Algebra 2 Name_____ ID: 1

Final Exam Review - DO NOT LOSE!

Date_____ Period____

Perform the indicated operation.

1) $g(t) = 3t - 3$
$h(t) = t^3 - 5t^2$
Find $\left(\frac{g}{h}\right)(t)$
$\frac{3t-3}{t^3-5t^2}$

2) $g(x) = -x + 1$
$f(x) = 2x - 5$
Find $(g + f)(x)$
$x - 4$

3) $f(a) = a - 3$
$g(a) = a^2 - 4$
Find $(3f + 3g)(a)$
$3a^2 + 3a - 21$

4) $f(n) = 4n + 3$
$g(n) = 2n + 1$
Find $(f \circ g)(n)$
$8n + 7$

5) $g(x) = 4x + 5$
$h(x) = x^2 - 3$
Find $\left(\frac{g}{h}\right)(x)$
$\frac{4x+5}{x^2-3}$

6) $g(x) = x^3 + 3$
$h(x) = 4x + 2$
Find $(g \cdot h)(x)$
$4x^4 + 2x^3 + 12x + 6$

7) $g(n) = 4n - 4$
Find $(g \circ g)(n)$
$16n - 20$

8) $g(n) = n^2 + 2n$
$h(n) = -4n + 5$
Find $(g - h)(n)$
$n^2 + 6n - 5$

9) $h(a) = -4a - 5$
$g(a) = -2a - 2$
Find $(h \circ g)(a)$
$8a + 3$

10) $g(n) = 2n - 2$
$h(n) = -3n + 1$
Find $(g \cdot h)(n)$
$-6n^2 + 8n - 2$

Find the inverse of each function.

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

12) $g(n) = -\frac{5}{7}n + \frac{15}{7}$
$g^{-1}(n) = 3 - \frac{7}{5}n$

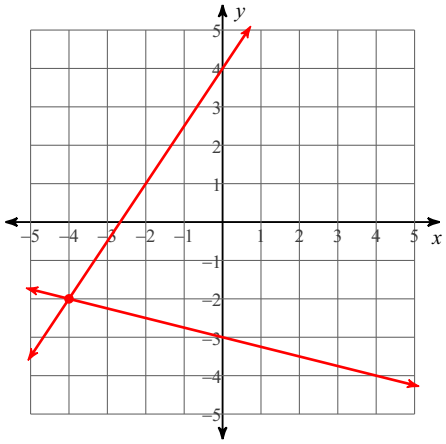
13) $f(n) = \frac{2}{5}n - 2$
$f^{-1}(n) = 5 + \frac{5}{2}n$

14) $f(n) = \frac{-4n + 16}{7}$
$f^{-1}(n) = \frac{16 - 7n}{4}$

Solve each system by graphing.

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

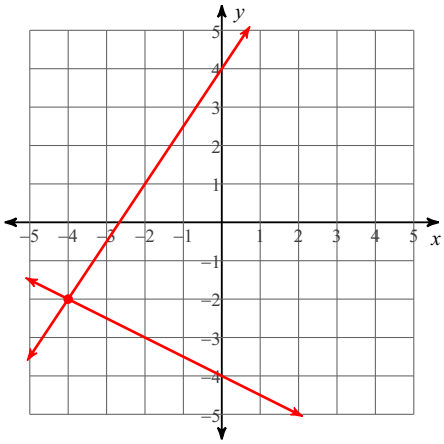
$3x = -8 + 2y$



$(-4, -2)$

16) $4 = y - \frac{3}{2}x$

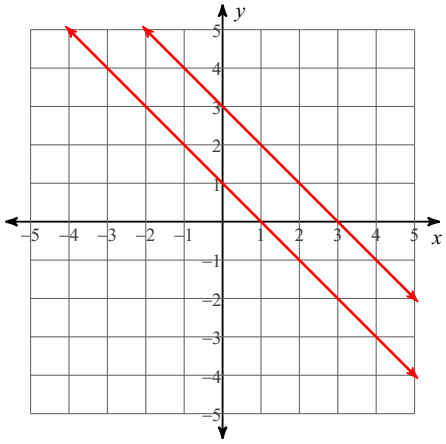
$4 + \frac{1}{2}x = -y$



$(-4, -2)$

17) $y + x = 1$

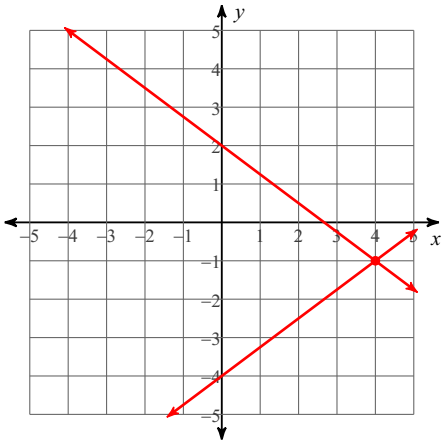
$\frac{1}{3}y = 1 - \frac{1}{3}x$



No solution

18) $-16 = -3x + 4y$

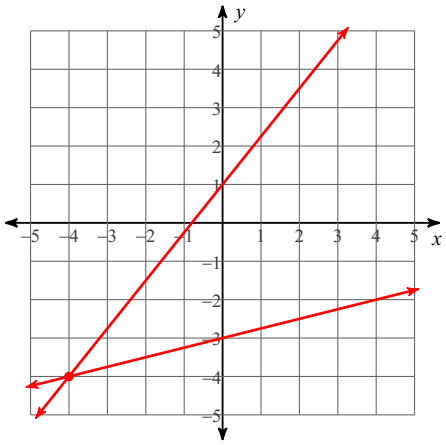
$-8 + 3x = -4y$



$(4, -1)$

19) $2x - 8y = 24$

$-\frac{4}{5}y = -x - \frac{4}{5}$



$(-4, -4)$

Solve each system by elimination.

20) $5x - 5y = 25$
$-15x + 7y = -27$
$(-1, -6)$

21) $6x - 8y = -4$
$4x - 4y = -4$
$(-2, -1)$

22) $24x + 9y = 21$
$8x + 3y = 7$
Infinite number of solutions

23) $-5x - y = 8$
$-15x + 3y = 6$
$(-1, -3)$

Solve each system by substitution or elimination.

24) $x - y = 4$
$5x + 5y = -20$
$(0, -4)$

25) $x - 2y = 1$
$3x - 6y = 3$
Infinite number of solutions

26) $-5x - 8y = 1$
$6x + y = 16$
$(3, -2)$

27) $2x + 7y = -8$
$x - 6y = -4$
$(-4, 0)$

28) The school that Norachai goes to is selling tickets to a fall musical. On the first day of ticket sales the school sold 5 adult tickets and 4 child tickets for a total of $45. The school took in $65 on the second day by selling 10 adult tickets and 3 child tickets. Find the price of an adult ticket and the price of a child ticket.

adult ticket: $5, child ticket: $5

29) Scott and Matt are selling flower bulbs for a school fundraiser. Customers can buy bags of windflower bulbs and bags of daffodil bulbs. Scott sold 6 bags of windflower bulbs and 5 bags of daffodil bulbs for a total of $164. Matt sold 12 bags of windflower bulbs and 3 bags of daffodil bulbs for a total of $216. Find the cost each of one bag of windflower bulbs and one bag of daffodil bulbs.

bag of windflower bulbs: $14, bag of daffodil bulbs: $16

30) Darryl and Jacob each improved their yards by planting grass sod and geraniums. They bought their supplies from the same store. Darryl spent \$156 on 6 ft² of grass sod and 12 geraniums. Jacob spent \$110 on 11 ft² of grass sod and 6 geraniums. What is the cost of one ft² of grass sod and the cost of one geranium?

ft² of grass sod: \$4, geranium: \$11

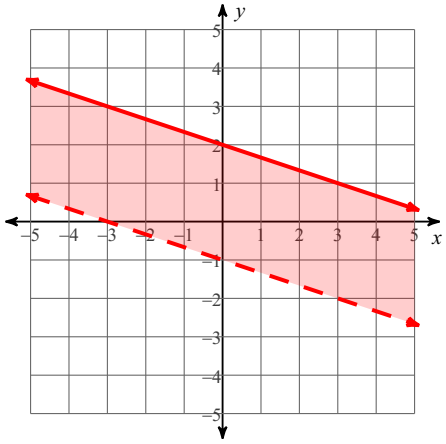
31) Arjun and Micaela are selling pies for a school fundraiser. Customers can buy blueberry pies and lemon meringue pies. Arjun sold 12 blueberry pies and 13 lemon meringue pies for a total of \$228. Micaela sold 3 blueberry pies and 10 lemon meringue pies for a total of \$138. What is the cost each of one blueberry pie and one lemon meringue pie?

blueberry pie: \$6, lemon meringue pie: \$12

Sketch the solution to each system of inequalities.

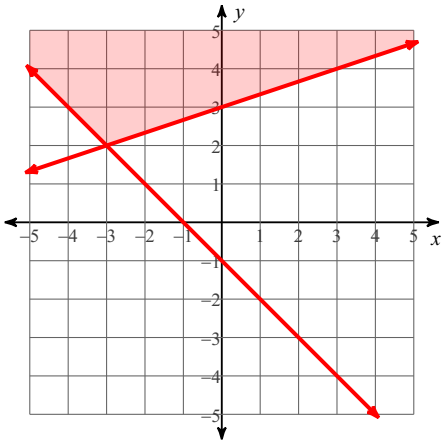
32) $y \leq -\frac{1}{3}x + 2$

$y > -\frac{1}{3}x - 1$

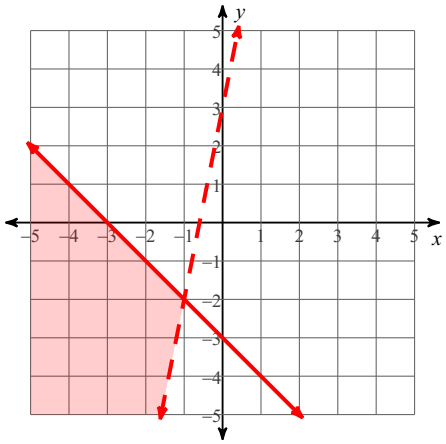


33) $y \geq \frac{1}{3}x + 3$

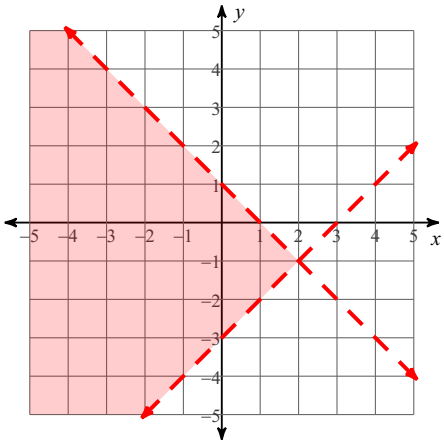
$y \geq -x - 1$



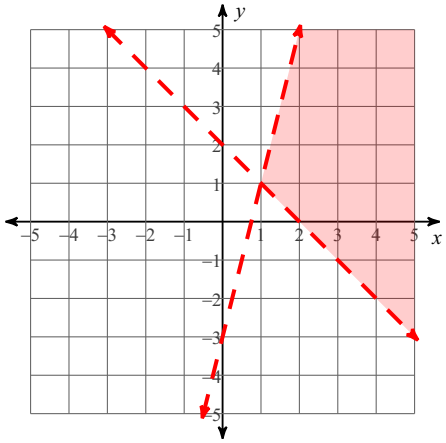
34) $y \leq -x - 3$
$y > 5x + 3$



35) $y > x - 3$
$y < -x + 1$



36) $y > -x + 2$
$y < 4x - 3$



Simplify. Your answer should contain only positive exponents.

37) $4b^2 \cdot 3b^{-4}$ $\frac{12}{b^2}$

38) $4x^2y^2 \cdot 3x^{-2}y^{-4}$ $\frac{12}{y^2}$

39) $a^{-2} \cdot 3a^3b^2$
$3ab^2$

40) $4x^{-1}y^{-3} \cdot 2x$ $\frac{8}{y^3}$

41) $(4y)^{-1}$ $\frac{1}{4y}$

42) $(4x)^{-4}$ $\frac{1}{256x^4}$

43) $(2yx^3)^2$
$4y^2x^6$

44) $(3m^{-1}n^3)^4$ $\frac{81n^{12}}{m^4}$

45) $\frac{3nm^3}{3n^3}$ $\frac{m^3}{n^2}$

46) $\frac{b^4}{2a^4b^{-2}}$ $\frac{b^6}{2a^4}$

47) $\frac{3yx^4}{2x^3y^{-4}}$ $\frac{3y^5x}{2}$

48) $\frac{4y^2}{2x^{-3}}$
$2x^3y^2$

Simplify.

49) $(a^{16})^{\frac{5}{4}}$
a^{20}

50) $(64x^6)^{-\frac{1}{6}}$ $\frac{1}{2x}$

51) $(n^2)^{-\frac{3}{2}}$ $\frac{1}{n^3}$

52) $(64a^4)^{-\frac{1}{2}}$ $\frac{1}{8a^2}$

53) $(16a^6)^{\frac{3}{2}}$
$64a^9$

54) $\sqrt{64x}$
$8\sqrt{x}$

55) $\sqrt[3]{40m}$
$2\sqrt[3]{5m}$

56) $\sqrt{63p}$
$3\sqrt{7p}$

57) $\sqrt{150x^2}$
$5x\sqrt{6}$

58) $\sqrt{180x}$
$6\sqrt{5x}$

59) $\sqrt{8b^3}$
$2b\sqrt{2b}$

60) $\sqrt[4]{128p^8}$
$2p^2\sqrt[4]{8}$

61) $\sqrt{294m^3}$
$7m\sqrt{6m}$

62) $\sqrt{24v^4}$
$2v^2\sqrt{6}$

63) $\sqrt{50v^4}$
$5v^2\sqrt{2}$

64) $-2\sqrt{3} - \sqrt{2} - 3\sqrt{8}$
$-2\sqrt{3} - 7\sqrt{2}$

65) $-2\sqrt[3]{5} + 3\sqrt[3]{81} - 2\sqrt[3]{81}$
$-2\sqrt[3]{5} + 3\sqrt[3]{3}$

66) $3\sqrt[3]{81} - \sqrt[3]{-135} - \sqrt[3]{81}$
$6\sqrt[3]{3} + 3\sqrt[3]{5}$

67) $3\sqrt[5]{5} - 2\sqrt[5]{128} - 3\sqrt[5]{128}$

$3\sqrt[5]{5} - 10\sqrt[5]{4}$

68) $-\sqrt{5} + 3\sqrt{24} - 2\sqrt{45}$

$-7\sqrt{5} + 6\sqrt{6}$

69) $\sqrt{2}(-2\sqrt{5} + 5)$

$-2\sqrt{10} + 5\sqrt{2}$

70) $3\sqrt{10}(\sqrt{10} + \sqrt{2})$

$30 + 6\sqrt{5}$

71) $\sqrt{15}(\sqrt{5} - 3\sqrt{6})$

$5\sqrt{3} - 9\sqrt{10}$

72) $\sqrt{15}(4 + 3\sqrt{5})$

$4\sqrt{15} + 15\sqrt{3}$

73) $\sqrt{2}(\sqrt{6} + 2)$

$2\sqrt{3} + 2\sqrt{2}$

74) $\dfrac{\sqrt{15}}{5\sqrt{80}}$ $\dfrac{\sqrt{3}}{20}$

75) $\dfrac{\sqrt{3}}{\sqrt{75}}$ $\dfrac{1}{5}$

76) $\dfrac{4\sqrt{25}}{\sqrt{16}}$

5

77) $\dfrac{3\sqrt{8}}{\sqrt{9}}$

$2\sqrt{2}$

78) $\dfrac{2\sqrt{10}}{\sqrt{9}}$ $\dfrac{2\sqrt{10}}{3}$

Solve each equation. Remember to check for extraneous solutions.

79) $\sqrt{1 - 33m} = 10$

$\{-3\}$

80) $\sqrt{33n + 1} + 1 = 11$

$\{3\}$

81) $\sqrt{k + 8} = \sqrt{2k + 13}$

$\{-5\}$

82) $-7\sqrt{v - 2} = -14$

$\{6\}$

83) $\sqrt{\dfrac{b}{4}} = \sqrt{3b - 99}$

$\{36\}$

Simplify.

84) $(-1 - 5i) + (-3 - 7i)$

$-4 - 12i$

85) $(-7i) + (4i) + (6 + 7i)$

$6 + 4i$

86) $(-6 + 5i) - (-1 - 6i)$

$-5 + 11i$

87) $(-2 - 6i) - 6 + 8$

$-6i$

88) $(-6 - i) - (-1 - 5i)$

$-5 + 4i$

89) $\dfrac{-10 - i}{-5 + 2i}$ $\dfrac{48 + 25i}{29}$

90) $\dfrac{-2 - 10i}{9 - 6i}$ $\dfrac{14 - 34i}{39}$

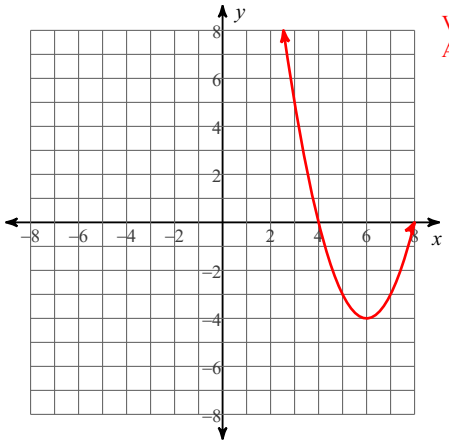
91) $\dfrac{-2 + 3i}{-9 - 7i}$ $\dfrac{-3 - 41i}{130}$

92) $\dfrac{3}{4-8i}$ $\dfrac{3+6i}{20}$

93) $\dfrac{8}{-8+9i}$ $\dfrac{-64-72i}{145}$

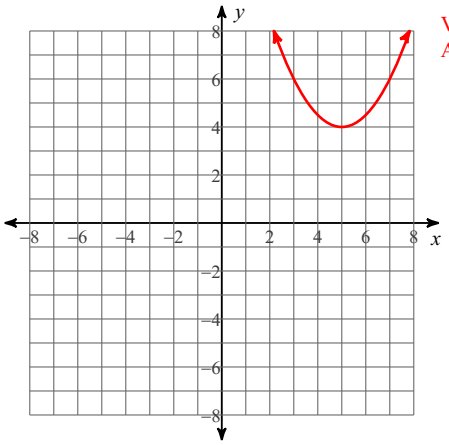
Identify the vertex and axis of symmetry of each. Then sketch the graph.

94) $y = x^2 - 12x + 32$



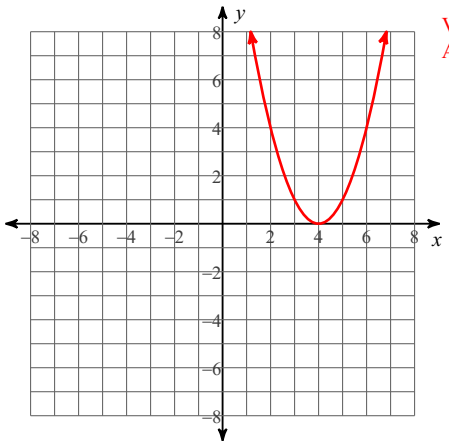
Vertex: (6, –4)
Axis of Sym.: $x = 6$

95) $y = \dfrac{1}{2}x^2 - 5x + \dfrac{33}{2}$



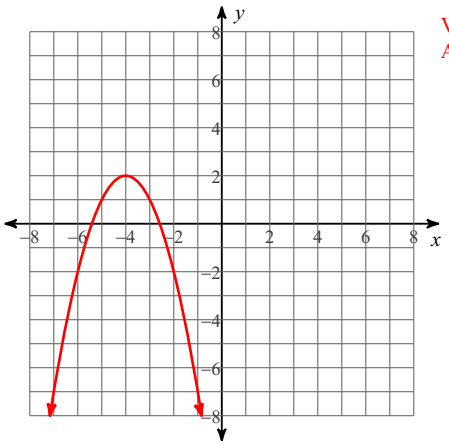
Vertex: (5, 4)
Axis of Sym.: $x = 5$

96) $y = x^2 - 8x + 16$



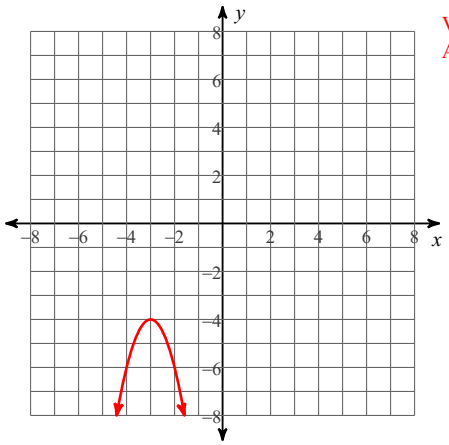
Vertex: (4, 0)
Axis of Sym.: $x = 4$

97) $y = -x^2 - 8x - 14$



Vertex: (–4, 2)
Axis of Sym.: $x = -4$

98) $y = -2x^2 - 12x - 22$



Vertex: (–3, –4)
Axis of Sym.: $x = -3$

Factor each.

99) $x^3 - 4x^2 + 4x - 16 = 0$

$(x - 4)(x^2 + 4) = 0$

100) $x^3 - 3x^2 - 4x + 12 = 0$

$(x - 3)(x - 2)(x + 2) = 0$

101) $x^3 + 4x^2 - 2x - 8 = 0$

$(x + 4)(x^2 - 2) = 0$

102) $x^3 - 3x^2 + 3x - 9 = 0$

$(x - 3)(x^2 + 3) = 0$

103) $x^3 - 5x^2 - 5x + 25 = 0$

$(x - 5)(x^2 - 5) = 0$

104) $x^3 - 1 = 0$

$(x - 1)(x^2 + x + 1) = 0$

105) $x^3 - 64 = 0$

$(x - 4)(x^2 + 4x + 16) = 0$

106) $x^3 + 125 = 0$

$(x + 5)(x^2 - 5x + 25) = 0$

107) $x^3 + 2x^2 - 4x - 8 = 0$

$(x + 2)^2(x - 2) = 0$

108) $x^3 + x^2 - 4x - 4 = 0$

$(x + 1)(x - 2)(x + 2) = 0$

109) $x^3 - x^2 + x - 1 = 0$

$(x - 1)(x^2 + 1) = 0$

110) $x^3 + 1 = 0$

$(x + 1)(x^2 - x + 1) = 0$

111) $x^3 - x^2 - 6x = 0$

$x(x - 3)(x + 2) = 0$

112) $x^3 - 6x^2 + 5x = 0$

$x(x - 1)(x - 5) = 0$

113) $x^3 - x^2 + 3x - 3 = 0$

$(x - 1)(x^2 + 3) = 0$

Find all roots.

114) $x^2 - 8x + 32 = 0$

$\{4 + 4i, 4 - 4i\}$

115) $x^2 + 4x + 4 = 0$

$\{-2 \text{ mult. } 2\}$

116) $x^3 - 5x^2 - 2x + 10 = 0$

$\{5, \sqrt{2}, -\sqrt{2}\}$

117) $x^3 - 2x^2 - 2x + 4 = 0$

$\{2, \sqrt{2}, -\sqrt{2}\}$

Find the value that completes the square and then rewrite as a perfect square.

118) $x^2 + 14x + \_\_$

$49;\ (x + 7)^2$

119) $x^2 + 36x + \_\_$

$324;\ (x + 18)^2$

120) $x^2 - 26x + \_\_$

$169;\ (x - 13)^2$

121) $n^2 - 32n + \_\_$

$256;\ (n - 16)^2$

122) $x^2 - 36x + \_\_$

$324;\ (x - 18)^2$

Solve each equation with the quadratic formula.

123) $n^2 = 24 + 3n$

$\left\{\frac{3 + \sqrt{105}}{2}, \frac{3 - \sqrt{105}}{2}\right\}$

124) $2v^2 - 8 = 2v$

$\left\{\frac{1 + \sqrt{17}}{2}, \frac{1 - \sqrt{17}}{2}\right\}$

125) $12r^2 = -6 + 11r$

$\left\{\frac{11 + i\sqrt{167}}{24}, \frac{11 - i\sqrt{167}}{24}\right\}$

126) $4n^2 - 17 = -7n$

$\left\{\frac{-7 + \sqrt{321}}{8}, \frac{-7 - \sqrt{321}}{8}\right\}$

127) $5n^2 - 13 = -n$

$\left\{\frac{-1 + 3\sqrt{29}}{10}, \frac{-1 - 3\sqrt{29}}{10}\right\}$

Find the discriminant of each quadratic equation then state the number and type of solutions.

128) $-5v^2 + 10v - 15 = -10$

0; one real solution

129) $-6v^2 - 4v - 7 = 3$

–224; two imaginary solutions

130) $-8k^2 - 8k - 7 = -5$

0; one real solution

131) $-9a^2 + a - 12 = -3$

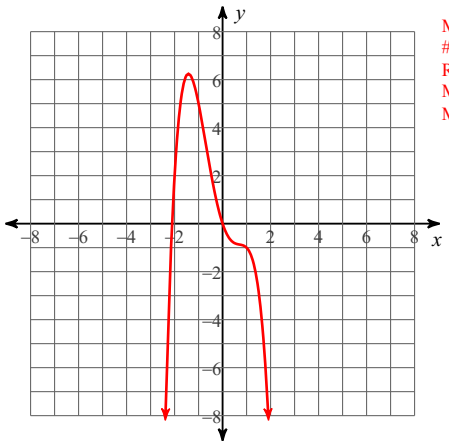
–323; two imaginary solutions

132) $8n^2 - n + 3 = -5$

–255; two imaginary solutions

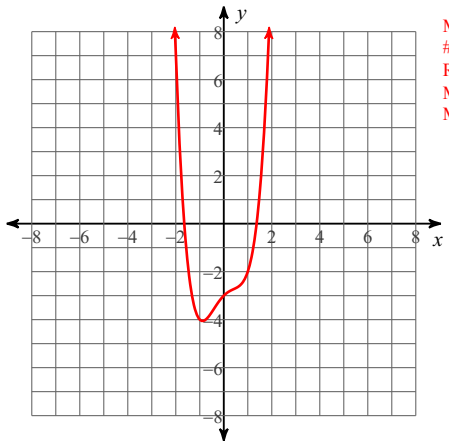
State the maximum number of turns the graph of each function could make. Then sketch the graph. State the number of real zeros. Approximate each zero to the nearest tenth. Approximate the relative minima and relative maxima to the nearest tenth.

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



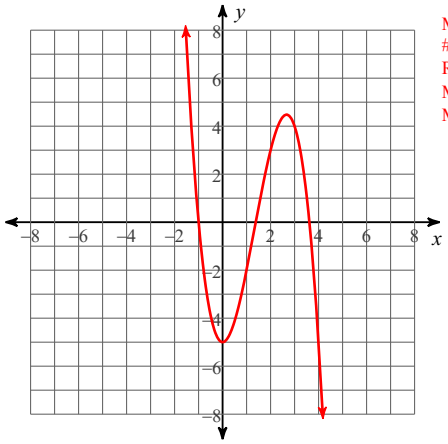
Max # Turns: 3
Real Zeros: 2
Real Zeros: –2.1, 0
Minima: None
Maxima: (–1.4, 6.2)

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



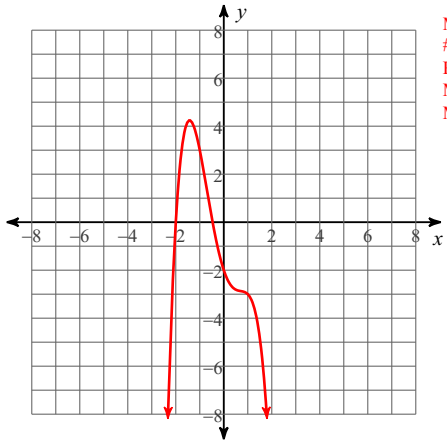
Max # Turns: 3
Real Zeros: 2
Real Zeros: –1.6, 1.4
Minima: (–0.9, –4.1)
Maxima: None

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



Max # Turns: 2
Real Zeros: 3
Real Zeros: −1, 1.4, 3.6
Minima: (0, −5)
Maxima: (2.7, 4.5)

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



Max # Turns: 3
Real Zeros: 2
Real Zeros: −2, −0.5
Minima: None
Maxima: (−1.4, 4.2)

Evaluate each function at the given value.

137) $f(m) = -2m^3 - 11m^2 - 12m + 15$ at $m = -3$

6

138) $f(m) = 4m^3 - 11m^2 - 3m - 7$ at $m = 3$

−7

139) $f(x) = x^3 - 2x^2 + 4x - 7$ at $x = 2$

1

140) $f(m) = -6m^3 + 34m^2 + 13m - 7$ at $m = 6$

−1

State the possible rational zeros for each function. Then find all rational zeros.

141) $f(x) = 2x^3 + 11x^2 + 8x - 7$

Possible rational zeros: $\pm 1, \pm 7, \pm \frac{1}{2}, \pm \frac{7}{2}$

Rational zeros: $\left\{\frac{1}{2}\right\}$

142) $f(x) = 3x^3 + 29x^2 + 51x + 22$

Possible rational zeros:
$\pm 1, \pm 2, \pm 11, \pm 22, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{11}{3}, \pm \frac{22}{3}$

Rational zeros: $\left\{-\frac{2}{3}\right\}$

143) $f(x) = 5x^3 - x^2 - 5x + 1$

Possible rational zeros: $\pm 1, \pm \frac{1}{5}$

Rational zeros: $\left\{\frac{1}{5}, -1, 1\right\}$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

144) −5, 1, 3

$f(x) = x^3 + x^2 - 17x + 15$

145) −3, −4, 3

$f(x) = x^3 + 4x^2 - 9x - 36$

146) $-2,\ -i$

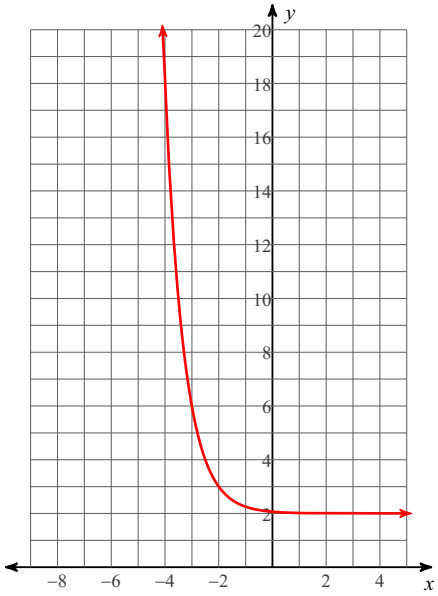
$f(x) = x^3 + 2x^2 + x + 2$

147) $4,\ -2i$

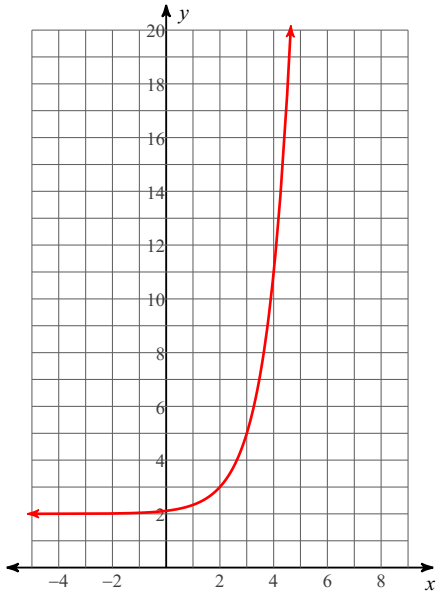
$f(x) = x^3 - 4x^2 + 4x - 16$

Sketch the graph of each function.

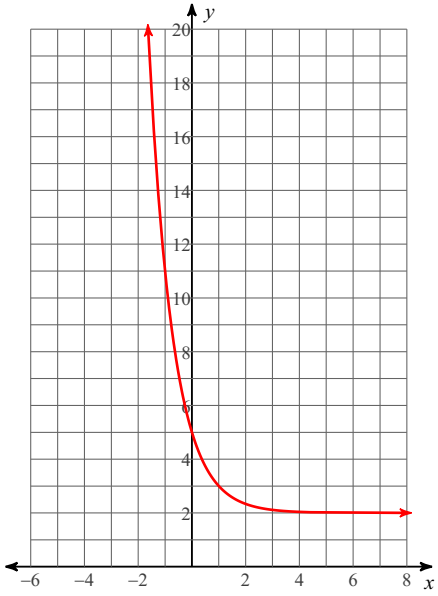
148) $f(x) = \left(\frac{1}{4}\right)^{x+2} + 2$



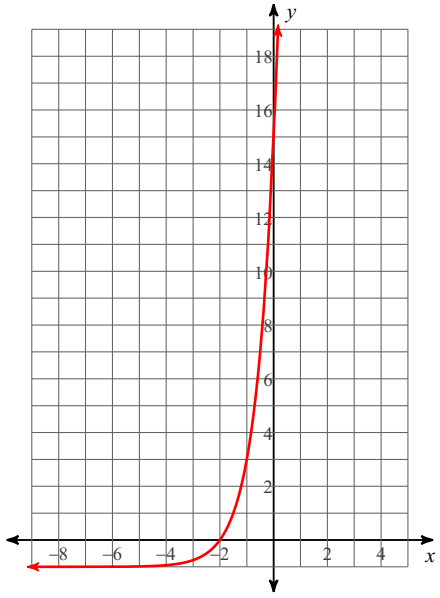
149) $f(x) = 3^{x-2} + 2$



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



151) $f(x) = 4^{x+2} - 1$



Solve each equation.

152) $25^{-3n} = 125$ $\left\{-\frac{1}{2}\right\}$

153) $4^{3b} = 4^{-3b}$

$\{0\}$

154) $6^{3x} = \frac{1}{216}$

$\{-1\}$

155) $2^{-3n} = 2^{-n}$

$\{0\}$

Rewrite each equation in exponential form.

156) $\log_{18} 324 = 2$

$18^2 = 324$

157) $\log_{15} 63 = x$

$15^x = 63$

158) $\log_{12} 144 = 2$

$12^2 = 144$

159) $\log_8 x = y$

$8^y = x$

Rewrite each equation in logarithmic form.

160) $x^y = 61$

$\log_x 61 = y$

161) $y^{-15} = x$

$\log_y x = -15$

162) $12^{-2} = \frac{1}{144}$ $\log_{12} \frac{1}{144} = -2$

163) $x^y = 91$

$\log_x 91 = y$

Evaluate each expression.

164) $\log_7 49$

2

165) $\log_7 \frac{1}{343}$

-3

166) $\log_3 \frac{1}{3}$

-1

167) $\log_4 64$

3

Use a calculator to approximate each to the nearest thousandth.

168) $\log_4 67$

3.033

169) $\log_4 31$

2.477

170) $\log_7 4$

0.712

171) $\ln 13$

2.565

Expand each logarithm.

172) $\log_9 (x \cdot y \cdot z^4)$

$\log_9 x + \log_9 y + 4\log_9 z$

173) $\log_8 (xy^5)^4$

$4\log_8 x + 20\log_8 y$

174) $\log_2 (x \cdot y \cdot z^3)$

$\log_2 x + \log_2 y + 3\log_2 z$

175) $\log_5 \left(\frac{8}{7^2}\right)^5$

$5\log_5 8 - 10\log_5 7$

Condense each expression to a single logarithm.

176) $\log_7 c + \dfrac{\log_7 a}{2} + \dfrac{\log_7 b}{2}$

$\log_7 \left(c\sqrt{ba}\right)$

177) $9\log_4 u - 3\log_4 v$

$\log_4 \dfrac{u^9}{v^3}$

178) $\log_2 x + \log_2 y + 5\log_2 z$

$\log_2 \left(yxz^5\right)$

179) $3\log_2 12 - 12\log_2 7$

$\log_2 \dfrac{12^3}{7^{12}}$

Simplify each and state the excluded values.

180) $\dfrac{x^2 - 11x + 18}{x - 2}$

$x - 9\ ;\ \{2\}$

181) $\dfrac{b - 6}{7b^2 - 42b}$

$\dfrac{1}{7b}\ ;\ \{0, 6\}$

182) $\dfrac{40n^2}{35n + 15}$

$\dfrac{8n^2}{7n + 3}\ ;\ \left\{-\dfrac{3}{7}\right\}$

183) $\dfrac{x - 2}{7x - 14}$

$\dfrac{1}{7}\ ;\ \{2\}$

Simplify each expression.

184) $\dfrac{m + 8}{6m + 60} \cdot \dfrac{4m}{m + 8}$ $\dfrac{2m}{3(m + 10)}$

185) $\dfrac{4n^2}{6n} \cdot \dfrac{n^2 + 9n - 10}{4n^3 + 40n^2}$ $\dfrac{n - 1}{6n}$

186) $\dfrac{9m - 81}{m - 5} \cdot \dfrac{4m^2}{9m - 81}$ $\dfrac{4m^2}{m - 5}$

187) $\dfrac{1}{n + 5} \cdot \dfrac{7n - 14}{n - 2}$ $\dfrac{7}{n + 5}$

188) $\dfrac{k + 4}{k + 1} \div \dfrac{10k - 90}{10k + 10}$ $\dfrac{k + 4}{k - 9}$

189) $\dfrac{4n^3 + 40n^2}{n + 8} \div \dfrac{n + 10}{n + 8}$

$4n^2$

190) $\dfrac{50m^2 - 30m}{5} \div \dfrac{30m^3 - 18m^2}{5}$ $\dfrac{5}{3m}$

191) $\dfrac{1}{x - 3} \div \dfrac{x - 2}{x^2 - 6x + 9}$ $\dfrac{x - 3}{x - 2}$

192) $\dfrac{b - 4}{12b^2 - 36b} - \dfrac{b + 1}{12b^2 - 36b}$

$-\dfrac{5}{12b^2 - 36b}$

193) $\dfrac{r + 2}{2r + 4} - \dfrac{5}{2r + 4}$

$\dfrac{r - 3}{2r + 4}$

194) $\dfrac{4}{k^2 + 5k + 6} - \dfrac{k + 4}{k^2 + 5k + 6}$

$-\dfrac{k}{k^2 + 5k + 6}$

195) $\dfrac{r + 6}{6r^2 + 6r} - \dfrac{2r + 2}{6r^2 + 6r}$

$\dfrac{-r + 4}{6r^2 + 6r}$

196) $\dfrac{x-1}{x-2} - \dfrac{6}{5}$

$\dfrac{-x+7}{5(x-2)}$

197) $\dfrac{3n}{3} + \dfrac{3}{2n-12}$

$\dfrac{2n^2-12n+3}{2(n-6)}$

198) $\dfrac{3}{5b} - \dfrac{6b}{5b+2}$

$\dfrac{15b+6-30b^2}{5b(5b+2)}$

199) $\dfrac{3}{m-4} - \dfrac{5m}{m+1}$

$\dfrac{23m+3-5m^2}{(m-4)(m+1)}$

200) $\dfrac{m-3}{\frac{25}{m^2} - \frac{5}{m-3}}$ $\dfrac{m^4-6m^3+9m^2}{-5m^2+25m-75}$

201) $\dfrac{\frac{m}{9} - \frac{m}{3}}{m^2}$ $-\dfrac{2}{9m}$

202) $\dfrac{5}{\frac{a-3}{a-5} - \frac{5}{a-3}}$ $\dfrac{5a^2-40a+75}{a^2-11a+34}$

203) $\dfrac{\frac{25}{u}}{\frac{4}{5u} - \frac{2}{u}}$ $-\dfrac{125}{6}$

Solve each equation. Remember to check for extraneous solutions.

204) $\dfrac{2k-12}{k} + \dfrac{1}{2k} = \dfrac{1}{k}$ $\left\{\dfrac{25}{4}\right\}$

205) $\dfrac{1}{5k^2} = \dfrac{1}{k^2} + \dfrac{1}{k}$ $\left\{-\dfrac{4}{5}\right\}$

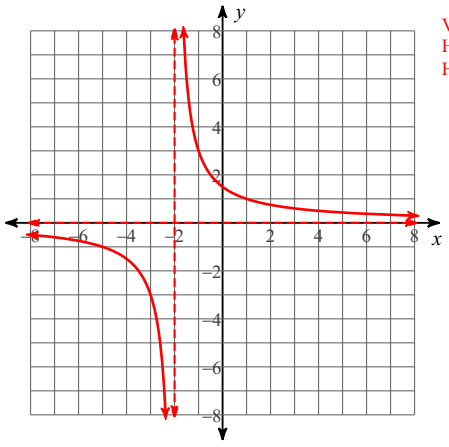
206) $\dfrac{5}{3} + \dfrac{1}{3b} = \dfrac{5}{b}$ $\left\{\dfrac{14}{5}\right\}$

207) $\dfrac{1}{r} + \dfrac{4}{3r^2} = \dfrac{r-2}{6r^2}$

$\{-2\}$

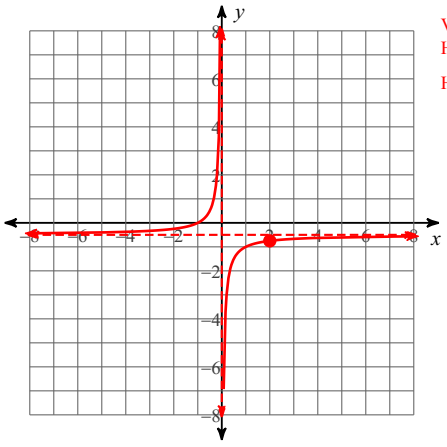
Identify the holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

208) $f(x) = \dfrac{3}{x+2}$



Vertical Asym.: $x = -2$
Holes: None
Horz. Asym.: $y = 0$

209) $f(x) = \dfrac{x^2-x-2}{-2x^2+4x}$



Vertical Asym.: $x = 0$
Holes: $x = 2$
Horz. Asym.: $y = -\dfrac{1}{2}$

Describe the end behavior of each function.

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

$f(x) \to -\infty$ as $x \to -\infty$

$f(x) \to +\infty$ as $x \to +\infty$

211) $f(x) = -x^2 + 6x - 8$

$f(x) \to -\infty$ as $x \to -\infty$

$f(x) \to -\infty$ as $x \to +\infty$

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

$f(x) \to +\infty$ as $x \to -\infty$

$f(x) \to -\infty$ as $x \to +\infty$

213) $f(x) = -x^2 - 2x + 2$

$f(x) \to -\infty$ as $x \to -\infty$

$f(x) \to -\infty$ as $x \to +\infty$

Divide by long division or synthetic division.

214) $(2n^3 - 4n^2 - 37n + 28) \div (n - 5)$

$2n^2 + 6n - 7 - \frac{7}{n - 5}$

215) $(2n^3 + 15n^2 - n + 52) \div (n + 8)$

$2n^2 - n + 7 - \frac{4}{n + 8}$

216) $(x^3 + 3x^2 - 23x - 23) \div (x + 6)$

$x^2 - 3x - 5 + \frac{7}{x + 6}$

217) $(n^3 - 14n^2 + 42n + 41) \div (n - 8)$

$n^2 - 6n - 6 - \frac{7}{n - 8}$

Factor each.

218) $x^3 - 3x^2 - 10x = 0$

$x(x + 2)(x - 5) = 0$

219) $x^3 + 64 = 0$

$(x + 4)(x^2 - 4x + 16) = 0$

220) $x^2 - 7x + 12 = 0$

$(x - 4)(x - 3) = 0$

221) $x^3 - 125 = 0$

$(x - 5)(x^2 + 5x + 25) = 0$

222) $x^2 + 3x + 2 = 0$

$(x + 1)(x + 2) = 0$

223) $x^4 - 12x^2 + 36 = 0$

$(x^2 - 6)^2 = 0$

224) $x^2 + 5x + 6 = 0$

$(x + 2)(x + 3) = 0$

225) $x^4 + x = 0$

$x(x + 1)(x^2 - x + 1) = 0$

226) $x^3 + 125 = 0$

$(x + 5)(x^2 - 5x + 25) = 0$

227) $x^3 + 4x^2 - 4x - 16 = 0$

$(x + 4)(x - 2)(x + 2) = 0$

228) $x^3 + 1 = 0$

$(x + 1)(x^2 - x + 1) = 0$

229) $x^3 - 5x^2 + 4x = 0$

$x(x - 1)(x - 4) = 0$

230) $x^3 + 27 = 0$

$(x + 3)(x^2 - 3x + 9) = 0$

231) $x^4 - 2x^2 - 63 = 0$

$(x^2 + 7)(x - 3)(x + 3) = 0$

232) $x^4 - 6x^2 + 5 = 0$

$(x^2 - 5)(x - 1)(x + 1) = 0$