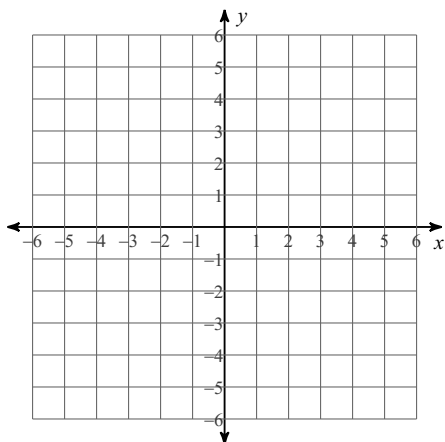


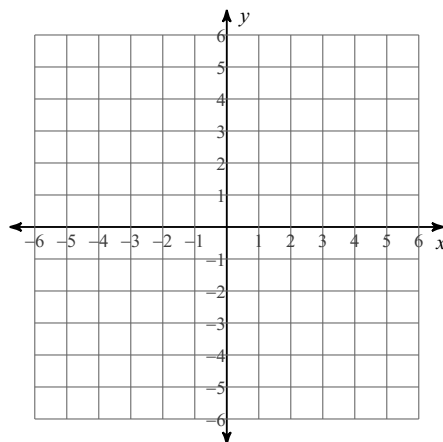
AG2 Pre-Comp Common Study Guide

Graph each translated equation.

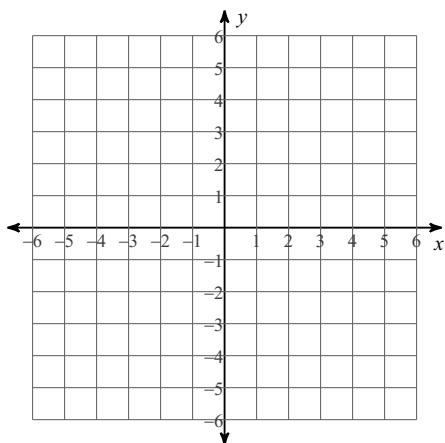
1) $y = -2|x - 1| - 1$



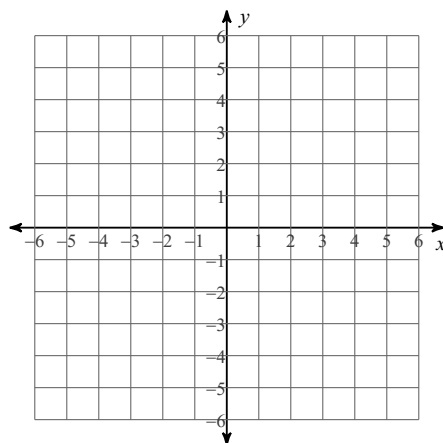
2) $y = -2|x + 4| + 4$



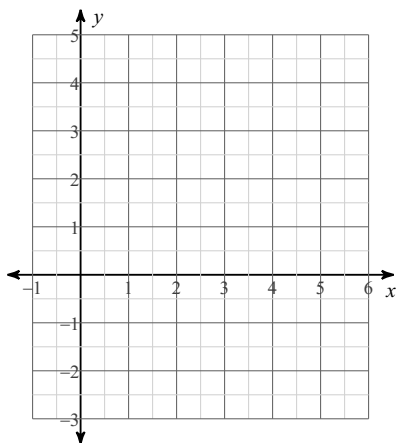
3) $y = -2|x - 2| - 1$



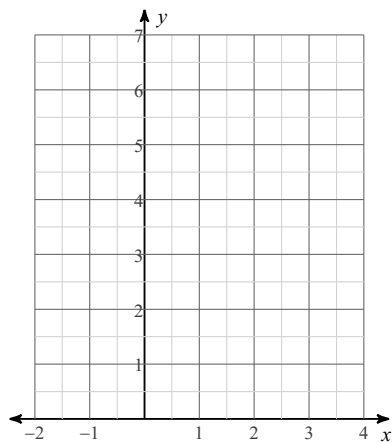
4) $y = 2|x + 3| - 2$



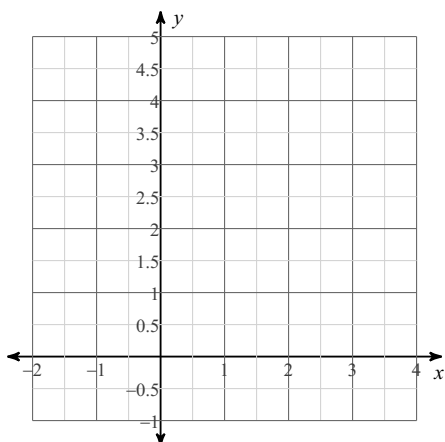
5) $f(x) = -(x - 4)^2 + 3$



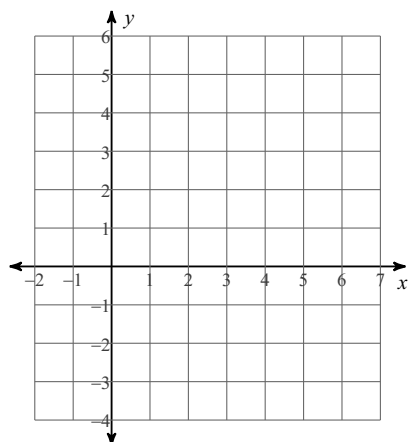
6) $f(x) = (x - 1)^2 + 2$



7) $f(x) = -(x - 2)^2 + 4$



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



Find the explicit formula and the recursive formula for the arithmetic sequence..

9) $-4, 0, 4, 8, \dots$

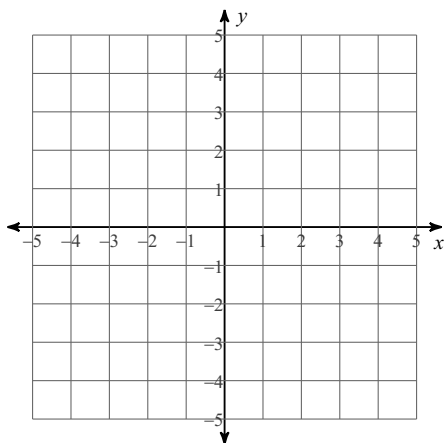
10) $19, 17, 15, 13, \dots$

11) $4, 10, 16, 22, \dots$

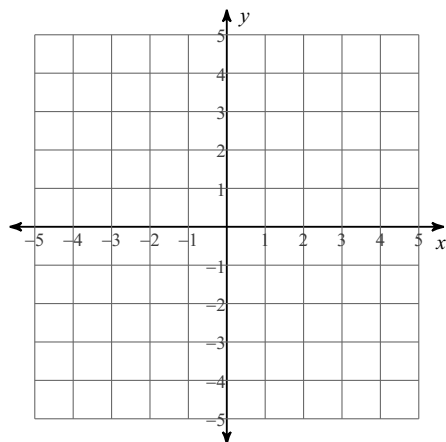
12) $10, 5, 0, -5, \dots$

Solve each system of equations by graphing.

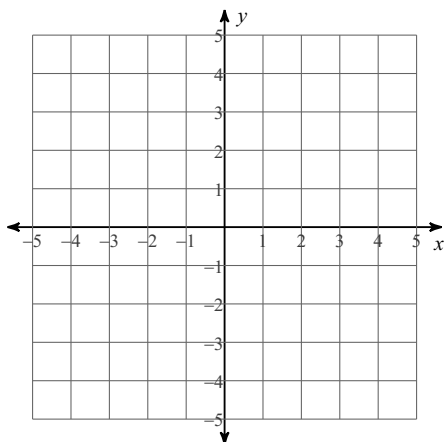
13) $y = \frac{4}{3}x - 3$
 $y = 1$



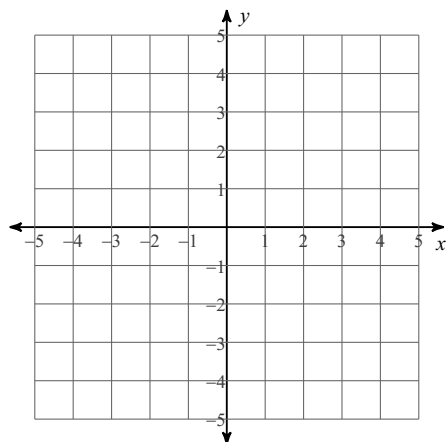
14) $y = x + 3$
 $y = -6x - 4$



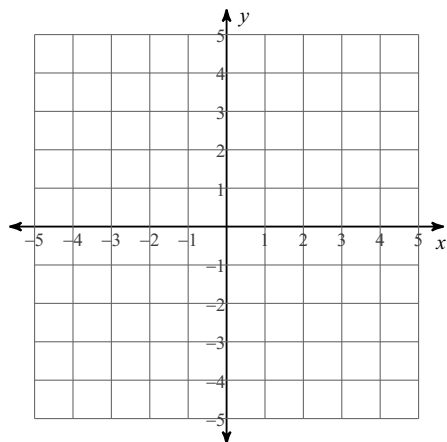
15) $-y - x = -3$
 $x = 3 - y$



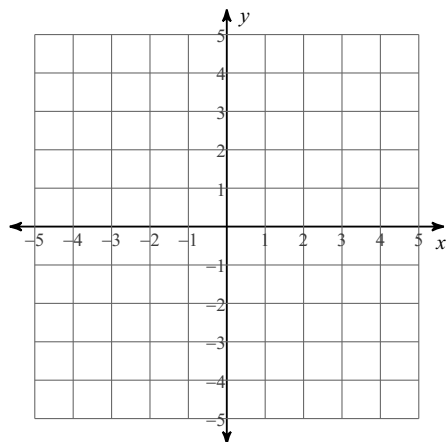
16) $0 = 2y - x - 6$
 $8 + 4y = -3x$



$$17) \begin{aligned} -x - 2y &= 4 \\ 3x &= 3 - y \end{aligned}$$

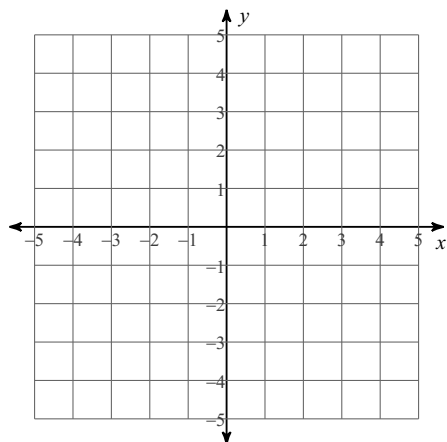


$$18) \begin{aligned} 0 &= -4 - x + 2y \\ 2 + 2y - x &= 0 \end{aligned}$$

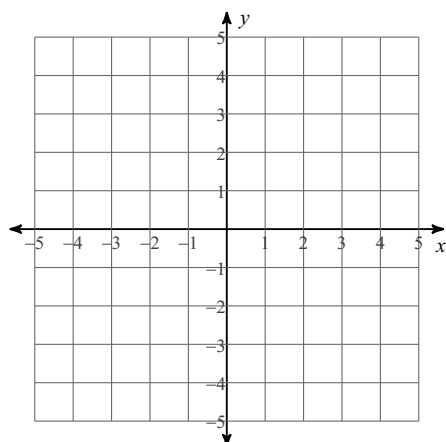


Sketch the graph of the set of all points that solve each system of linear inequalities.

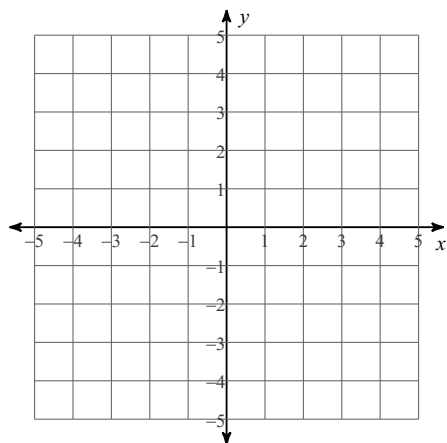
$$19) \begin{aligned} y &\leq 6x + 3 \\ y &> -3 \end{aligned}$$



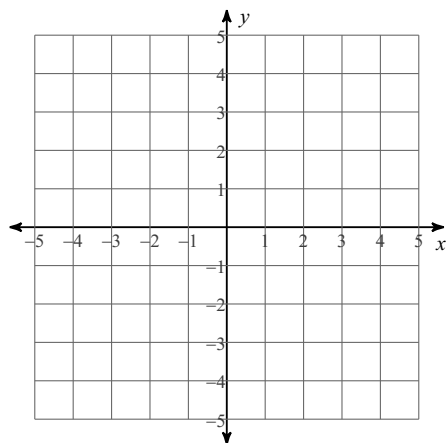
$$20) \begin{aligned} y &\geq 3x - 3 \\ y &> \frac{1}{2}x + 2 \end{aligned}$$



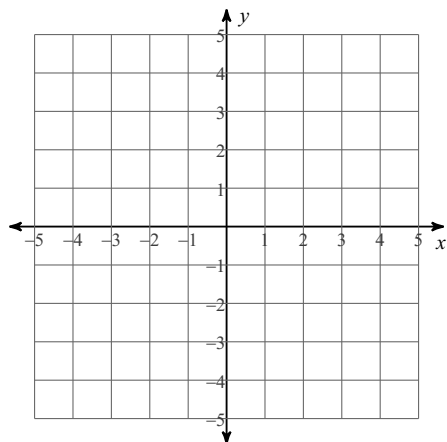
$$21) \begin{aligned} y &< x + 3 \\ y &\leq -5x - 3 \end{aligned}$$



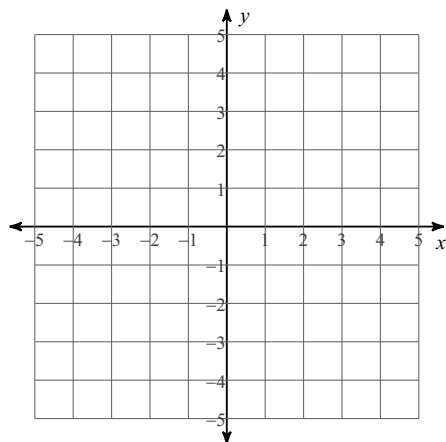
$$22) \begin{aligned} y &\leq -1 \\ x - y &> 2 \end{aligned}$$



23) $2x + y > 1$
 $x + 2y \leq -4$



24) $3x + y \geq 3$
 $x + 2y < -4$



Find the key features of each quadratic function: the vertex, domain, range, axis of symmetry, and the y-intercept.

See the Answer Supplement for the answers to 25-36

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

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

27) $f(x) = x^2 + 8x + 13$

28) $f(x) = -3x^2 - 6x - 7$

$$29) f(x) = -3(x + 3)^2 - 2$$

$$30) f(x) = (x - 1)^2 - 2$$

$$31) f(x) = x^2 + 2x - 3$$

$$32) f(x) = -(x - 5)^2$$

$$33) f(x) = -x^2 + 3$$

$$34) f(x) = (x - 4)^2 - 4$$

$$35) f(x) = -3x^2 - 6x + 3$$

$$36) f(x) = x^2 - 4x + 11$$

Solve each quadratic equation by any method.

$$37) n^2 + 7n - 60 = 0$$

$$38) x^2 - 3x - 70 = 0$$

$$39) 2k^2 - 15k + 27 = 2$$

$$40) 20x^2 - 16x - 5 = -5$$

$$41) x^2 = -10x$$

$$42) v^2 - 3v = 28$$

$$43) -3n^2 = 18$$

$$44) v^2 + 6 = 46$$

$$45) x^2 - 10x + 5 = 0$$

$$46) n^2 - 12n + 26 = 0$$

Quadratic Applications

- 47) A soccer ball is kicked across the field. The height of the ball is modeled by the equation:
 $h(t) = -16t^2 + 32t + 20$, where t is time in seconds.

A. What is the maximum height the ball reaches?

B. How many seconds after it leaves the ground does it reach its maximum height?

C. How long does it take for the ball to hit the ground?

- 48) A volleyball is served across the net and its height, in feet, is modeled by the equation:
 $h(t) = -2t^2 + 4t + 10$, where t is time in seconds.

A. What is the maximum height the volleyball reaches? Does it go over the net?

B. The other team misses the ball and it hits the ground. How long does it take for the ball to hit the ground?

- 49) You are sightseeing on the top of a 120 foot tall building, when your little brother throws his favorite stuffed animal off the top to watch it fly. The height of the stuffy after take-off is modeled by the equation:
 $h(t) = -t^2 + 4t + 120$, where t is time in seconds.

A. What is the maximum height the stuffy reaches? Does it go higher than the top of the building?

B. How long does it take for the stuffy to hit the ground?

C. How long does it take for you to calm your brother once he realizes his stuffy cannot fly?

- 50) A toy rocket is launched up into the air and the maximum height it reaches is 550 feet. The height of the rocket is modeled by the equation:
 $h(t) = -t^2 + 20t + 450$, where t is time in seconds.

A. How long does it take for the rocket to reach 550 feet?

What is the total flight time of the rocket?

Add or subtract.

51) $(2m^2 + 5m^2n) - (4m^2 - 4m^2n)$

52) $(6x^2 + 6) - (5x^2 - 2)$

53) $(8x^2y - 4) - (4xy + 1 - x^2y)$

54) $(2 - 4x^3y^3) + (8x^3y^3 - 7 - 5x^3)$

55) $(m + 4mn^3 + 5m^3n^2) - (7m - 8m^3n^2 + 3mn^3)$

56) $(5uv^2 - 5uv^4 - 5uv^3) + (2uv^4 + 4uv^3 + 8uv^2)$

Find each product.

57) $(2x + 3)(6x - 7)$

58) $(4r - 2)(8r - 4)$

59) $(5b - 5)(8b^2 + 8b - 2)$

60) $(3r + 7)(6r^2 + 7r - 7)$

61) $(x + 2)(x + 3)(x + 4)$

62) $(x + 1)^3$

Factor using special identities.

63) $25a^4 - 36b^2$

64) $8x^3 - 125$

65) $x^2 + 10x + 25$

66) $64p^2 - 49q^2$

67) $125x^3 - 64$

68) $x^3 - 1$

Use any method to divide.

69) $(x^4 + 10x^3 + 5) \div (x + 10)$

70) $(n^3 + 14n^2 + 37n - 81) \div (n + 9)$

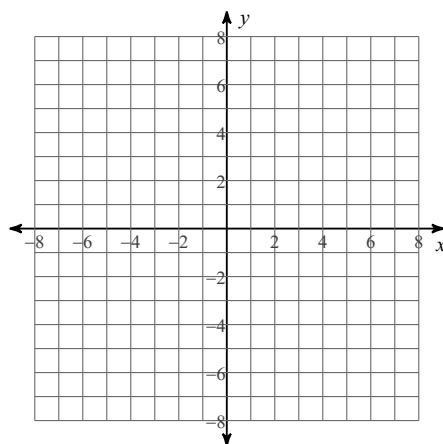
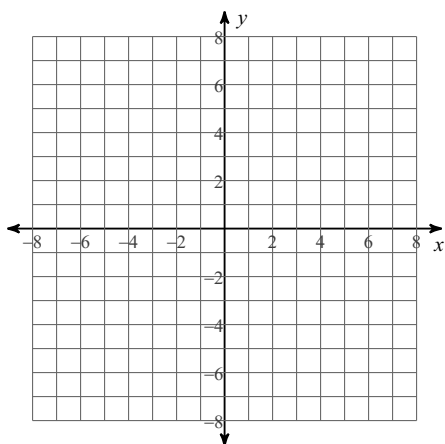
71) $(x^4 + 14x^3 + 43x^2 - 38x + 6) \div (x + 8)$

72) $(9n^3 - 87n^2 + 50n + 33) \div (n - 9)$

Identify the vertical asymptote(s) and horizontal asymptote of each. Then sketch the graph.

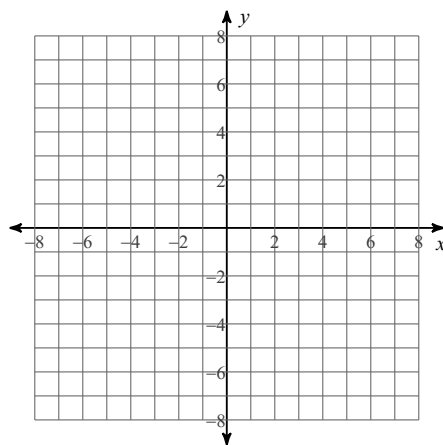
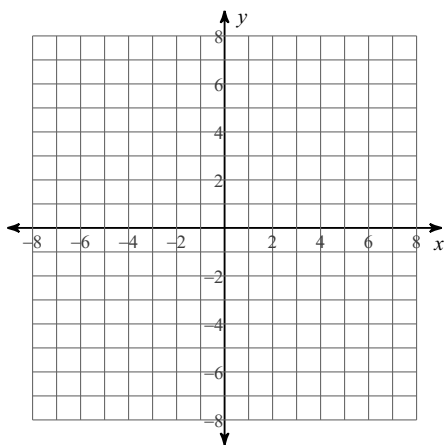
73) $f(x) = \frac{3}{x} - 2$

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

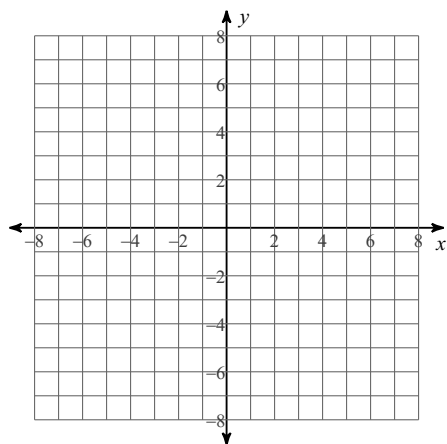


75) $f(x) = -\frac{1}{x-1} - 2$

76) $f(x) = \frac{-x+1}{x-2}$



$$77) f(x) = \frac{x-3}{2x-8}$$



Multiply or divide and then simplify completely. State the values excluded from the domain.

$$78) \frac{12x-4}{2x} \cdot \frac{2x}{1-3x}$$

$$79) \frac{2x^2+x-6}{5} \cdot \frac{1}{2x-3}$$

$$80) \frac{\frac{3}{3b+12}}{\frac{b+3}{b+5}}$$

$$81) \frac{2m^2}{8m-20} \div \frac{3}{6m-15}$$

$$82) \frac{1}{n-2} \cdot \frac{3n^2+8n+4}{3n+2}$$

$$83) \frac{3}{20b-8} \div \frac{3}{8-18b-5b^2}$$

Add or subtract then simplify completely.

$$84) \frac{2}{3k^2+16k+5} + 5k$$

$$85) \frac{7}{2v+8} - \frac{7v}{3v}$$

$$86) \frac{4}{3b} - \frac{7b}{3b^2 - 6b}$$

$$87) \frac{4}{x-3} - \frac{2}{8}$$

$$88) \frac{8b}{8} - \frac{b-8}{b-4}$$

$$89) \frac{x+2y}{12x^4} + \frac{x+4y}{12x^4}$$

Solve each rational equation.

$$90) \frac{5}{3-x} = 1$$

$$91) \frac{6}{x+3} = 3$$

$$92) \frac{1600}{400+p} = \frac{1200}{400-p}$$

$$93) \frac{4}{x-3} - 1 = \frac{3}{x-3}$$

$$94) \frac{x}{x+2} + \frac{3}{x+3} = \frac{1}{x^2+5x+6}$$

$$95) \frac{72}{b+24} = \frac{48}{b-24}$$

Simplify each radical expression. Assume all variables are positive.

$$96) -\sqrt[3]{128a^3bc}$$

$$97) 2\sqrt[3]{128x^3y^4z^2}$$

$$98) 3\sqrt{27x}$$

$$99) -4\sqrt[5]{64a^6}$$

$$100) -\sqrt[4]{48x^5}$$

$$101) -4\sqrt[4]{162x^6}$$

Solve each radical equation. Exclude any extraneous solutions.

102) $x = \sqrt{x + 12}$

103) $x = \sqrt{2x + 3}$

104) $x = \sqrt{5x - 4}$

105) $\sqrt{x + 7} = x - 1$

106) $\sqrt{3x + 4} = \sqrt{x + 10}$

107) $\sqrt{2x + 5} = x + 1$

Perform the indicated operation.

108) $g(a) = a - 3$
 $f(a) = a^2 + 5a$
Find $\left(\frac{g}{f}\right)(-6)$

109) $h(t) = t^2 - 4t$
 $g(t) = 3t + 2$
Find $(h \cdot g)(5)$

110) $g(x) = 2x + 2$
 $f(x) = x^3 + x^2$
Find $(g + f)(-4)$

111) $g(t) = t^3 + 5t^2$
 $h(t) = -2t + 1$
Find $(g + h)(-1)$

112) $h(x) = 3x + 4$
 $g(x) = -x^2 + 3 - 2x$
Find $(h \circ g)(3)$

113) $g(t) = 3t - 1$
 $f(t) = 3t - 4$
Find $(g \circ f)(0)$

114) $f(t) = 2t + 4$
Find $(f \circ f)(-1)$

115) $g(x) = 2x - 3$
 $f(x) = x^3 - 5x^2$
Find $(g \circ f)(7)$

Find the inverse of each function.

116) $f(x) = -x$

117) $f(x) = \frac{-12 - x}{3}$

118) $f(x) = \frac{3}{7}x + \frac{6}{7}$

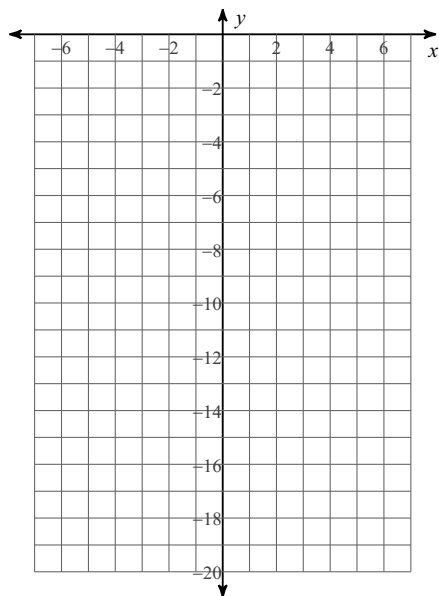
119) $h(x) = \sqrt[3]{x} - 1$

120) $g(x) = \frac{2}{x-1} - 1$

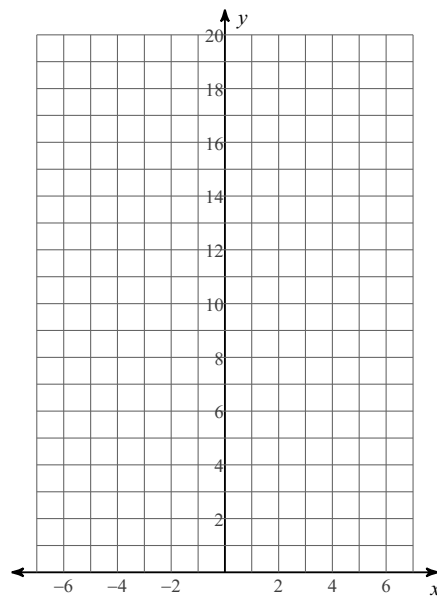
121) $f(x) = 1 + (x+2)^5$

Sketch the graph of each exponential function.

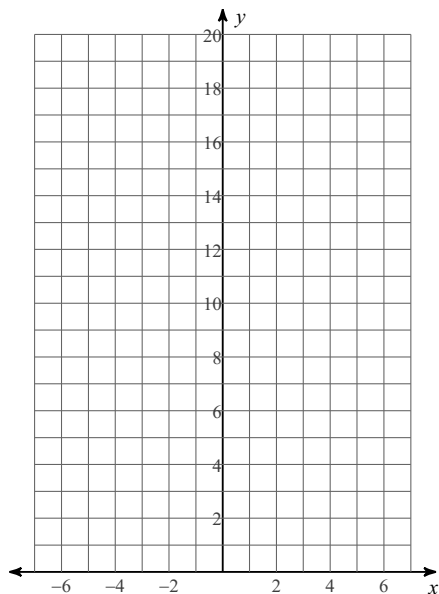
122) $f(x) = -\frac{1}{4} \cdot 2^x$



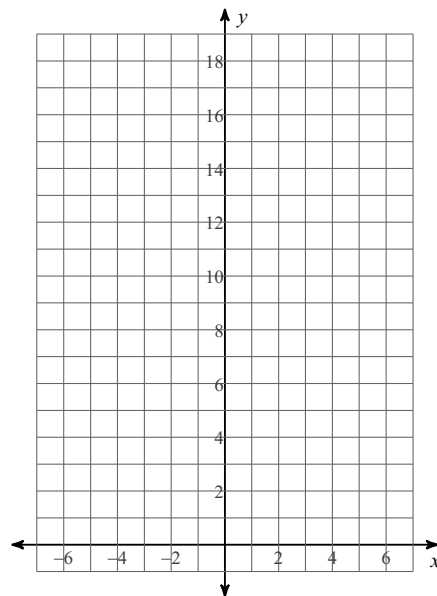
123) $f(x) = 5 \cdot \left(\frac{1}{2}\right)^x$



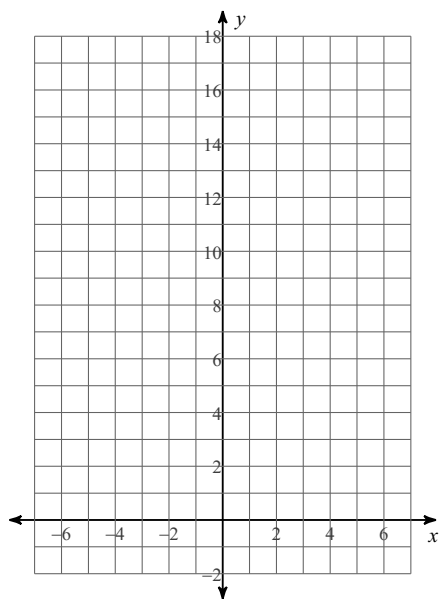
124) $f(x) = \frac{1}{2} \cdot \left(\frac{1}{6}\right)^x + 2$



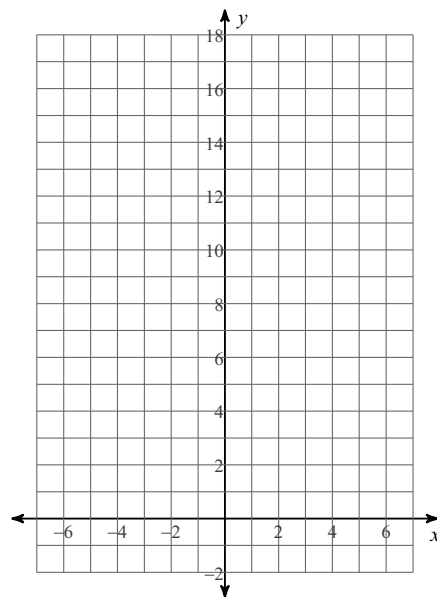
125) $f(x) = \frac{1}{2} \cdot 5^x - 1$



126) $f(x) = 3 \cdot 2^x - 2$



127) $f(x) = 3 \cdot \left(\frac{1}{2}\right)^x - 2$



Use the properties of logarithms to write the expression as a single logarithm.

$$128) \log_5 c + \frac{\log_5 a}{2} + \frac{\log_5 b}{2}$$

$$129) 6\log_9 3 + 5\log_9 2$$

$$130) 3\log_9 a + 18\log_9 b$$

$$131) 5\log_9 a - 2\log_9 b$$

$$132) 8\log_9 x + 4\log_9 y$$

$$133) 12\log_8 12 - 2\log_8 7$$