. $y = 2x^2 + 12x + 21$



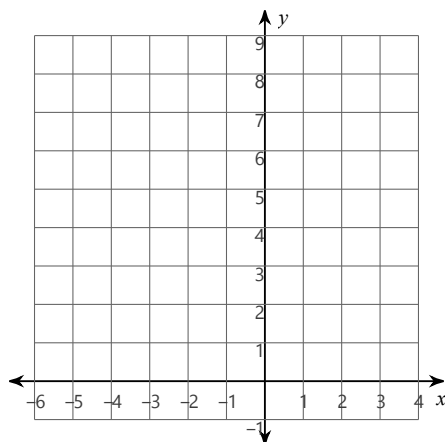
Sketch the graph of each function.

56. $y = 2x^2$

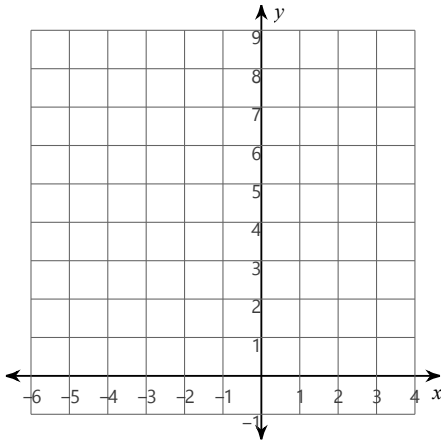


Sketch the graph of each inequality.

59. $y > -2x^2$



60. $y \leq x^2$



Solve each equation by factoring.

61. $(2n + 5)(n - 3) = 0$

62. $(r + 1)^2 = 0$

63. $a^2 = -13a - 40$

64. $a^2 = -15 - 8a$

Solve each equation by taking square roots.

65. $7a^2 = 196$

66. $81n^2 - 2 = 62$

Expand.

67. $(3y - 2)(3y + 2)$

68. $(3x + 7y)^2$

69. $(5x - 1)(5x + 1)$

Factor if possible.

70. $x^2 - 6x + 9$

71. $2x^2 + 7x + 5$

72. $3m^2 + 10m + 8$

73. $2p^2 - 11pq + 5q^2$

74. $x^2 - 25$

75. $36x^2 - y^2$

Solve each equation by factoring.

76. $(b - 5)(b - 1) = 0$

77. $n^2 = -49 + 14n$

78. $v^2 = 36$

79. $16b^2 - 41b - 22 = 8b^2 - 4 + 4b$

Solve each equation by completing the square.

80. $b^2 + 10b + 11 = 0$

81. $8p^2 - 16p - 35 = 7$

Solve each equation with the quadratic formula.

82. $m^2 + 3m + 2 = 0$

83. $2p^2 + 5p + 3 = 0$

84. $10r^2 + 1 = -6r$

Simplify each expression.

85. $(13n^4 + 14n^5 - 4) - (-10n^4 - 8 + 6n^5)$

86. $(11p - 11p^2 - 2p^3) - (-13p^2 + 2p^3 + 4p)$

Find each product.

87. $(-b - 8)(-7b - 7)$

88. $(-5m + 2)(5m - 6)$

89. $(4n + 1)(4n - 1)$

90. $(5v + 7)(5v - 7)$

Find the coefficient described.

91. Coefficient of n^2 in expansion of $(n + 4)^4$

Expand completely.

92. $(x^2 + 3)^4$

Factor each completely.

93. $96xy + 120x + 32y^3 + 40y^2$

94. $40xy + 8x - 25y + 5$

95. $x^3 + 1$

96. $-125x^4 - 64x$

97. $3x^5 - 28x^3 + 49x$

98. $5m^4 - 17m^2 + 14$

A polynomial function with rational coefficients has the following zeros. Find additional zeroes.

99. $\sqrt{3}, -2 + \sqrt{3}$

100. $-1, -3 - 2i$

Evaluate each function.

101. $f(t) = 4t + 2$; Find $f(-10)$

102. $f(n) = |n - 1|$; Find $f(-5)$

103. $h(a) = 2|2a - 2|$; Find $h(-2)$

Perform the indicated operation.

104. $g(a) = 2a - 3$, $f(a) = 4a - 1$,
Find $(g + f)(a)$

105. $g(x) = -x - 1$, $h(x) = 4x - 4$,
Find $(g + h)(x)$

Find the inverse of each function.

106. $f(x) = 4 + \frac{1}{x+2}$

107. $g(x) = -\frac{1}{2}x + \frac{11}{2}$

Simplify. Your answer should contain only positive exponents.

108. $-x^0 \cdot (-x^{-2}y^{-1})^5$

109. $(-a^2b^{-2})^{-5} \cdot b^4$

Simplify.

110. $\sqrt{3}(4 - 4\sqrt{3})$

111. $\sqrt{3}(4\sqrt{10} + \sqrt{3})$

112. $3\sqrt{3} - 3\sqrt{6} + 2\sqrt{54}$

113. $3\sqrt{24} - \sqrt{5} - 3\sqrt{5}$

114. $\frac{4\sqrt{3}}{3\sqrt{16}}$

115. $\frac{3}{\sqrt{3}} - 4$

Write each expression in radical form.

116. $6^{\frac{1}{3}}$

117. $3^{\frac{1}{2}}$

Write each expression in exponential form.

118. $\sqrt{6v}$

119. $(\sqrt[3]{a})^4$

Simplify. Your answer should contain only positive exponents.

120. $3v^0 \cdot 2v^3$

121. $((-x^4)^{-4} \cdot -xx^2)^0$

122. $(uv^3 \cdot -u \cdot uv^2)^3$

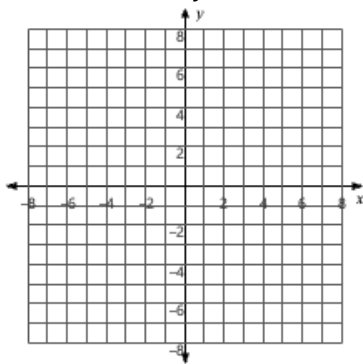
Solve each equation. Remember to check for extraneous solutions.

123. $\sqrt{-2 - 17m} = 10$

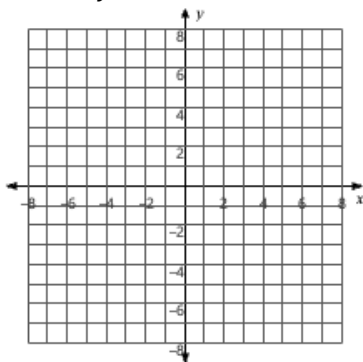
124. $\sqrt{6 - x} = 1$

Sketch the graph of each function.

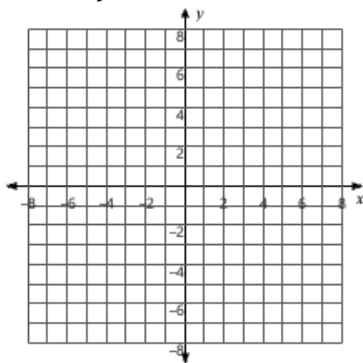
125. $y = \sqrt{x} + 2$



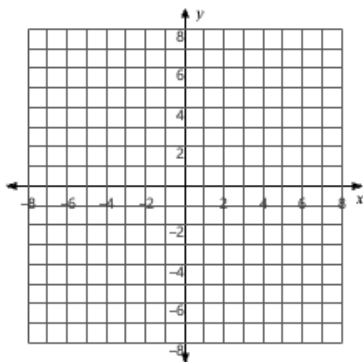
126. $y = \sqrt{x} + 5$



127. $y = \sqrt[3]{x} - 2$



128. $y = \sqrt{x - 1}$



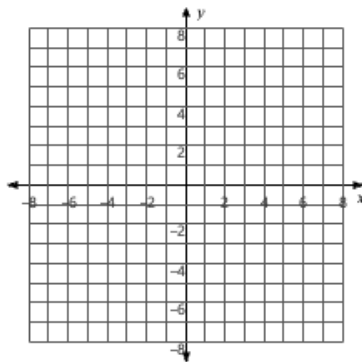
Identify the domain and range of each.

129. $y = \sqrt{x - 2}$

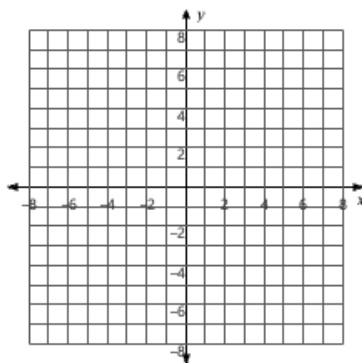
130. $y = \sqrt{x}$

Graph the equation.

131. $y = -2x^2$

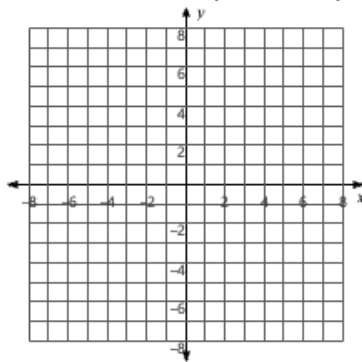


132. $y = 4x^3 + 2$

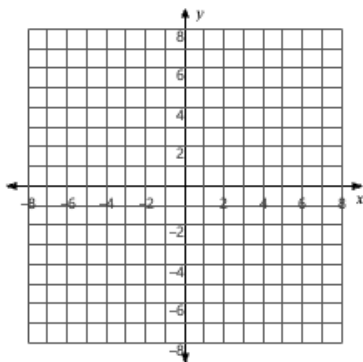


Identify the vertex, focus, and directrix of each. Then sketch the graph.

133. $x = -8y^2 + 48y - 77$



134. $x = -y^2 - 10y - 30$



Use the information provided to write the vertex form equation of each parabola.

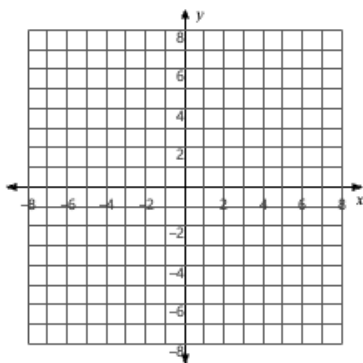
135. Vertex at origin, Focus: $(0, 1)$

136. Vertex: $(7, -3)$, Directrix: $y = -\frac{25}{8}$

137. Vertex: $(7, -4)$, Directrix: $y = \frac{141}{20}$

Graph the function

138. $f(x) = \frac{3}{x+1} - 1$

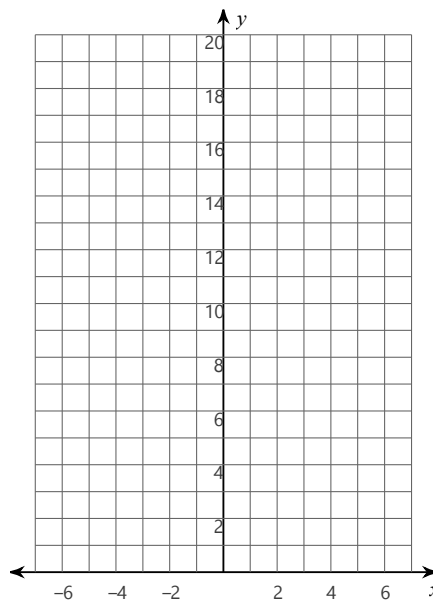


Identify the holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

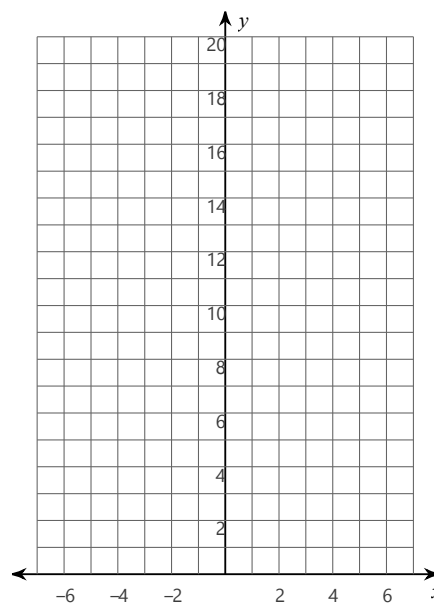
139. $f(x) = \frac{x+1}{x-3}$

Sketch the graph of each function.

140. $y = 5 \cdot 2^x$



141. $y = \frac{1}{3} \cdot 2^x$



Expand each logarithm.

142. $\log \sqrt[3]{x}$

143. $\log(u \cdot v)$

Solve each equation. Round your answers to the nearest ten-thousandth.

144. $\log x - \log 3 = 1$

145. $\log x - \log 4 = 1$

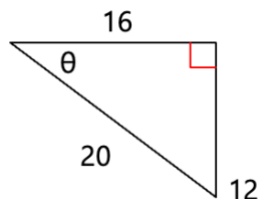
Solve each discrete exponential growth/decay problem.

146. A company promises to release a new smartphone model every month. Each model's battery life will be 6% longer than the previous model's. If the current model's battery life is 698.0 minutes, what will the latest model's battery life be 6 months from now?

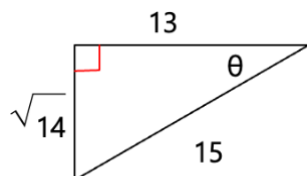
147. A savings account balance is compounded continuously. If the interest rate is 4% per year and the current balance is \$1,853.00, what will the balance be 10 years from now?

Find the value of the trig function indicated.

148. $\sin \theta$

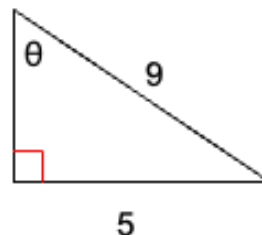


149. $\sin \theta$



Find the measure of each angle indicated. Round to the nearest tenth.

150.

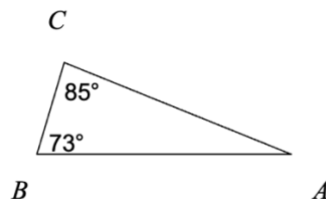


151.

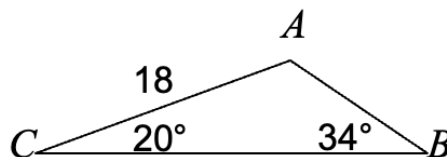


Find each measurement indicated. Round your answers to the nearest tenth.

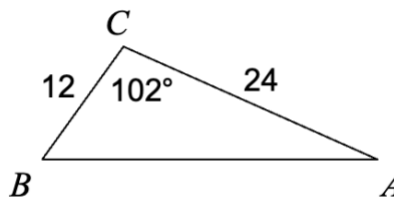
152. Find AB



153. Find AB



154. Find AB



Answers

1. -7

2. 16

3. -9

4. $\frac{2v}{v+5}$

5. 1

6. $\frac{7(r-1)}{2r-9}$ 7. $\frac{m+9}{9m}$

8. $\frac{7x-2}{7(x+1)}$

9. $-12m^3\sqrt[3]{7m}$

10. 2

11. -6

12. 5

13. 1

14. \$6/oz

15. 10 oz

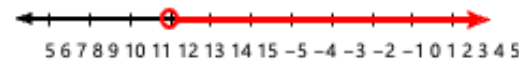
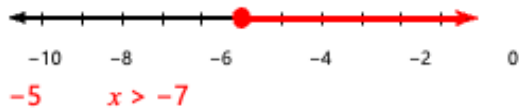
16. 40 km/h

17. 60 km/h

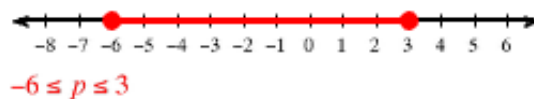
18. 50 mph

19.

20.



21.



22.

23. Domain: $-6 \leq x \leq 4$, Range: $-2 \leq$

$y \leq 7$

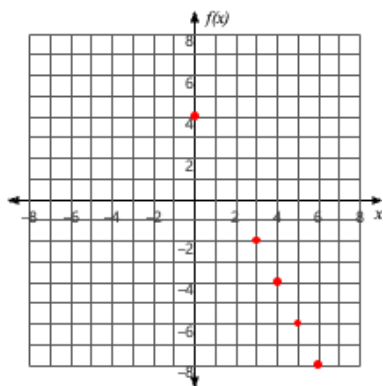
24. Domain: $-5 < x \leq$

4 Range: $-7 < y \leq 0$

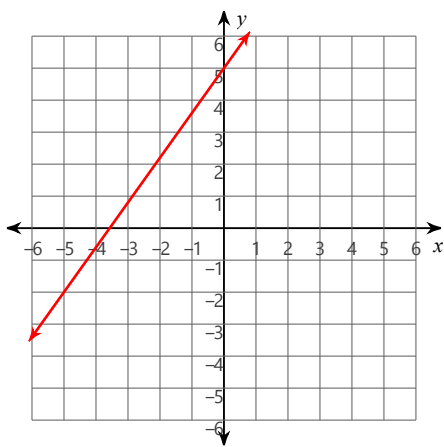
25. -6

26. $-\frac{25}{3}$

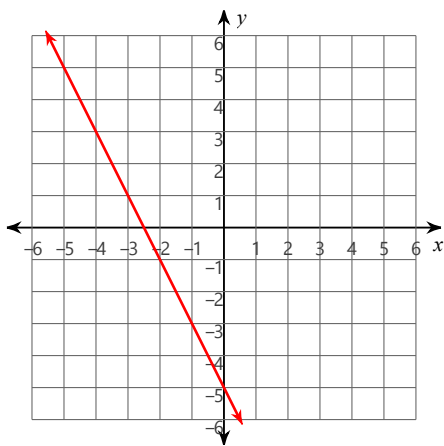
27.



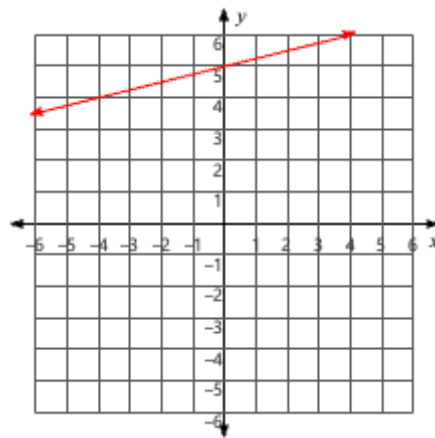
28.



29.



30.



31. $y = \frac{1}{2}x - 1$

32. $y = \frac{2}{9}x + \frac{1}{9}$

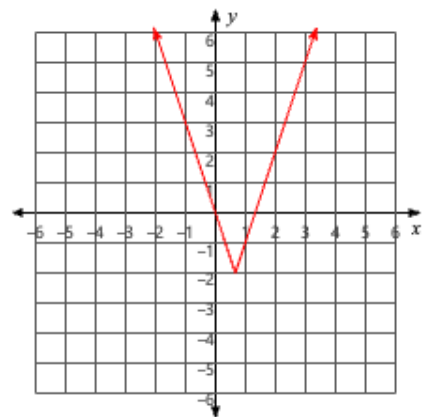
33. $y = \frac{4}{3}x + \frac{10}{3}$

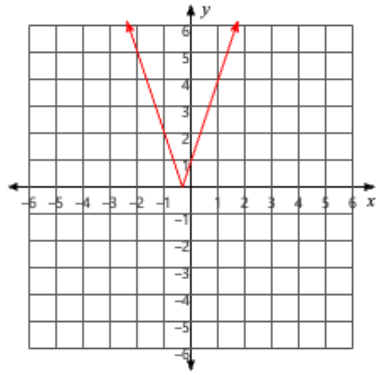
34. $y = 2$

35. $y = 3x - 3$

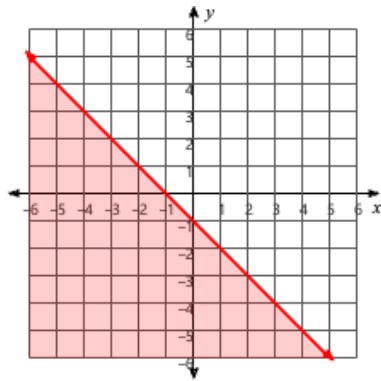
36. $y = -x - 4$

37.

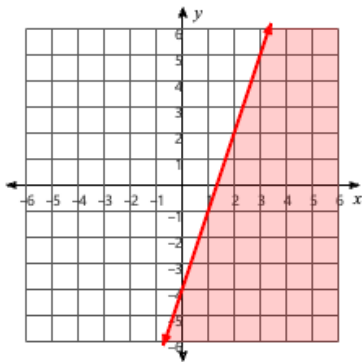




38.

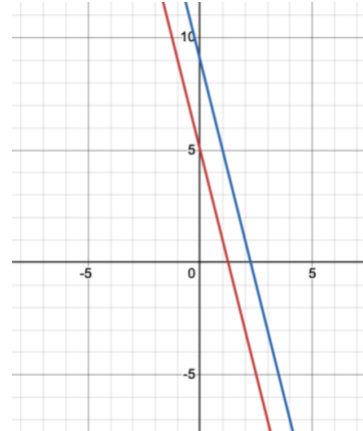


39.

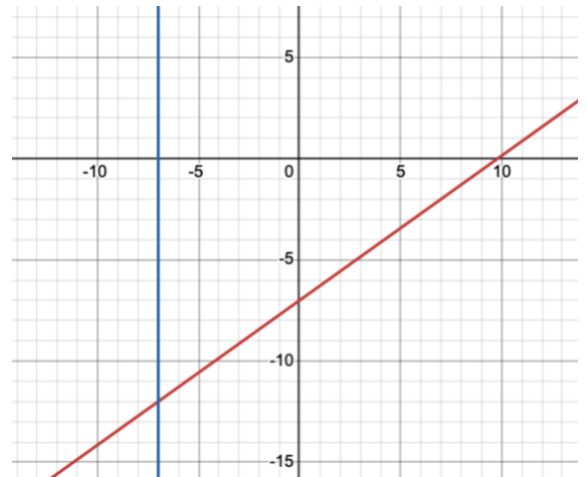


40.

41. no solution



42. $\{-7, -12\}$



43. $(1, 0)$

44. $(0, -7)$

45. $(-4, 2)$

46. $(2, -4)$

47. $(-4, -1)$

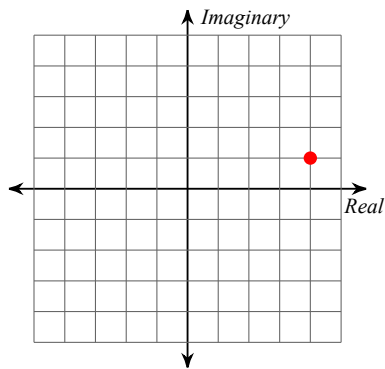
48. Van: 6, Bus: 32

49. $5 - 33i$

50. $-5 + 6i$

51. $14 + 29i$

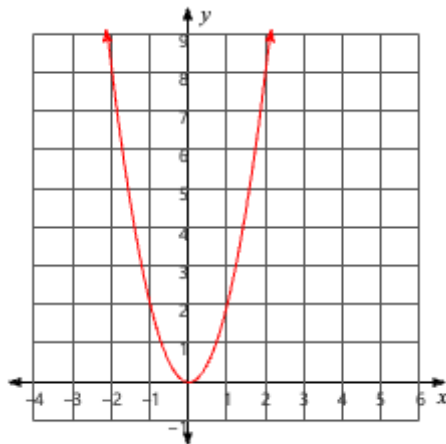
52.



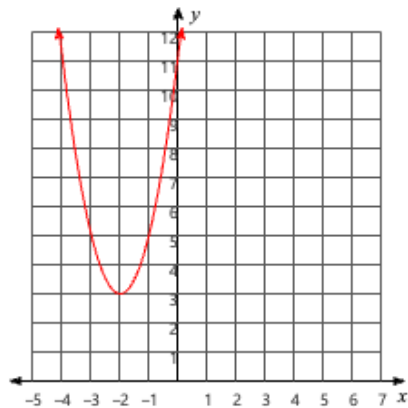
53. $5\sqrt{2}$

54. $\frac{i}{7}$

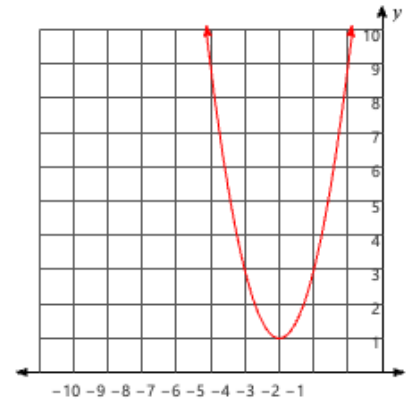
55. $\frac{-63-27i}{58}$



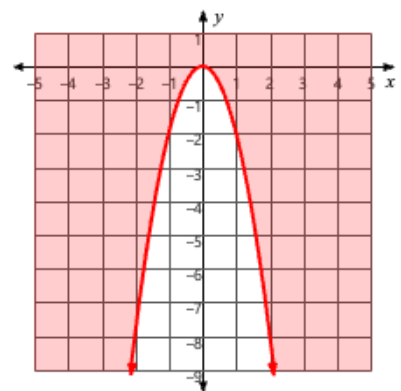
56.



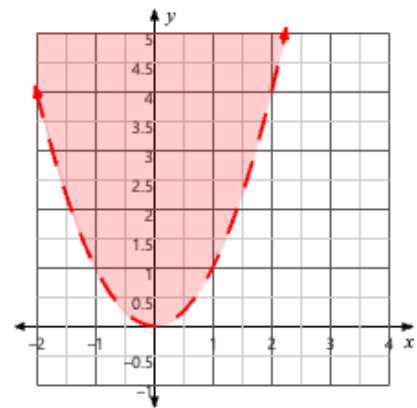
57.



58.



59.



60.

61. $\{-\frac{5}{2}; 3\}$

62. $\{-1\}$

63. $\{-5, -8\}$

64. $\{-5, -3\}$

$$65. \{2\sqrt{7}, -2\sqrt{7}\}$$

$$66. \{\frac{8}{9}; -\frac{8}{9}\}$$

$$67. 9y^2 - 4$$

$$68. 9x^2 + 42xy + 49y^2$$

$$69. 25x^2 - 1$$

$$70. (x - 3)^2$$

$$71. (x + 1)(2x + 5)$$

$$72. (m + 2)(3m + 4)$$

$$73. (p - 5q)(2p - q)$$

$$74. (x + 5)(x - 5)$$

$$75. (6x + y)(6x - y)$$

$$76. \{5, 1\}$$

$$77. \{7\}$$

$$78. \{6, -6\}$$

$$79. \{-3, -6\}$$

$$80. \{-1.258, -8.742\}$$

$$81. \{\frac{7}{2}; -\frac{3}{2}\}$$

$$82. \{-1, -2\}$$

$$83. \{-1, -\frac{3}{2}\}$$

$$84. r = \frac{-3}{10} \pm \frac{1}{10}i$$

$$85. 8n^5 + 23n^4 + 4$$

$$86. -4p^3 + 2p^2 + 7p$$

$$87. 7b^2 + 63b + 56$$

$$88. -25m^2 + 40m - 12$$

$$89. 16n^2 - 1$$

$$90. 25v^2 - 49$$

$$91. 96$$

$$92. 8(3x + y^2)(4y + 5)$$

$$93. (2x - 5y^2)(5y + 4)$$

$$94. (8x + 5)(5y + 1)$$

$$95. (x + 1)(x^2 - x + 1)$$

$$96. x(-5x - 4)(25x^2 - 20x + 16)$$

$$97. x(3x^2 - 7)(x^2 - 7)$$

$$98. 5m^2 + 23m - 10$$

$$99. -\sqrt{3}, -2 - \sqrt{3}$$

$$100. -3 + 2i$$

$$101. -38$$

$$102. 6$$

$$103. 6$$

$$104. 6a - 4$$

$$105. 3x - 5$$

$$106. f^{-1}(x) = \frac{4}{x-1} - 2$$

$$107. g^{-1}(x) = -2x + 11$$

$$108. \frac{1}{-x^{10}y^5}$$

109. $-\frac{b^{14}}{a^{10}}$

110. $4\sqrt{3} - 12$

111. $4\sqrt{30} + 3$

112. $3\sqrt{3} + 3\sqrt{6}$

113. $6\sqrt{6} - 4\sqrt{5}$

114. $\frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$

115. $\sqrt{3} - 4$

116. $\sqrt[3]{6}$

117. $\sqrt{3}$

118. $(6v)^{\frac{1}{2}}$

119. $a^{\frac{4}{3}}$

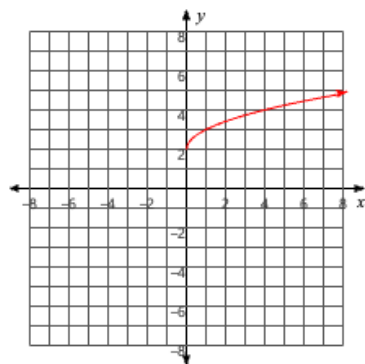
120. $6v^3$

121. 1

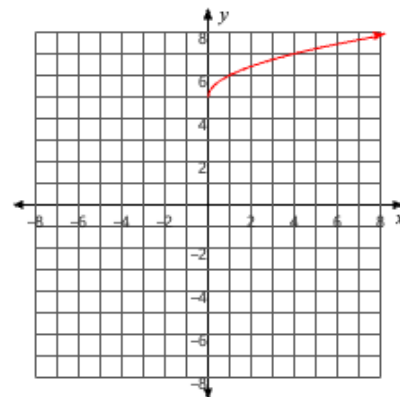
122. $-u^9 \cdot v^{15}$

123. $\{-6\}$

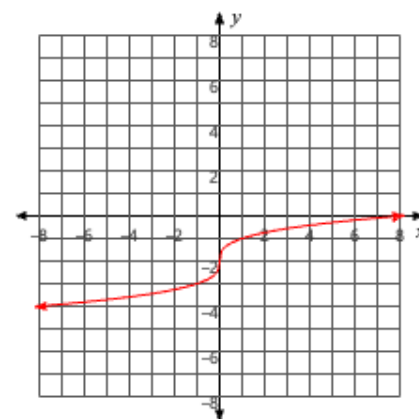
124. $\{5\}$



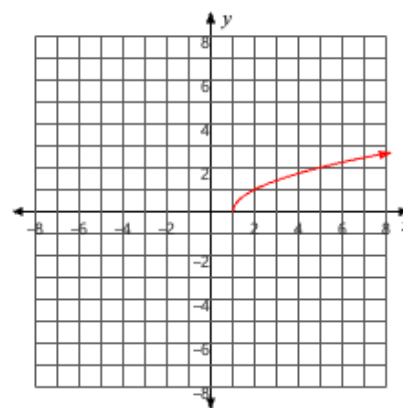
125.



126.



127.

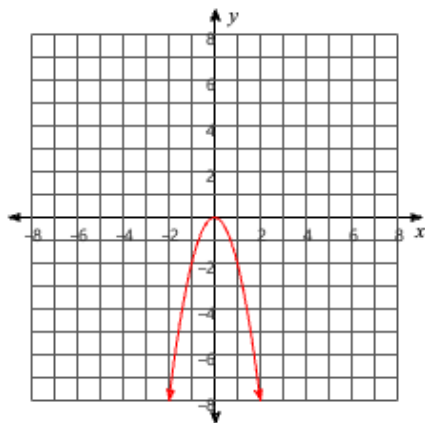


128.

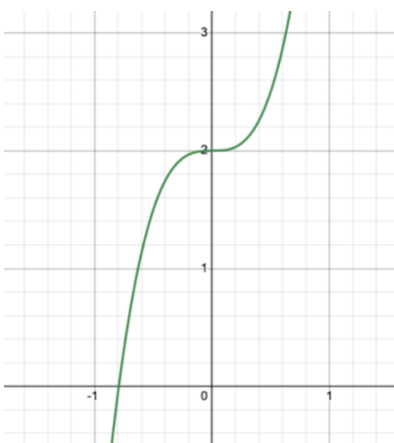
129. Domain: $x \geq 2$, Range: $y \geq 0$

130. Domain: $x \geq 0$

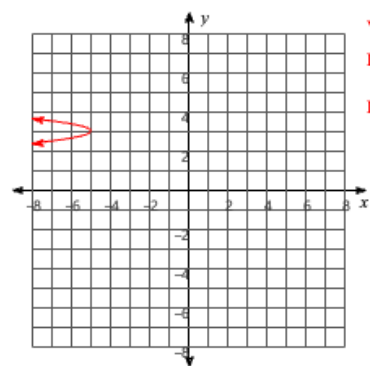
Range: $y \geq 0$



131.



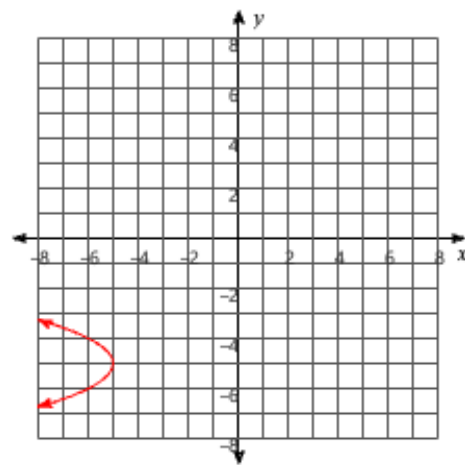
132.



133.

Vertex: $(-5, 3)$, Focus $(-3, \frac{161}{32})$,

Directrix: $-\frac{159}{32}$



134.

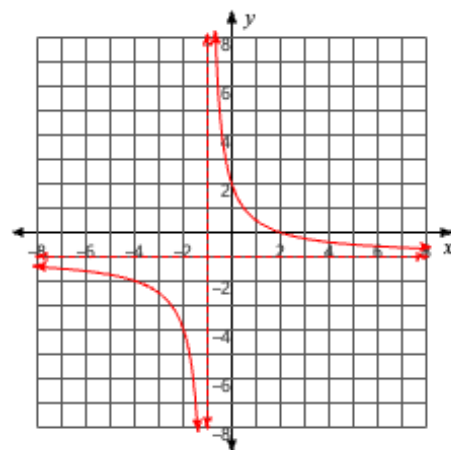
Vertex: $(-5, -5)$, Focus $(-5,$

$\frac{21}{4})$, Directrix: $-\frac{19}{4}$

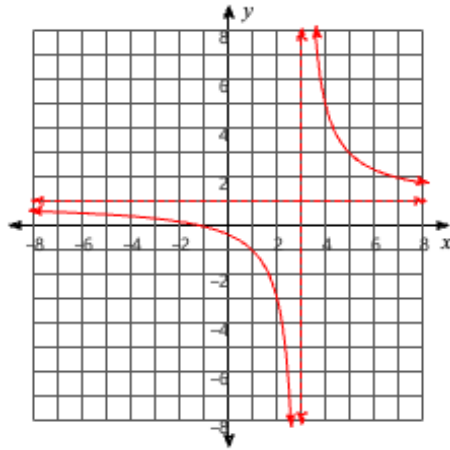
135. $y = \frac{1}{2}x^2$

136. $y = 2(x - 7)^2 - 3$

137. $x = -5(y + 4)^2 + 7$



138.

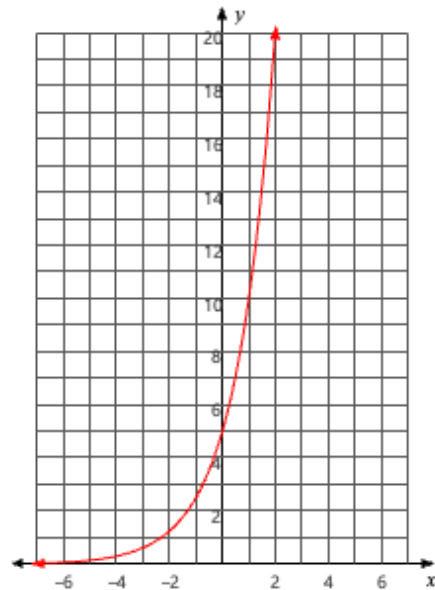


139.

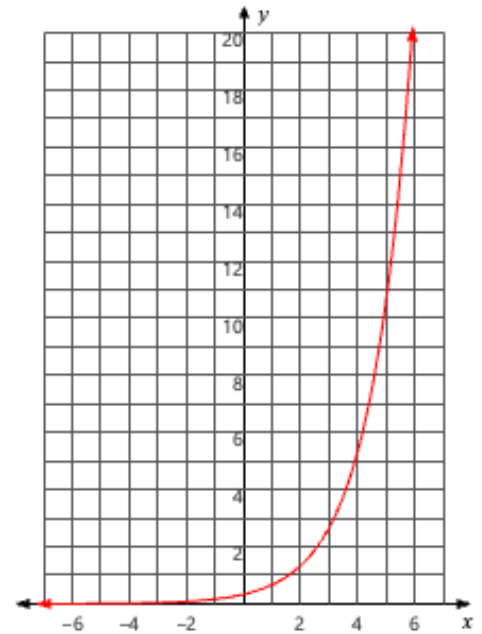
Holes: None, Vertical

Asymptote: $x=3$, Horizontal

Asymptote: $y=1$



140.



141.

142. $\frac{\log x}{3}$

143. $\log u + \log v$

144. $\{30\}$

145. $\{40\}$

146. $698 \cdot 1.06^6 \approx 990.1$ minutes

147. $1853 e^{0.04 \cdot 10} \approx \$2,764.35$

148. $\sin \vartheta = \frac{3}{5}$

149. $\sin \vartheta = \frac{2\sqrt{14}}{15}$

150. 56.3°

151. 20.6°

152. 23.9

153. 11

154. 29

