Evaluate each expression.

1) $2 - 6 \div 6$

2) $6 - (4 - 2)$

3) $1 - (-8) - \dfrac{12}{-3}$

4) $9 - \dfrac{24}{-8} - (-5)$

Evaluate each using the values given.

5) $-5x^2 - (x + y)$; use $x = -2$, and $y = 5$

6) $\left|-5\right|\left(\dfrac{n}{3} - p\right)$; use $n = -9$, and $p = 2$

Solve each proportion.

7) $\dfrac{v - 3}{v + 5} = -\dfrac{12}{7}$

8) $\dfrac{11}{b - 1} = \dfrac{6}{b + 1}$

Find each percent change. State if it is an increase or a decrease.

9) From 12 to 15

10) From 16.6 to 13

11) From 99 to 35

12) From 17 to 74

13) From 305 to 395

14) From 309 to 292

Answers

1) 1	2) 4	3) 13	4) 17
5) –23	6) –25	7) $\{-2.05\}$	8) $\{-3.4\}$
9) 25% increase	10) 21.7% decrease	11) 64.6% decrease	12) 335.3% increase
13) 29.5% increase	14) 5.5% decrease	15) 27.7	16) 1.76

Solve each problem.

15) What is 42% of 66?

16) What is 98% of 1.8?

17) 98% of 74 is what?

18) 41% of what is 35?

19) 330 is 300% of what?

20) 13% of what is 260?

Solve each equation.

21) $6x - 5x = 0$

22) $17 = n + 2 + 4n$

23) $-2(2m + 7) = -28 - 6m$

24) $25 + r = -5(2 + 8r) + 6r$

25) $-6n - 12(-11n + 8) = -10(n - 4)$

26) $-28x + 6 = -3(1 + 7x) - 7x$

27) $|-6n| = 6$

28) $|5x| = 30$

29) $|-7 - 8k| = 73$

30) $|10a - 8| = 78$

31) $-6|3 - 9x| = -18$

32) $|9x - 9| + 4 = 76$

Answers

13) 29.5% increase
14) 5.5% decrease
15) 27.7
16) 1.76
17) 72.5
18) 85.4
19) 110
20) 2000
21) $\{0\}$
22) $\{3\}$
23) $\{-7\}$
24) $\{-1\}$
25) $\{1\}$
26) No solution.
27) $\{-1, 1\}$
28) $\{6, -6\}$
29) $\left\{-10, \frac{33}{4}\right\}$
30) $\left\{\frac{43}{5}, -7\right\}$
31) $\left\{0, \frac{2}{3}\right\}$
32) $\{9, -7\}$

Solve each equation. Remember to check for extraneous solutions.

33) $2 = \sqrt{\frac{m}{4}}$

34) $1 = \sqrt{n+5}$

35) $x = \sqrt{20 - x}$

36) $p = \sqrt{10 - 9p}$

37) $-n + \sqrt{2n + 34} = 5$

38) $-b + \sqrt{60 - 6b} = -10$

Simplify. Your answer should contain only positive exponents.

39) $n \cdot n^3 \cdot 2n$

40) kk^2

41) $a^2 \cdot 2a^0$

42) $2x^3 \cdot 3x$

43) $\left(\left(-x^4y^4\right)^{-5} \cdot 2xy^3\right)^0$

44) $\left(-2u^{-2}v^2\right)^2 \cdot -2v^{-5}$

45) $2u^0v^5 \cdot \left(2u^5v^3\right)^3$

46) $-xy^5 \cdot \left(2yx^2\right)^2$

47) $\frac{\left(-2x^4y^2\right)^3}{2y^{-2} \cdot 2x^{-2}y^2}$

48) $\left(-\frac{vu^3}{2u^4v^{-3} \cdot -u^4v^{-4}}\right)^3$

Answers

33) $\{16\}$
34) $\{-4\}$
35) $\{4\}$
36) $\{1\}$
37) $\{1\}$
38) $\{10\}$
39) $2n^5$
40) k^3
41) $2a^2$
42) $6x^4$
43) 1
44) $-\frac{8}{u^4v}$
45) $16v^{14}u^{15}$
46) $-4x^5y^7$
47) $-2x^{14}y^6$
48) $\frac{v^{24}}{8u^{15}}$

49) $\dfrac{a^{-4}b^{-1}\cdot ab^{2}}{(-a)^{-4}}$

50) $-\dfrac{x^{2}y^{0}}{2yx^{-1}\cdot(2x^{2})^{-1}}$

Name each polynomial by degree and number of terms.

51) $6p^{4}+10p^{3}$

52) $-8n+3$

Simplify each expression.

53) $(7n^{4}-14-5n^{3})-(7-8n^{3}+11n^{4})$

54) $(12x+10x^{3}-7)+(6x^{3}+14+4x)$

55) $(13xy-6y^{2})+(14x^{4}-3y^{2}+x^{2}y^{2})-(-9y^{2}-4xy)$

56) $(9-4a^{3}b^{3})-(-6a^{3}b^{3}-14-a)-(-6a^{3}b^{3}+2a)$

Find each product.

57) $(2x+4)(2x-2)$

58) $(4n+5)(n+4)$

59) $(-5p+8)(7p-5)$

60) $(-k+3)(8k-8)$

61) $(4n-6)(6n^{2}+3n+8)$

62) $(-x-3)(6x^{2}+8x+8)$

Answers

49) ba

50) $-\frac{x^5}{y}$

51) quartic binomial

52) linear binomial

53) $-4n^4 + 3n^3 - 21$

54) $16x^3 + 16x + 7$

55) $14x^4 + x^2y^2 + 17xy$

56) $8a^3b^3 - a + 23$

57) $4x^2 + 4x - 8$

58) $4n^2 + 21n + 20$

59) $-35p^2 + 81p - 40$

60) $-8k^2 + 32k - 24$

61) $24n^3 - 24n^2 + 14n - 48$

62) $-6x^3 - 26x^2 - 32x - 24$

63) $(m-2)^2$

64) $(r+1)^2$

65) $(n-6)(n+6)$

66) $(8-6x)^2$

Divide.

67) $(10v^4 + 30v^3 + 2v^2) \div 10v$

68) $(18b^3 + 2b^2 + 3b) \div 6b$

Factor each completely.

69) $p^2 - 9p + 18$

70) $p^2 - 8p - 9$

71) $15v^2 + 132v + 96$

72) $5n^2 - 8n - 21$

73) $6r^2 + 53r - 70$

74) $-30a^2 + 51a - 18$

75) $4n^2 - 25$

76) $16m^2 - 25$

77) $4p^2 + 12p + 9$

78) $9x^2 + 24x + 16$

79) $18b^2 - 2$

80) $27n^2 - 3$

Answers

63) $m^2 - 4m + 4$

64) $r^2 + 2r + 1$

65) $n^2 - 36$

66) $64 - 96x + 36x^2$

67) $v^3 + 3v^2 + \frac{v}{5}$

68) $3b^2 + \frac{b}{3} + \frac{1}{2}$

69) $(p-3)(p-6)$

70) $(p+1)(p-9)$

71) $3(5v+4)(v+8)$

72) $(5n+7)(n-3)$

73) $(r+10)(6r-7)$

74) $-3(2a-1)(5a-6)$

75) $(2n+5)(2n-5)$

76) $(4m+5)(4m-5)$

77) $(2p+3)^2$

78) $(3x+4)^2$

79) $2(3b+1)(3b-1)$

80) $3(3n+1)(3n-1)$

81) $\left\{-\frac{1}{3}, -4\right\}$

82) $\{1, -1\}$

Solve each equation by factoring.

81) $(3x+1)(x+4)=0$

82) $(r-1)(r+1)=0$

83) $v^2-8v+7=0$

84) $3x^2+12x+9=0$

85) $x^2+7x=8$

86) $n^2=-9-6n$

Solve each equation with the quadratic formula.

87) $n^2-2n-3=0$

88) $x^2-3x-18=0$

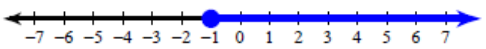
89) $4r^2=24-10r$

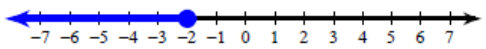
90) $4m^2=2-4m$

91) $-2n^2+2n+53=-7$

92) $-10x^2-12x+45=-9x^2+1-5x$

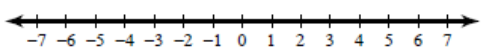
Write an inequality for each graph.

93) 

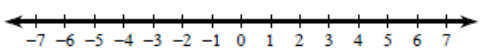
94) 

Draw a graph for each inequality.

95) $-p \geq 5$



96) $-5 < -n$



Answers

79) $2(3b+1)(3b-1)$

80) $3(3n+1)(3n-1)$

81) $\left\{-\frac{1}{3}, -4\right\}$

82) $\{1, -1\}$

83) $\{1, 7\}$

84) $\{-3, -1\}$

85) $\{1, -8\}$

86) $\{-3\}$

87) $\{3, -1\}$

88) $\{6, -3\}$

89) $\{1.5, -4\}$

90) $\{0.366, -1.366\}$

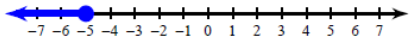
91) $\{-5, 6\}$

92) $\{-11, 4\}$

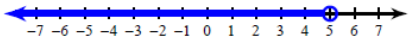
93) $p \geq -1$

94) $a \leq -2$

95)

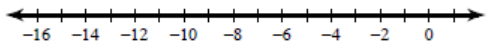


96)

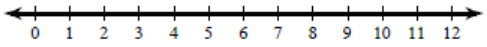


Solve each compound inequality and graph its solution.

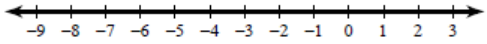
97) $2a - 12 > -20$ or $5 - 2a \geq 29$



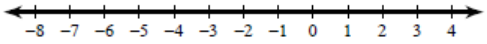
98) $11 \leq 4 + 7n \leq 67$



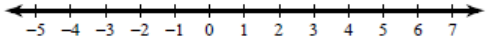
99) $5x \geq -10$ or $3x \leq -18$



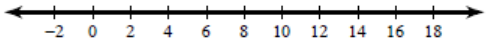
100) $-1 < 3 + r \leq 4$



101) $-14 - 15v \leq 18 - 19v < -19v - 1$

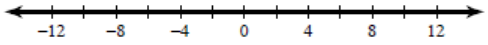


102) $-17x - 3 \leq 13 - x$ and $8 - 2x > -8 - x$

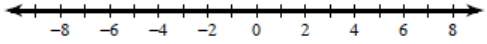


Solve each inequality and graph its solution.

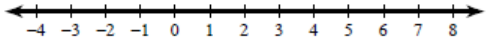
103) $\left|\frac{n}{3}\right| > 3$



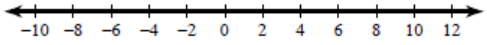
104) $|3x| \geq 15$



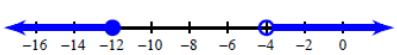
105) $|4k - 5| < 5$

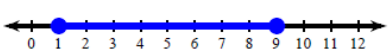


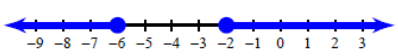
106) $|9 - 6p| < 57$

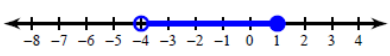


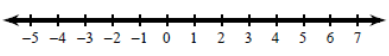
Answers

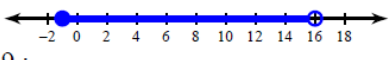
97) $a > -4$ or $a \leq -12$: 

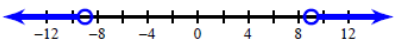
98) $1 \leq n \leq 9$: 

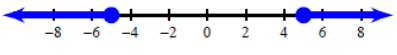
99) $x \geq -2$ or $x \leq -6$: 

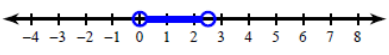
100) $-4 < r \leq 1$: 

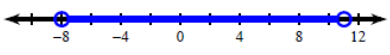
101) No solution. : 

102) $-1 \leq x < 16$: 

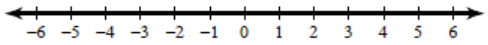
103) $n > 9$ or $n < -9$: 

104) $x \geq 5$ or $x \leq -5$: 

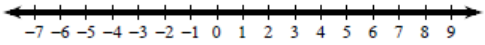
105) $0 < k < \frac{5}{2}$: 

106) $-8 < p < 11$: 

107) $3\left|3n-6\right| > -9$



108) $\left|6-6x\right| + 3 \le 39$



Simplify.

109) $\sqrt{8}$

110) $\sqrt{27}$

111) $3\sqrt{486v^3}$

112) $-5\sqrt{256x}$

113) $-5\sqrt{2}+5\sqrt{2}$

114) $-2\sqrt{5}+5\sqrt{5}$

115) $-2\sqrt{3}-2\sqrt{12}-\sqrt{54}$

116) $-3\sqrt{12}-3\sqrt{45}-2\sqrt{5}$

117) $4\sqrt{112}-2\sqrt{128}-2\sqrt{7}-2\sqrt{32}$

118) $2\sqrt{80}+2\sqrt{8}-\sqrt{20}+4\sqrt{5}$

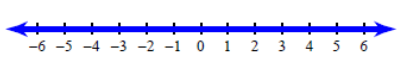
119) $\sqrt{2}\cdot\sqrt{4}$

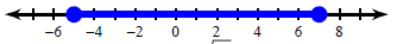
120) $\sqrt{4}\cdot\sqrt{2}$

121) $-2\sqrt{15}\left(5+\sqrt{10}\right)$

122) $5\sqrt{15}\left(\sqrt{10}+\sqrt{3}\right)$

Answers

107) { All real numbers. } : 

108) $-5 \le x \le 7$: 

109) $2\sqrt{2}$

110) $3\sqrt{3}$

111) $27v\sqrt{6v}$

112) $-80\sqrt{}$

113) 0

114) $3\sqrt{5}$

115) $-6\sqrt{3} - 3\sqrt{6}$

116) $-6\sqrt{}$

117) $14\sqrt{7} - 24\sqrt{2}$

118) $10\sqrt{5} + 4\sqrt{2}$

119) $2\sqrt{2}$

120) $2\sqrt{2}$

121) $-10\sqrt{15} - 10\sqrt{6}$

122) $25\sqrt{6} + 15\sqrt{5}$

123) $216\sqrt{x} + 18x\sqrt{42} - 12\sqrt{42}$

123) $\left(6\sqrt{7x}-2\sqrt{6}\right)\left(6\sqrt{7}+3\sqrt{6x}\right)$

124) $\left(-5\sqrt{5n}+5\sqrt{7}\right)\left(5\sqrt{5n}-2\sqrt{7}\right)$

125) $\dfrac{2\sqrt{3}}{\sqrt{27}}$

126) $\dfrac{2\sqrt{16}}{4\sqrt{9}}$

127) $\dfrac{4}{4+2\sqrt{2}}$

128) $\dfrac{2}{3+\sqrt{3}}$

Simplify. Use absolute value signs when necessary.

129) $7\sqrt{128m^3np^4}$

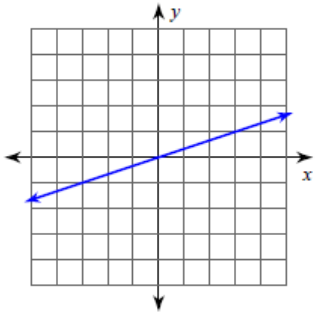
130) $-\sqrt{576m^5p^3q}$

Find the slope of each line.

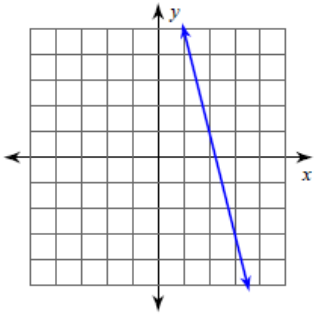
131) $y=\dfrac{5}{4}x+5$

132) $y=-\dfrac{5}{2}x+5$

133)



134)



Answers

121) $-10\sqrt{15} - 10\sqrt{6}$

122) $25\sqrt{6} + 15\sqrt{5}$

123) $216\sqrt{x} + 18x\sqrt{42} - 12\sqrt{42}$

124) $-125n + 35\sqrt{35n} - 70$

125) $\frac{2}{3}$

126) $\frac{2}{3}$

127) $2 - \sqrt{2}$

128) $\frac{3 - \sqrt{3}}{3}$

129) $56p^2|m|\sqrt{2mn}$

130) $-24m^2|p|\sqrt{mpq}$

131) $\frac{5}{4}$

132) $-\frac{5}{2}$

133) $\frac{1}{3}$

134) -4

Find the slope of a line parallel to each given line.

135) $x = 4y$

136) $1 - y = 4x$

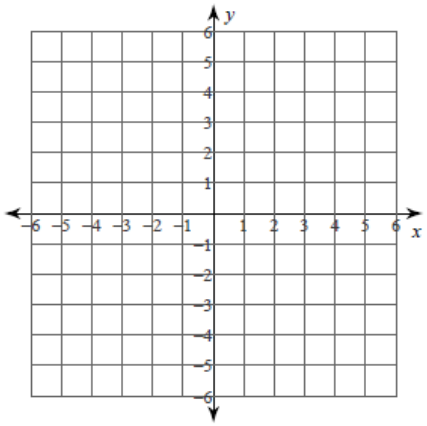
Find the slope of the line through each pair of points.

137) $(17, 2), (-3, -4)$

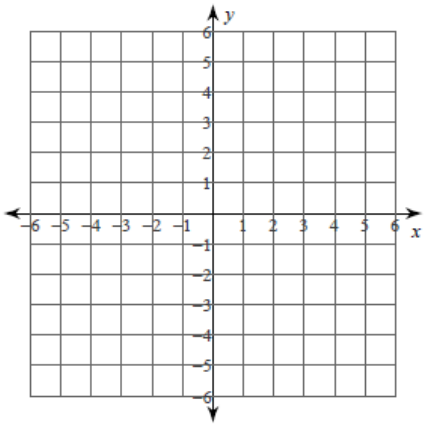
138) $(4, -18), (-12, 20)$

Sketch the graph of each line.

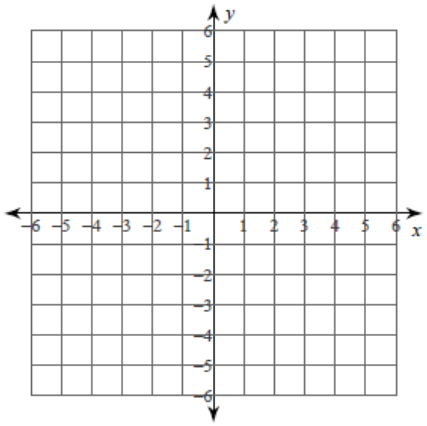
139) $y = x - 3$



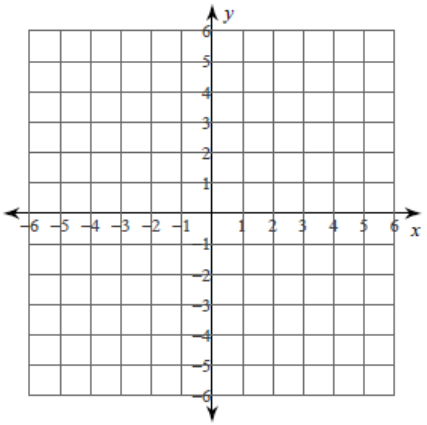
140) $y = 4x - 2$



141) $y + 6x = 3$



142) $0 = -8x - 15 + 3y$



Answers

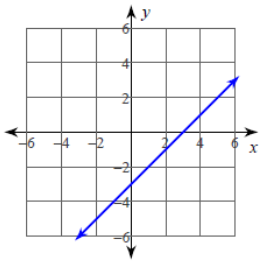
135) $\frac{1}{4}$

136) -4

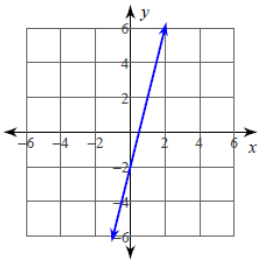
137) $\frac{3}{10}$

138) $-\frac{19}{8}$

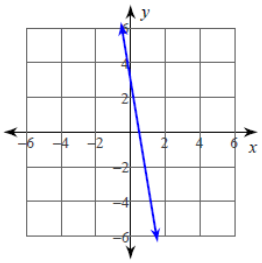
139)



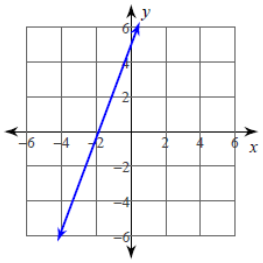
140)



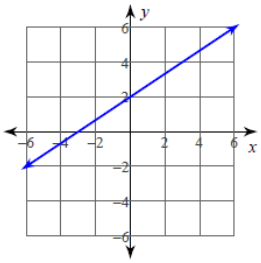
141)



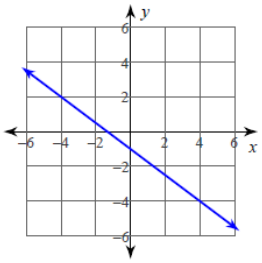
142)



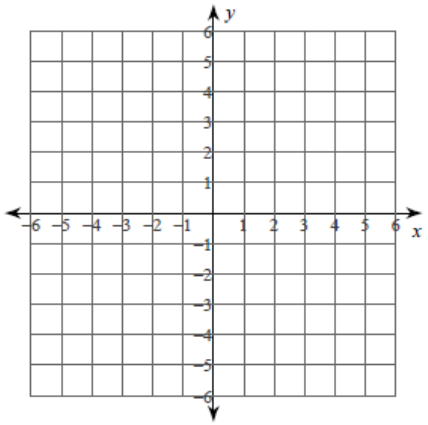
143)



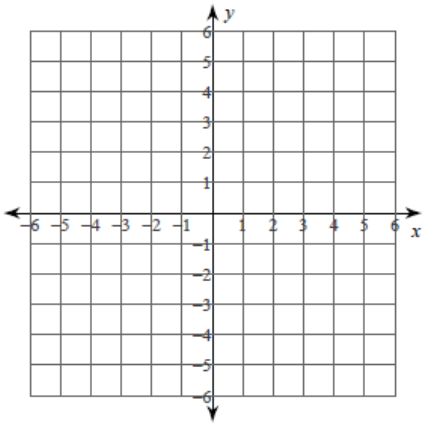
144)



143) $2x - 3y = -6$

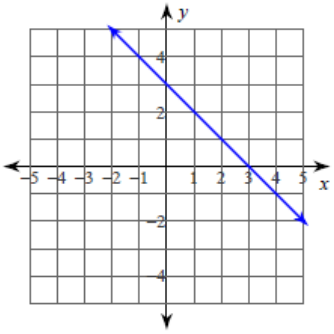


144) $3x + 4y = -4$



Write the slope-intercept form of the equation of each line.

145)



146) $3x + 7y = -28$

147) $y + 2 = -\frac{3}{2}(x + 2)$

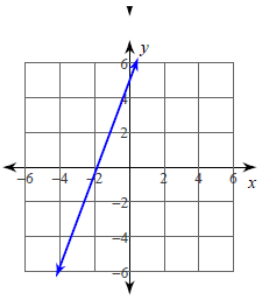
148) $\frac{1}{5}x = -y - 4$

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

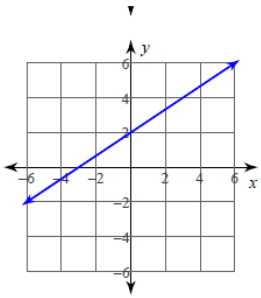
149) Slope $= -\frac{1}{3}$, y-intercept = 5

Answers

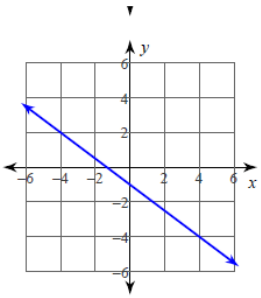
142)



143)



144)



145) $y = -x + 3$

146) $y = -\frac{3}{7}x - 4$

147) $y = -\frac{3}{2}x - 5$

148) $y = -\frac{1}{5}x - 4$

149) $y = -\frac{1}{3}x + 5$

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

151) $y = \frac{1}{4}x - \frac{5}{4}$

152) $y = -\frac{7}{4}x - 2$

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

150) through: $(3, 1)$, slope $= \frac{4}{3}$

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

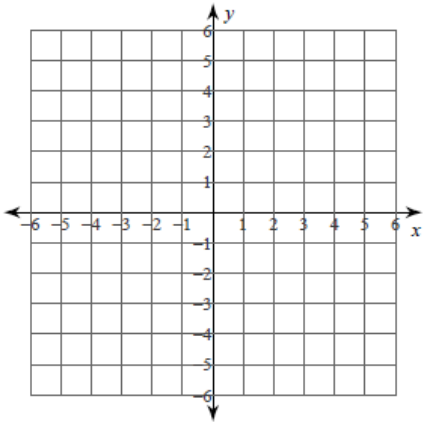
151) through: $(-3, -2)$ and $(1, -1)$

Write the slope-intercept form of the equation of the line described.

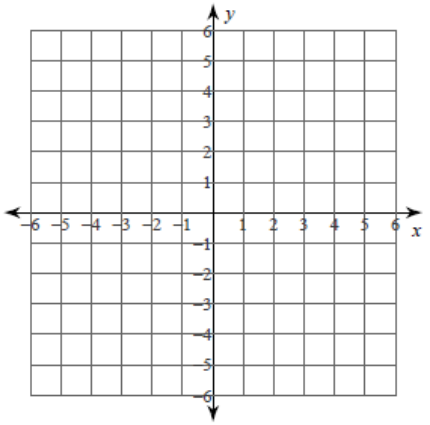
152) through: $(-4, 5)$, parallel to $y = -\frac{7}{4}x + 1$

Sketch the graph of each linear inequality.

153) $y > x - 4$



154) $y \leq -\frac{1}{3}x - 3$



Answers

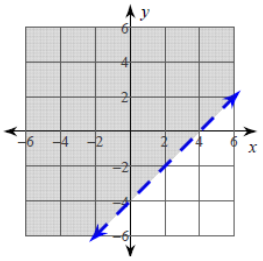
149) $y = -\frac{1}{3}x + 5$

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

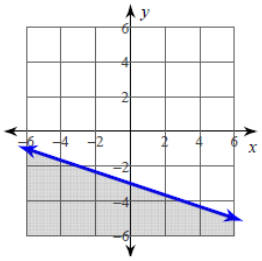
151) $y = \frac{1}{4}x - \frac{5}{4}$

152) $y = -\frac{7}{4}x - 2$

153)



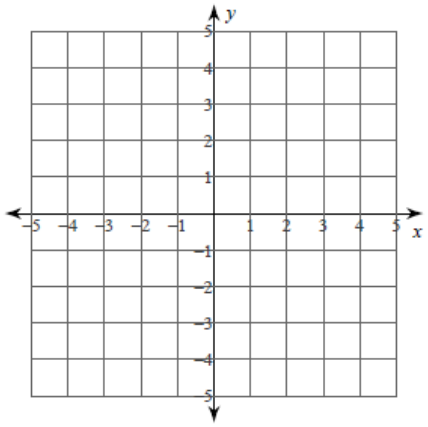
154)



Solve each system by graphing.

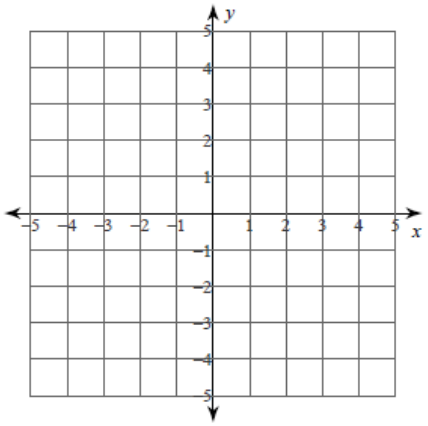
155) $y = \frac{1}{3}x + 4$

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



156) $y = -x + 1$

$y = -\frac{1}{4}x - 2$



Solve each system by substitution.

157) $x + 5y = 20$

$-3x - 5y = -20$

158) $7x + y = 7$

$-7x - 8y = -7$

Solve each system by elimination.

159) $5x + y = -13$

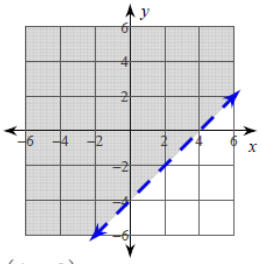
$x + 2y = 1$

160) $6x - 9y = -30$

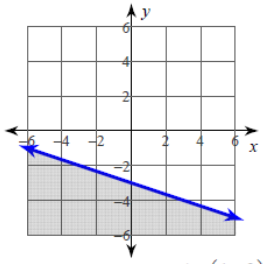
$-x + 18y = 5$

Answers

153)



154)



155) $(-3, 3)$

156) $(4, -3)$

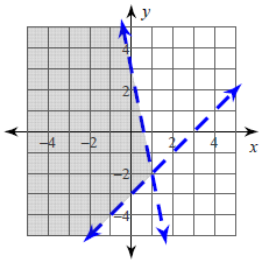
157) $(0, 4)$

158) $(1, 0)$

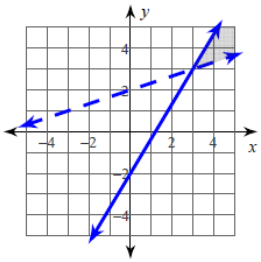
159) $(-3, 2)$

160) $(-5, 0)$

161)

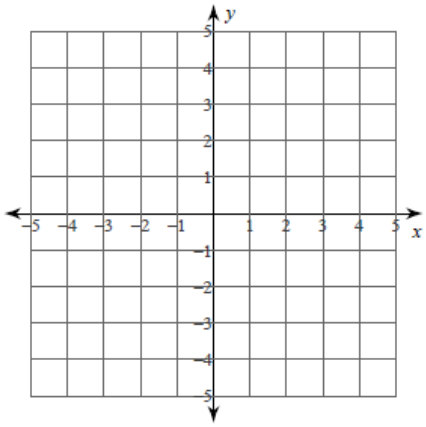


162)

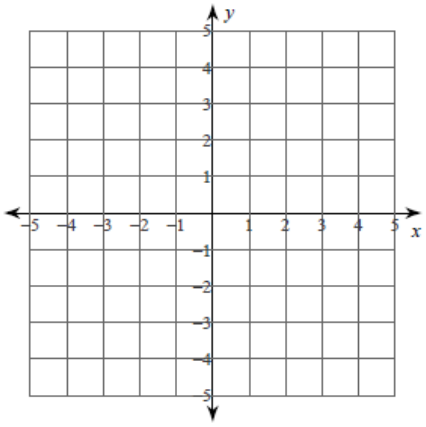


Sketch the solution to each system of inequalities.

161) $y < -5x + 3$
$y > x - 3$



162) $y \le \frac{5}{3}x - 2$
$y > \frac{1}{3}x + 2$



Evaluate each function.

163) $g(x) = 4x - 1$; Find $g(-6)$

164) $h(a) = 2a - 1$; Find $h(2)$

165) $f(x) = 2 \cdot 2^x + 1$; Find $f(1)$

166) $p(t) = -3|t + 1|$; Find $p(2)$

167) $g(n) = 3n + 1$; Find $g(-n)$

168) $h(n) = 2n + 2$; Find $h(-1 - n)$

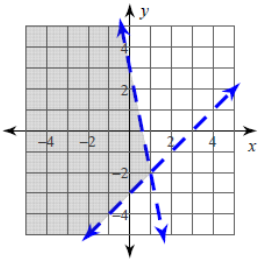
Perform the indicated operation.

169) $g(x) = x + 5$
$f(x) = -x + 1$
Find $g(-10) + f(-10)$

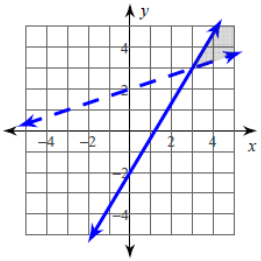
170) $f(x) = 3x + 5$
$g(x) = -x^3 - 3x^2 - x$
Find $f(-5) + g(-5)$

Answers

156) $(4, -3)$
157) $(0, 4)$
158) $(1, 0)$
159) $(-3, 2)$
160) $(-5, 0)$
161)



162)



163) -25
164) 3
165) 5
166) -9
167) $-3n + 1$
168) $-2n$
169) 6
170) 45

171) $h(a) = 3a + 1$
$g(a) = -a^2 + 1$
Find $h(10) - g(10)$

172) $g(a) = 2a + 3$
$h(a) = 2a + 1$
Find $g(-7) - h(-7)$

173) $g(t) = 2t + 1$
$h(t) = 3t + 3$
Find $g(5) \cdot h(5)$

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

175) $f(n) = 2n^3 + 5n$
$g(n) = n + 3$
Find $f(1) \div g(1)$

176) $h(n) = 3n - 3$
$g(n) = -n^2 - 4n$
Find $h(-10) \div g(-10)$

177) $g(x) = -x - 4$
$h(x) = -2x^2 - 2x$
Find $g(x) + h(x)$

178) $g(x) = x^2 + 5x$
$h(x) = 2x + 5$
Find $g(x) - h(x)$

179) $h(x) = 4x - 2$
$g(x) = 3x^2 + 1$
Find $h(x) \cdot g(x)$

180) $g(x) = x^3 + 5x$
$f(x) = x + 5$
Find $g(x) \div f(x)$

State the excluded values for each.

181) $\dfrac{3b^2 + 3b}{b + 1}$

182) $\dfrac{r^2 - 5r - 36}{r - 9}$

183) $\dfrac{49x + 70}{28x}$

184) $\dfrac{16n^2 + 24n}{24n}$

Answers

171) 130

172) 2

173) 198

174) 0

175) $\frac{7}{4}$

176) $\frac{11}{20}$

177) $-2x^2 - 3x - 4$

178) $x^2 + 3x - 5$

179) $12x^3 - 6x^2 + 4x - 2$

180) $\frac{x^3 + 5x}{x + 5}$

181) $\{-1\}$

182) $\{9\}$

183) $\{0\}$

184) $\{0\}$

185) $\frac{10}{3v}$; $\{0\}$

Simplify each and state the excluded values.

185) $\frac{70v}{21v^2}$

186) $\frac{70x^4}{30x^4}$

187) $\frac{6}{6a+27}$

188) $\frac{2x+18}{x+9}$

189) $\frac{k^2+5k-36}{9k+81}$

190) $\frac{p^2-4p-12}{p^2-7p-18}$

Answers

182) $\{9\}$

183) $\{0\}$

184) $\{0\}$

185) $\frac{10}{3v}$; $\{0\}$

186) $\frac{7}{3}$; $\{0\}$

187) $\frac{2}{2a+9}$; $\left\{-\frac{9}{2}\right\}$

188) 2 ; $\{-9\}$

189) $\frac{k-4}{9}$; $\{-9\}$

190) $\frac{p-6}{p-9}$; $\{9, -2\}$