Summer Review For Students Entering Precalc at CRMS

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
   a) Discrete relations
   b) Continuous relations
   c) Evaluating and graphing functions
4) Linear Relations and Functions
   a) Graphing and wirting linear equations
   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
   a) Operations
   b) Graphing
   c) Absolute value
   d) Rationalizing denominators
7) Quadratic Functions and Inequalities
   a) Graphing quadratic functions
   b) Graphing quadratic inequalities

   c) Factoring quadratic expressions
   d) Solving equations by taking square roots or factoring
   e) Completing the square
   f) Solving equations with the Quadratic Formula
8) Polynomial Functions
   a) Adding, subtracting and multiplying
   b) The Binomial Theorem
   c) Factoring by grouping
   d) Factoring quadratic form
   e) Writing functions
9) General Functions
   a) Evaluating, operations and inverses
10) Radical Functions and Rational Exponents
   a) Simplifying radicals
   b) Adding, subtracting, multiplying and dividing radical expressions
   c) Connecting radical expressions and rational exponents
   d) Evaluating rational exponent expressions
   e) The properties of exponents
   f) Radical equations
   g) Rational exponent equations
   h) Graphing radical equations
   i) Domain and range of radical functions
11) Conic Sections
   a) Parabolas, graphing & properties
   b) Parabolas, writing equations
12) Rational Expressions
   a) Graphing, simplifying
   b) Adding, subtracting, multiplying and dividing
   c) Equations
13) Exponential and Logarithmic Expressions
   a) Graphing exponential functions
   b) Properties of logarithms
   c) Logarithmic equations
   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

Evaluate each expression.

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

2) $10 - (9 - 3) - (-10)$

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

4) $(-2)((-1) + 10 + 9)$

5) $\dfrac{24 \times 2}{-6} - 1$

6) $4 + 3 - 6 \times (-7)$

Simplify each and state the excluded values.

7) $\dfrac{2v^2 + 10v}{v^2 + 10v + 25}$

8) $\dfrac{k^2 - k - 90}{k^2 - k - 90}$

9) $\dfrac{63r^2 - 63r}{18r^2 - 81r}$

10) $\dfrac{18x + 42}{12x + 12}$

11) $\dfrac{m^2 + 14m + 45}{9m^2 + 45m}$

12) $\dfrac{9m + 54}{m^2 + 11m + 30}$

13) $\dfrac{70x - 20}{70x + 70}$

14) $\dfrac{n^2 - n - 90}{n^2 - 3n - 70}$

Simplify.

15) $-4\sqrt[3]{189m^{10}}$

16) $-8\sqrt[3]{-875x^6}$

Solve each equation.

17) $-6(5 - 5x) + 1 = 35 - 2x$

18) $7(2k + 4) = -38 + 3k$

19) $25 + 8n = 5(8 + n)$

20) $-2 + 5r = 4(r - 2) + 2$

21) $-20 + 2k = -2(6k + 4) + 2k$

22) $7(n - 2) = -38 + 3n$

23) 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.?

24) How many oz. of a metal containing 60% copper must be combined with 6 oz. of pure copper to form an alloy containing 76% copper?

25) 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.?

26) 1 fl. oz. of an alcohol solution was mixed with 2 fl. oz. of a 54% alcohol solution to make a 42% alcohol solution. Find the percent concentration of the first solution.

27) 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?

28) An Air Force plane and a jet left London at the same time. The planes flew in opposite directions. The jet flew 271 mph faster than the Air Force plane. After 12 hours they were 8316 mi. apart. Find the Air Force plane's speed.

29) 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?

30) Kristin traveled to her friend's house and back. On the trip there she traveled 25 km/h and on the return trip she went 20 km/h. How long did the trip there take if the return trip took five hours?

31) 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?

32) Rob left school and drove toward the lake at an average speed of 40 mph. Kristin left sometime later driving in the opposite direction with an average speed of 80 mph. After Rob had driven for five hours they were 440 mi. apart. Find the number of hours Kristin drove.

Solve each equation.

33) $|x - 7| = 0$

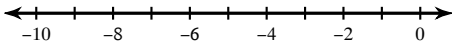
34) $|x - 7| = 11$

35) $|-6 + 5b| = 0$

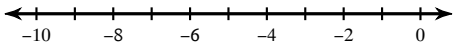
36) $|5 - 6x| = -1$

Solve each inequality and graph its solution.

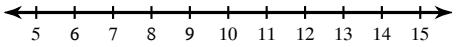
37) $-108 \le -3(6 - 6n)$



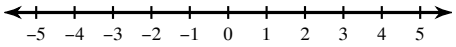
38) $-108 < 2(8x + 2)$



39) $115 < -5(1 - 3x)$

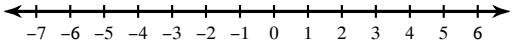


40) $-7 + 6(8 - 8x) > -103$

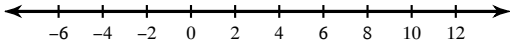


Solve each compound inequality and graph its solution.

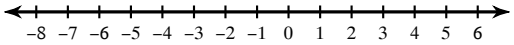
41) $-7 > -11 + x \ge -15$



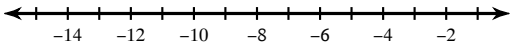
42) $-2n - 6 > -26$ and $12n - 10 > -70$



43) $3p + 7 \le 16$ and $7p - 1 \ge -43$

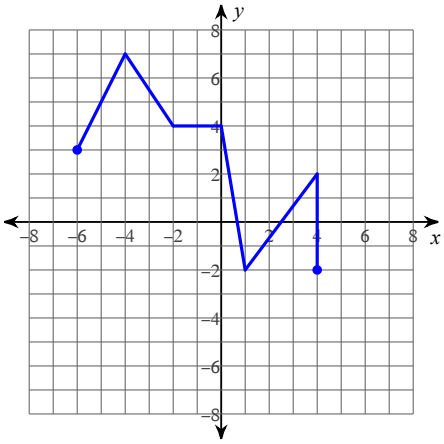


44) $-5 - 11n \ge 116$ or $-1 + n > -7$



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

45)



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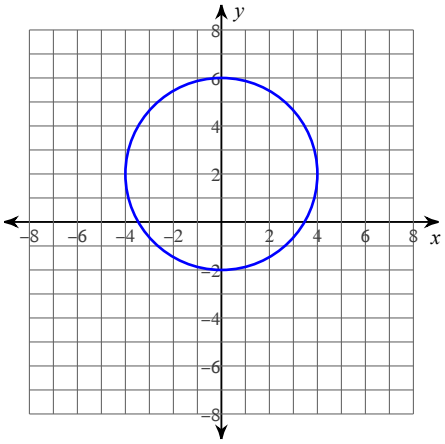

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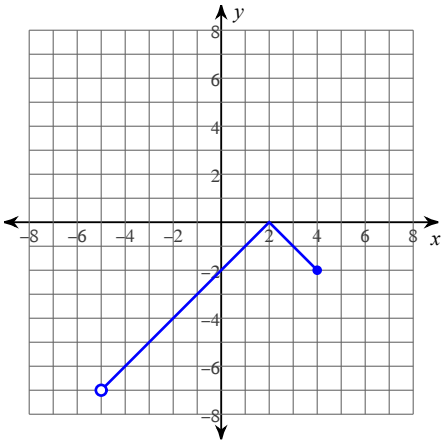
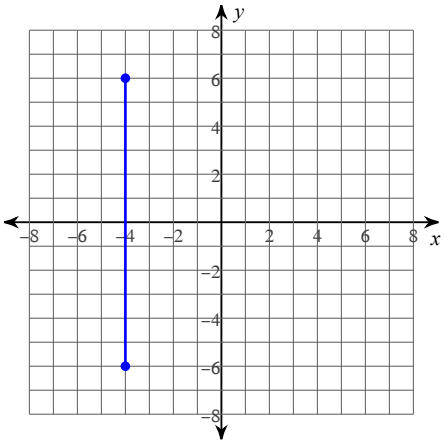


48)



Evaluate each function for the given value.

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

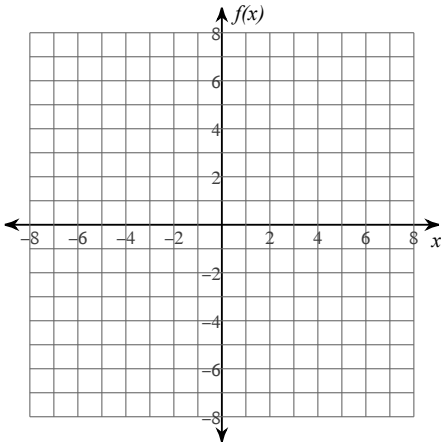
50) $f(x) = 3|x-2| - 3$; Find $f\left(\frac{16}{5}\right)$

51) $f(x) = -|x-2|$; Find $f\left(-\frac{19}{3}\right)$

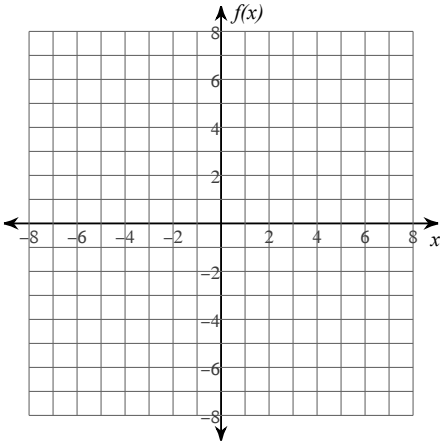
52) $f(x) = 3|x-2| - 4$; Find $f\left(-\frac{1}{4}\right)$

Graph each function for the given domain.

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

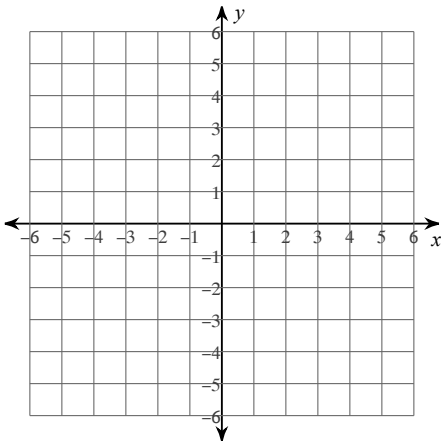


54) $f(x) = -|x+2| + 2$
Domain: $\{-7, -6, -2, 2, 8\}$

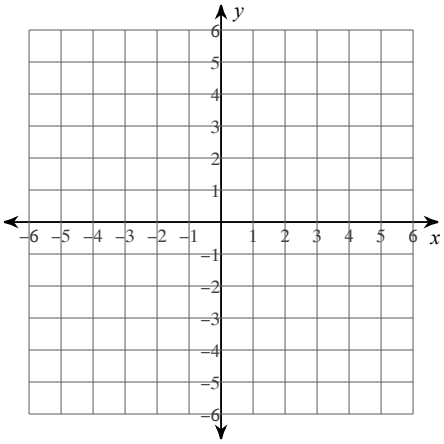


Sketch the graph of each line.

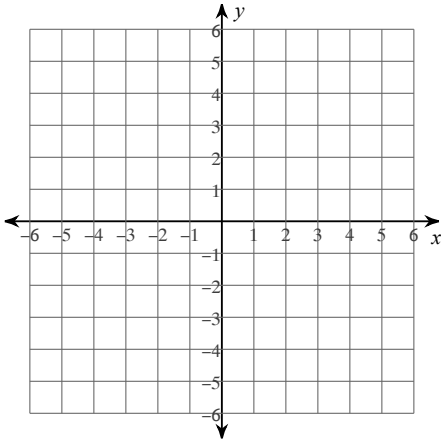
55) $y = \frac{7}{5}x + 5$



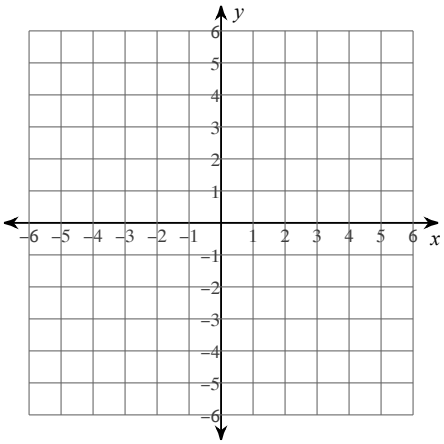
56) $y = 6x + 4$



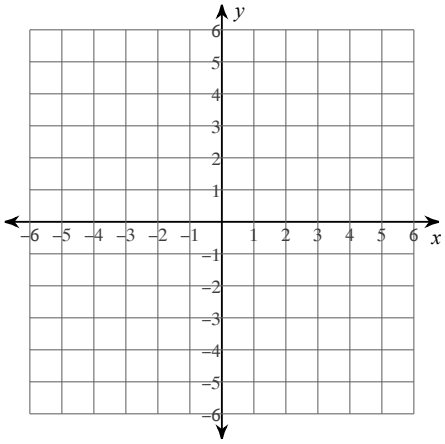
57) $y = -2x - 5$



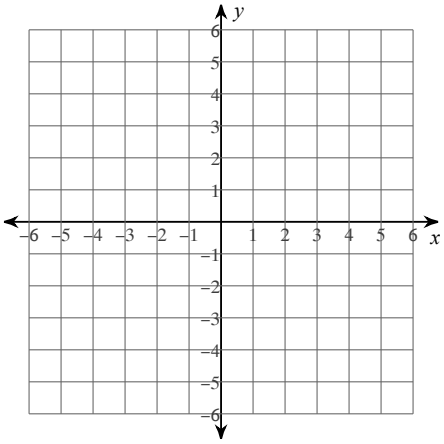
58) $y = -\frac{9}{4}x + 4$



59) $-4y + x = -20$



60) $5y - 25 - 9x = 0$



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

61) through: $(-2, -2)$, slope $= \frac{1}{2}$

62) through: $(-1, -5)$, slope $= 3$

63) through: $(4, 1)$, slope $= \frac{2}{9}$

64) through: $(2, 5)$, slope $= 3$

65) through: $(-1, 2)$, slope $= \frac{4}{3}$

66) through: $(1, -4)$, slope $= -1$

67) through: $(-3, 0)$, slope = undefined

68) through: $(-3, 1)$, slope $= -\frac{5}{3}$

69) through: $(5, 2)$, slope $= 0$

70) through: $(-2, 2)$, slope $= -1$

71) through: $(2, 3)$, slope $= 3$

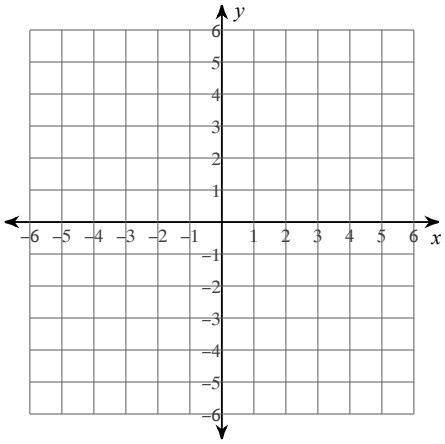
72) through: $(-3, 5)$, slope $= 0$

73) through: $(-5, 1)$, slope $= -1$

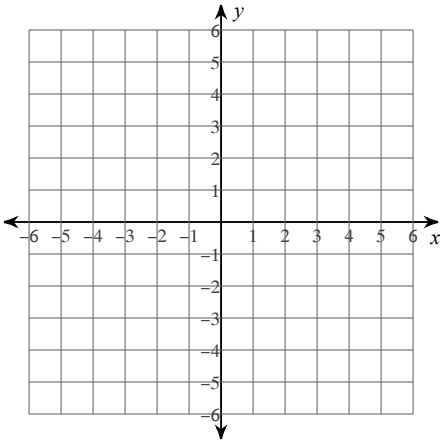
74) through: $(-2, -3)$, slope $= -\frac{1}{2}$

Graph each equation.

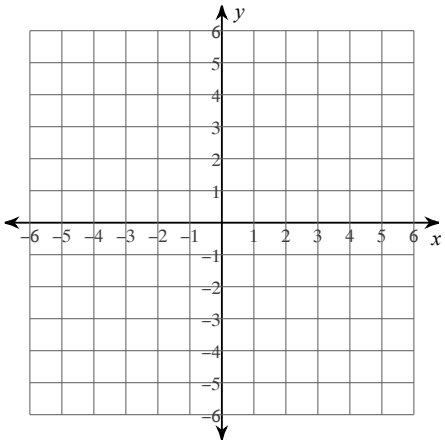
75) $y = |3x - 2| - 2$



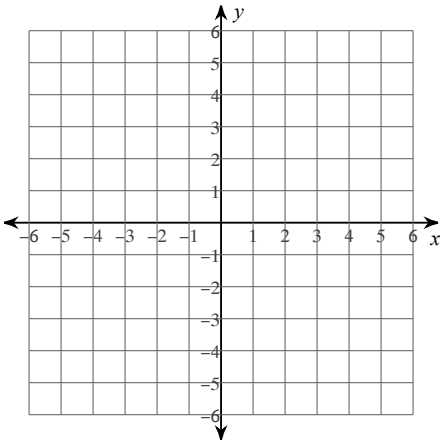
76) $y = |3x + 4| - 2$



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

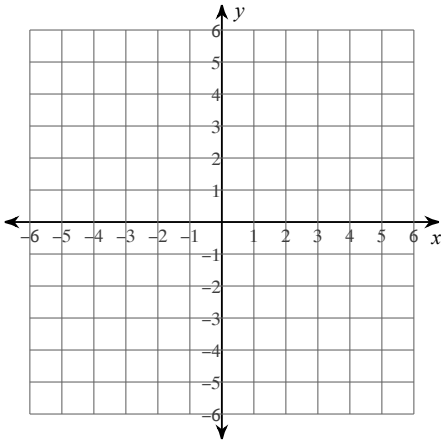


78) $y = |2x| + 2$

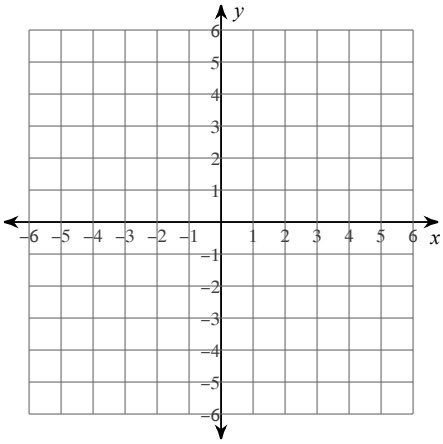


Sketch the graph of each linear inequality.

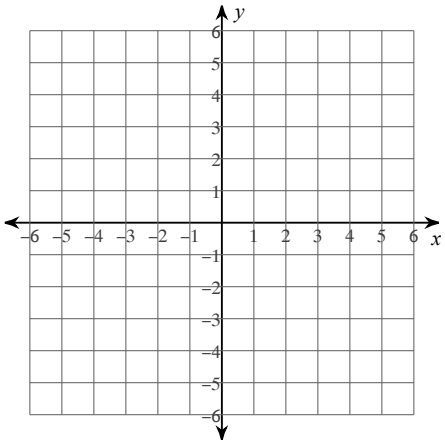
79) $y \le -x - 1$



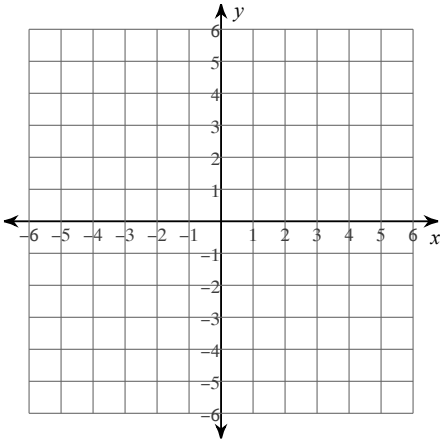
80) $y < 3$



81) $y \le 3x - 4$



82) $y > -\frac{3}{2}x + 5$



Solve each system by graphing.

83) $y = -4x + 5$
$y = -4x + 9$

84) $y = x + 4$
$y = -4x + 9$

85) $y = -\frac{5}{7}x - 7$
$x = -7$

86) $y = 4x + 9$
$y = -4x - 7$

Solve each system by elimination.

87) $-18x + 7y = -18$
$-9x - 6y = -9$

88) $-12x - 9y = -12$
$-6x + 5y = -6$

89) $-3x - 4y = 28$
$-7x - 2y = 14$

90) $-16x - 6y = -28$
$8x + 3y = 14$

Solve each system by graphing.

91) $y = -\frac{5}{4}x - 3$
$y = \frac{5}{4}x + 7$

92) $y = -\frac{5}{4}x - 3$
$y = \frac{3}{2}x + 8$

Solve each system by substitution.

93) $6x + 5y = -8$
$6x + y = 8$

94) $6x + y = -6$
$-4x + 4y = 4$

95) $7x - 4y = -24$
$x - 2y = -2$

96) $-3x + y = 23$
$-6x + 2y = 46$

97) 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?

98) The sum of the digits of a certain two-digit number is 12. When you reverse its digits you increase the number by 36. Find the number.

Simplify.

99) $(-6i)(3 - 5i) + (5i)(-3 - 7i)$

100) $(8i)(7i) - (7i)(-5 + i)$

101) $(2 + 3i) - (7 - 3i)$

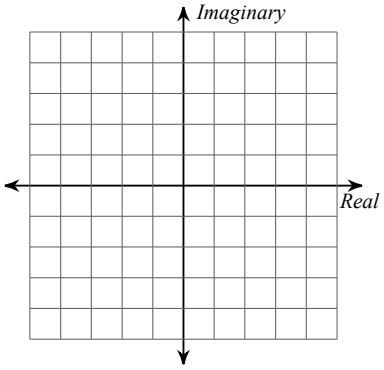
102) $(-4 + 8i)(8 + 4i)$

103) $(1 - 4i)(-6 + 5i)$

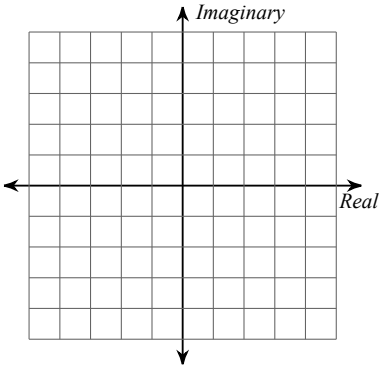
104) $(4i)(-2 + 4i) + (8i)(3 - i)$

Graph each number in the complex plane.

105) $4 + i$



106) $4 + 4i$



Find the absolute value of each complex number.

107) $\left|7 - i\right|$

108) $\left|-6 + 3i\right|$

Simplify.

109) $\dfrac{1}{-7i}$

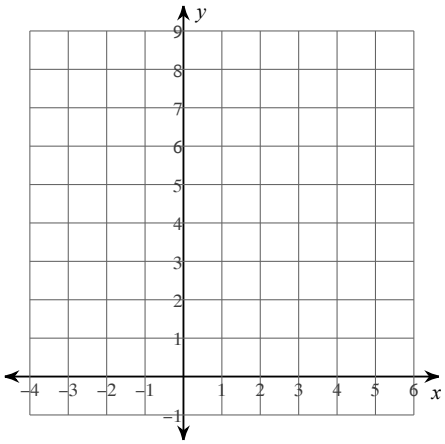
110) $\dfrac{1}{6i}$

111) $\dfrac{9}{-7 + 3i}$

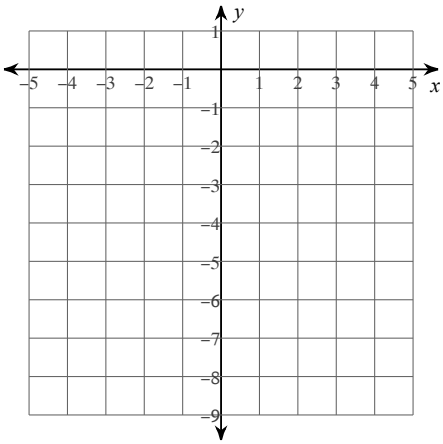
112) $\dfrac{-5 - 10i}{-2 + 3i}$

Sketch the graph of each function.

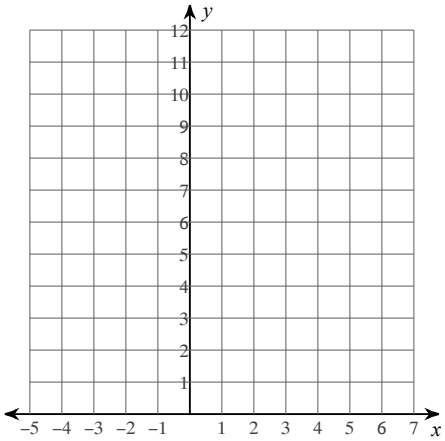
113) $y = 2x^2$



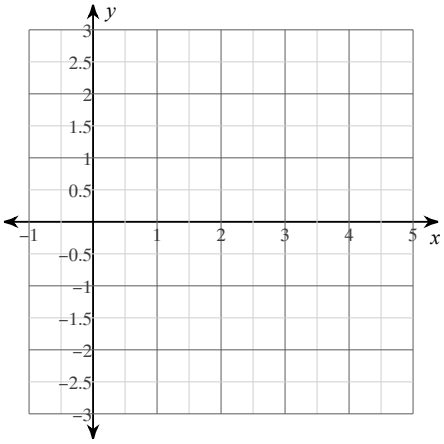
114) $y = -2x^2$



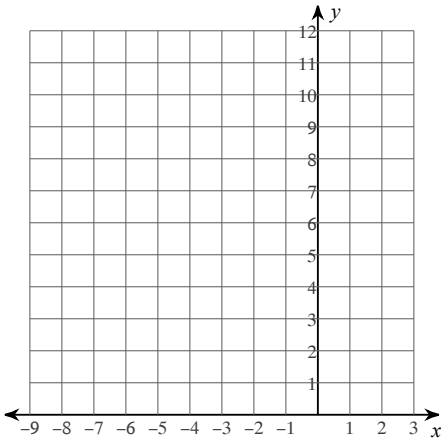
115) $y = 2x^2 + 8x + 11$



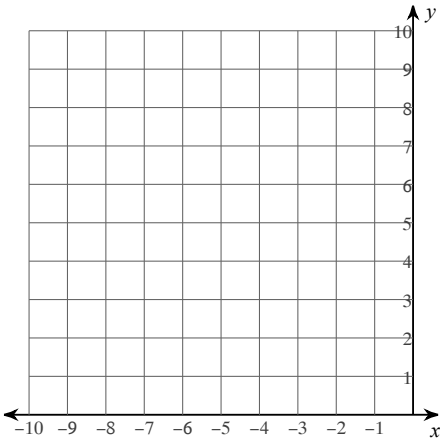
116) $y = -x^2 + 2x + 1$



117) $y = 2x^2 + 12x + 21$

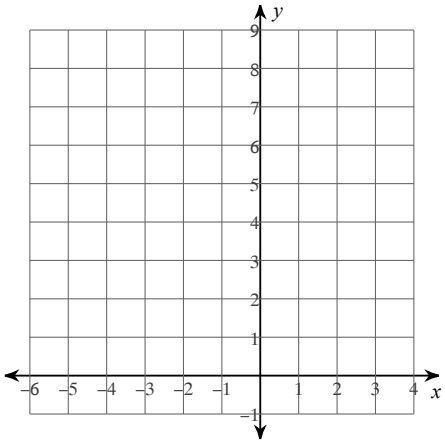


118) $y = 2x^2 + 12x + 19$

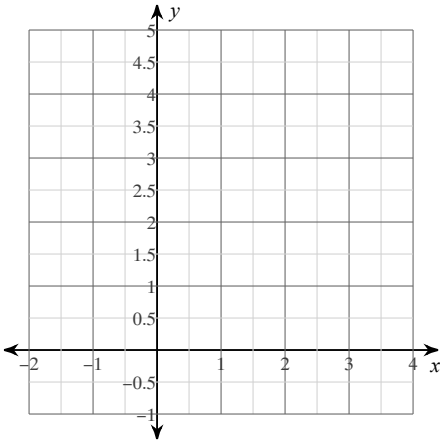


Sketch the graph of each inequality.

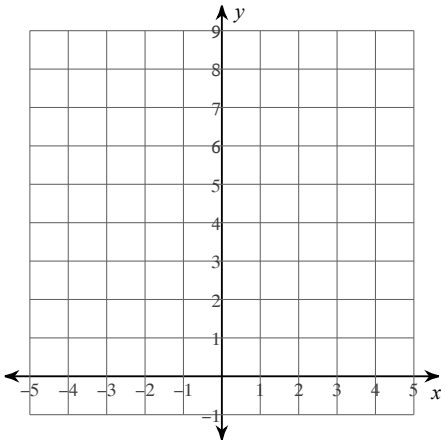
119) $y > 2x^2$



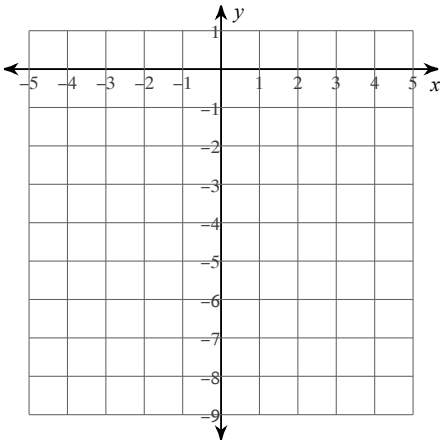
120) $y > x^2$



121) $y \le 2x^2$



122) $y \ge -2x^2$



Solve each equation by factoring.

123) $(2n + 5)(n - 3) = 0$

124) $x(3x + 1) = 0$

125) $(r+1)^2 = 0$

126) $(r-3)(r+5) = 0$

127) $a^2 = -13a - 40$

128) $m^2 - 25 = 0$

129) $a^2 = -15 - 8a$

130) $5x^2 - 200 = -15x$

Solve each equation by taking square roots.

131) $7a^2 = 196$

132) $6n^2 = 384$

133) $81n^2 - 2 = 62$

134) $25p^2 - 4 = 0$

Solve each equation by factoring.

135) $(b-5)(b-1) = 0$

136) $(a+2)(a+4) = 0$

137) $n^2 = -49 + 14n$

138) $7b^2 = 7b$

139) $v^2 = 36$

140) $x^2 - 13x = -42$

141) $16b^2 - 41b - 22 = 8b^2 - 4 + 4b$

142) $3x^2 - x + 6 = 8$

Solve each equation by completing the square.

143) $b^2 + 10b + 11 = 0$

144) $b^2 + 16b + 48 = 0$

145) $8p^2 - 16p - 35 = 7$

146) $v^2 + 14v + 32 = 8$

Solve each equation with the quadratic formula.

147) $m^2 + 3m + 2 = 0$

148) $r^2 + 4r - 5 = 0$

149) $2p^2 + 5p + 3 = 0$

150) $2x^2 - 4x - 6 = 0$

151) $7m^2 = -1 - 5m$

152) $4r^2 = 49$

153) $10r^2 + 1 = -6r$

154) $2r^2 = -9r + 56$

Simplify each expression.

155) $(13n^4 + 14n^5 - 4) - (-10n^4 - 8 + 6n^5)$

156) $(9a^2 + 3a - 7a^3) + (-13a^4 - 8a^3 + 9a^2)$

157) $(11p - 11p^2 - 2p^3) - (-13p^2 + 2p^3 + 4p)$

158) $(-x^3 + 3x^4 - 7x^5) - (-13x^3 - 8x^4 + 9x^5)$

Find each product.

159) $(-b - 8)(-7b - 7)$

160) $(-5m + 2)(-m - 5)$

161) $(-5m + 2)(5m - 6)$

162) $(-5x - 8)(-5x - 5)$

163) $(4n + 1)(4n - 1)$

164) $(3x - 2)^2$

165) $(5v + 7)(5v - 7)$

166) $(5x + 1)(5x - 1)$

Find each coefficient described.

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

168) Coefficient of n in expansion of $(n + 4)^4$

Expand completely.

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

170) $(4n + m)^4$

Factor each completely.

171) $96xy + 120x + 32y^3 + 40y^2$

172) $40xy + 8x + 25y + 5$

173) $10xy + 8x - 25y^3 - 20y^2$

174) $448xy - 168x + 256y - 96$

175) $x^3 + 1$

176) $u^3 + 8$

177) $-125x^4 - 64x$

178) $125u^5 - 64u^2$

179) $x^4 - 8x^2 + 15$

180) $x^4 - 3x^2 - 10$

181) $3x^5 - 28x^3 + 49x$

182) $7x^4 - 57x^2 + 56$

183) $5m^4 - 17m^2 + 14$

184) $7a^5 - 39a^3 - 18a$

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

185) $\sqrt{3},\ \ -2 + \sqrt{3}$

186) $\sqrt{3},\ \ 3 + \sqrt{7}$

187) $-1,\ \ -3 - 2i$

188) $-3 + \sqrt{7},\ \ -2 - i$

Evaluate each function.

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

190) $f(a) = -2a$; Find $f(-10)$

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

192) $h(a) = a^3 - a^2$; Find $h(-5)$

193) $h(a) = 2|2a| - 2$; Find $h(-2)$

194) $f(x) = x^2 + 3x$; Find $f(-2)$

Perform the indicated operation.

195) $g(a) = 2a - 3$
$f(a) = 4a - 1$
Find $(g + f)(a)$

196) $h(x) = 4x - 4$
$g(x) = -x^3 + 5x$
Find $(h - g)(x)$

197) $g(x) = -x - 1$
$h(x) = 4x - 4$
Find $(g + h)(x)$

198) $h(x) = x^2 + 5x$
$g(x) = 4x$
Find $(h - g)(x)$

Find the inverse of each function.

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

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

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

202) $f(x) = \sqrt[3]{x-2} + 1$

Simplify. Your answer should contain only positive exponents.

203) $-x^0 \cdot \left(-x^{-2}y^{-1}\right)^5$

204) $\left(-u^0\right)^{-1} \cdot u^3v^5$

205) $\left(-a^2b^{-2}\right)^{-5} \cdot b^4$

206) $\left(x^{-2}y^{-1}\right)^5 \cdot x$

Simplify.

207) $\sqrt{3}\left(4 - 4\sqrt{3}\right)$

208) $\sqrt{15}\left(\sqrt{10} + 2\right)$

209) $\sqrt{3}\left(4\sqrt{10} + \sqrt{3}\right)$

210) $\sqrt{3}\left(-2\sqrt{6} + \sqrt{2}\right)$

211) $3\sqrt{3} - 3\sqrt{6} + 2\sqrt{54}$

212) $3\sqrt{5} - 3\sqrt{3} + 2\sqrt{3}$

213) $3\sqrt{24} - \sqrt{5} - 3\sqrt{5}$

214) $3\sqrt[3]{-40} + 3\sqrt[3]{24} + 3\sqrt[3]{-3}$

215) $\frac{4\sqrt{3}}{3\sqrt{16}}$

216) $\frac{\sqrt{3}}{5\sqrt{16}}$

217) $\frac{3}{4 + \sqrt{2}}$

218) $-\frac{4}{2\sqrt{3} - 4}$

Write each expression in radical form.

219) $6^{\frac{1}{3}}$

220) $10^{\frac{7}{4}}$

221) $3^{\frac{1}{2}}$

222) $6^{\frac{1}{2}}$

Write each expression in exponential form.

223) $\sqrt{6v}$

224) $\left(\sqrt{2x}\right)^5$

225) $\left(\sqrt[3]{a}\right)^4$

226) $\sqrt{10k}$

Simplify.

227) $3v^0 \cdot 2v^3$

228) $2n \cdot 2n^3$

Simplify. Your answer should contain only positive exponents.

229) $\left(\left(-x^4\right)^{-4} \cdot -xx^2\right)^0$

230) $\left(\left(a^4b^0\right)^2 \cdot b^5\right)^5$

231) $\left(uv^3 \cdot -u \cdot uv^2\right)^3$

232) $\left(-a^{-4} \cdot a^{-4}b^5\right)^{-3}$

Solve each equation. Remember to check for extraneous solutions.

233) $\sqrt{-2 - 17m} = 10$

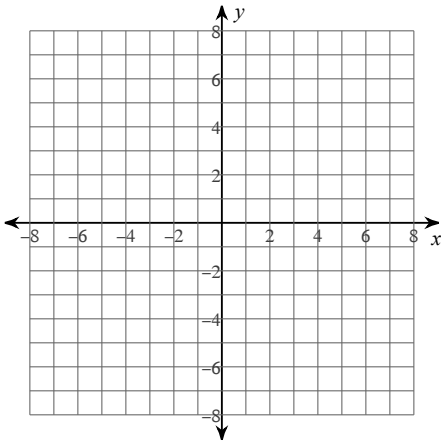
234) $v = \sqrt{80 + 2v}$

235) $1 = \sqrt{6 - x}$

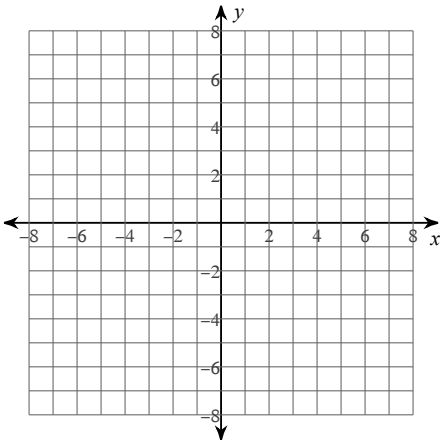
236) $\sqrt{\frac{n}{4}} = \sqrt{90 - 2n}$

Sketch the graph of each function.

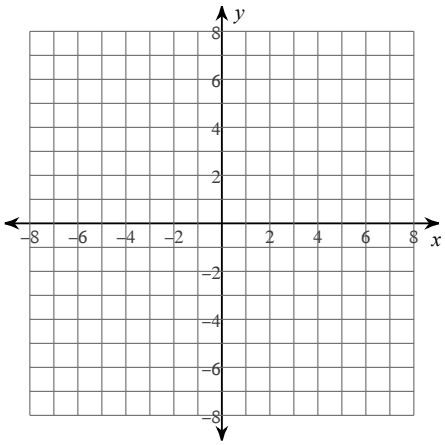
237) $y = \sqrt{x} + 2$



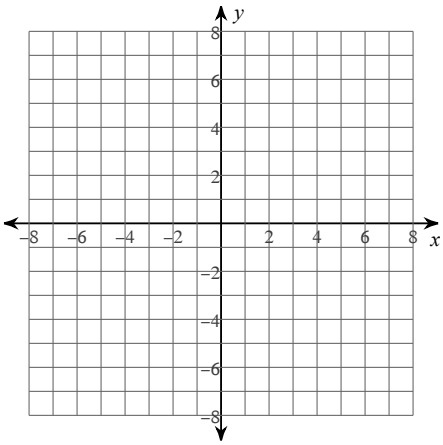
238) $y = \sqrt{x} + 4$



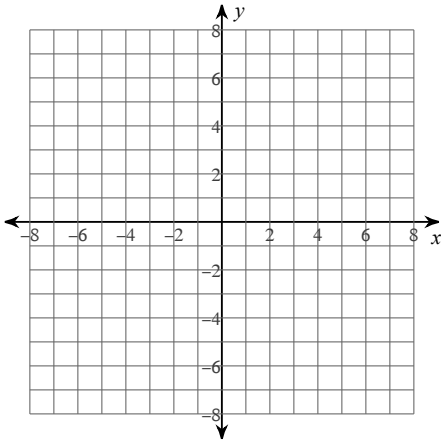
239) $y = \sqrt{x} + 5$



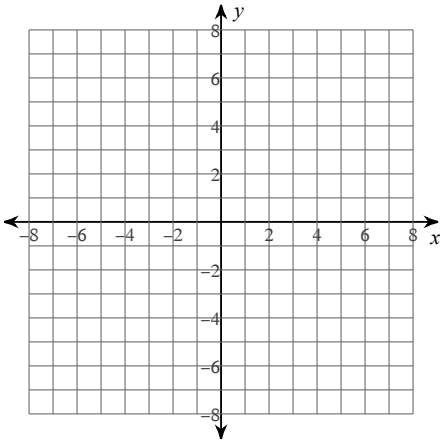
240) $y = \sqrt{x} - 2$



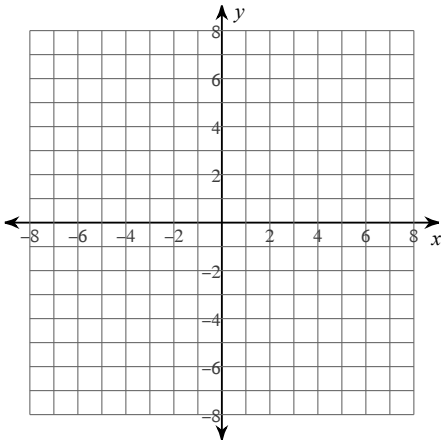
241) $y = \sqrt[3]{x} - 2$



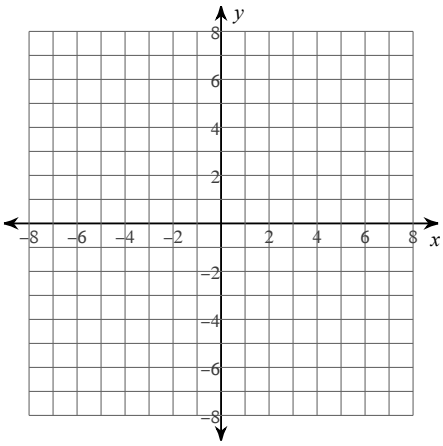
242) $y = \sqrt[3]{x}$



243) $y = \sqrt{x - 1}$



244) $y = -4 + \frac{3}{4}\sqrt[3]{x}$



Identify the domain and range of each.

245) $y = \sqrt{x - 2}$

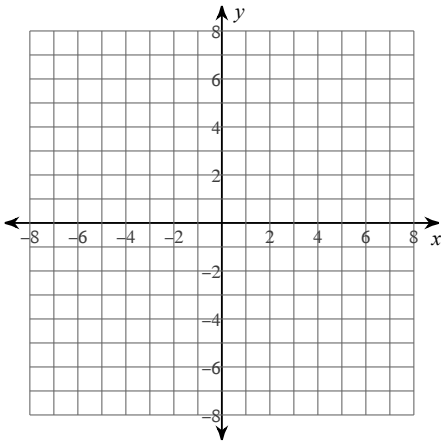
246) $y = \sqrt{x} - 3$

247) $y = \sqrt{x}$

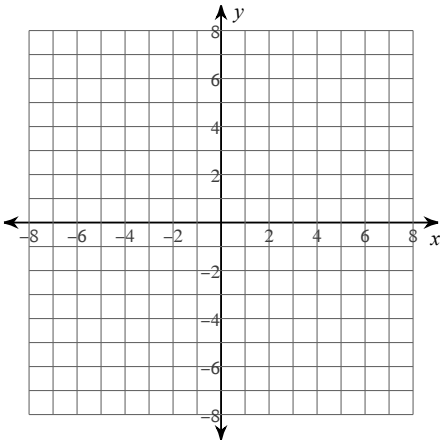
248) $y = \sqrt{x} + 3$

Graph each equation.

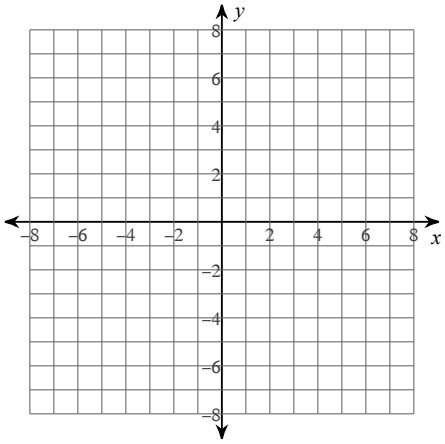
249) $y = -x^2$



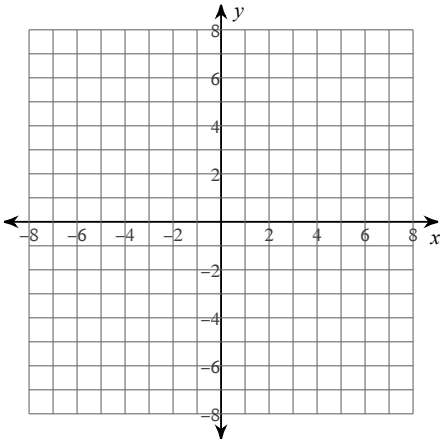
250) $y = -\frac{6}{7}x^2$



251) $y = -2x^2$

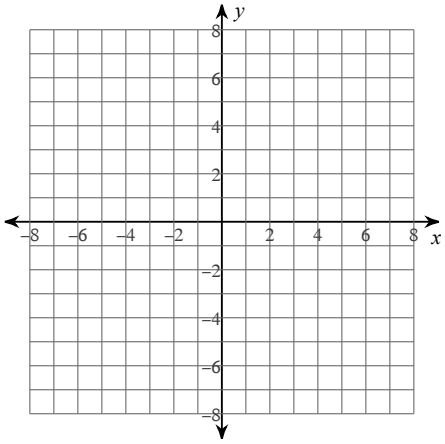


252) $y = 2x^2$

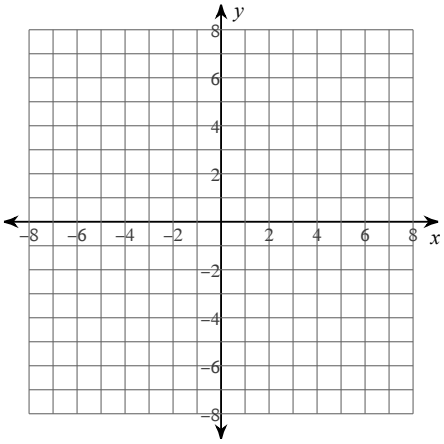


Identify the vertex, focus, and directrix of each. Then sketch the graph.

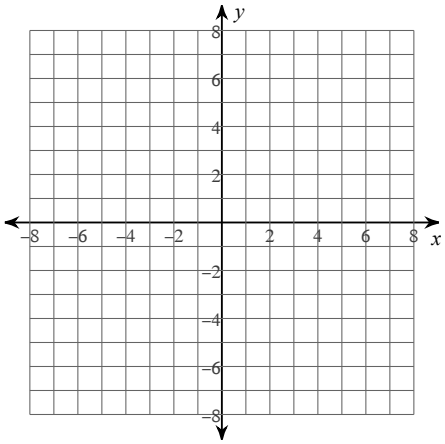
253) $x = -8y^2 + 48y - 77$



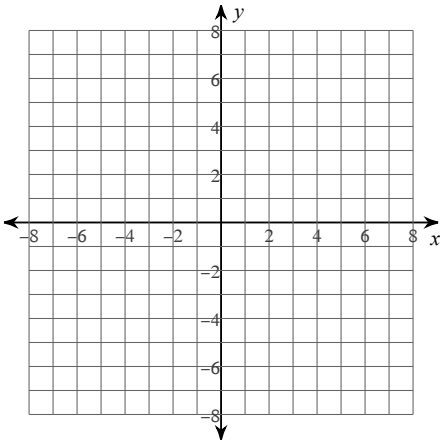
254) $y = 3x^2 + 24x + 44$



255) $x = -y^2 - 10y - 30$



256) $y = -x^2 - 8x - 19$



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

257) Vertex at origin, Focus: $\left(0, \frac{1}{2}\right)$

258) Vertex at origin, Focus: $\left(0, \frac{1}{16}\right)$

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

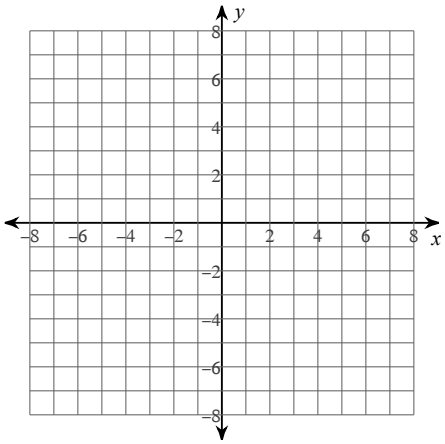
260) Vertex: $(-4, 7)$, Directrix: $x = -\frac{17}{4}$

261) Vertex: $(7, -4)$, Directrix: $x = \frac{141}{20}$

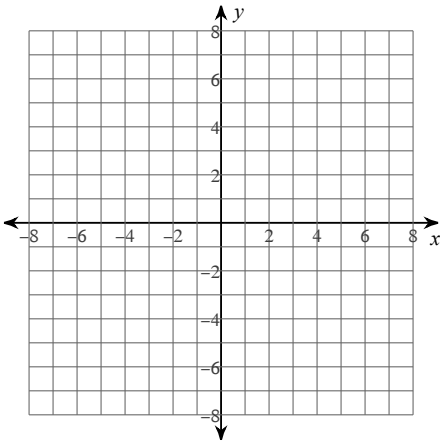
262) Vertex: $(0, 0)$, Directrix: $x = -\frac{1}{4}$

Graph each function.

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

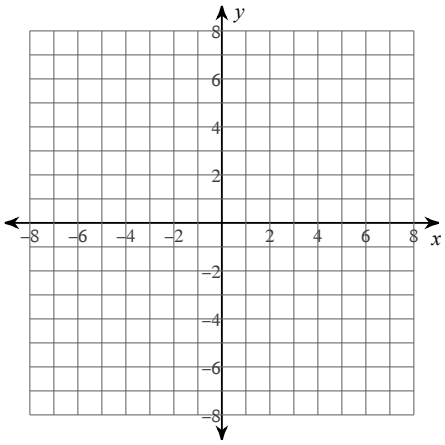


264) $f(x) = \frac{2}{x+3} + 1$

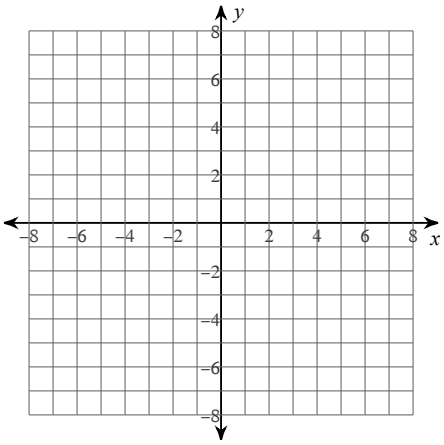


Identify the holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

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



266) $f(x) = \frac{x^3 + 5x^2 + 6x}{x^3 + 7x^2 + 12x}$



Simplify each and state the excluded values.

267) $\dfrac{10}{6r - 8}$

268) $\dfrac{r - 1}{r^2 + 4r - 5}$

269) $\dfrac{k^2 + 3k - 28}{k^2 + 3k - 28}$

270) $\dfrac{b^2 - 9b + 20}{b^2 - 8b + 15}$

Simplify each expression.

271) $\dfrac{2v}{84v^2 + 24v} + 5v$

272) $\dfrac{r + 1}{5} + \dfrac{r - 1}{r + 1}$

273) $\dfrac{8v}{3v^2 - 3v} - \dfrac{8}{3}$

274) $\dfrac{v - 8}{2v + 14} + 5$

275) $\dfrac{3m^3 - 9m^2}{3m^2} \div \dfrac{m - 3}{4}$

276) $\dfrac{r + 5}{r + 2} \div \dfrac{r^2 + r - 12}{r - 3}$

277) $\dfrac{4r^2}{8r} \cdot \dfrac{13r}{4}$

278) $\dfrac{16}{8n^2} \cdot \dfrac{12}{16n}$

279) $\dfrac{r + 8}{5r} \div \dfrac{r^2 - 2r - 24}{5r^2 - 30r}$

280) $\dfrac{n^2 - 11n + 30}{48} \cdot \dfrac{1}{n - 5}$

Solve each equation. Remember to check for extraneous solutions.

281) $\dfrac{x + 1}{x^2} + \dfrac{1}{6x} = \dfrac{1}{x}$

282) $\dfrac{1}{3n^2} - \dfrac{1}{3n} = \dfrac{4n + 8}{3n^2}$

283) $\dfrac{1}{5n^2} + \dfrac{4}{5n} = \dfrac{n - 6}{5n^2}$

284) $\dfrac{1}{3n} = \dfrac{5}{3n} - \dfrac{1}{3}$

285) $\dfrac{1}{6n} + \dfrac{n - 8}{6n} = 1$

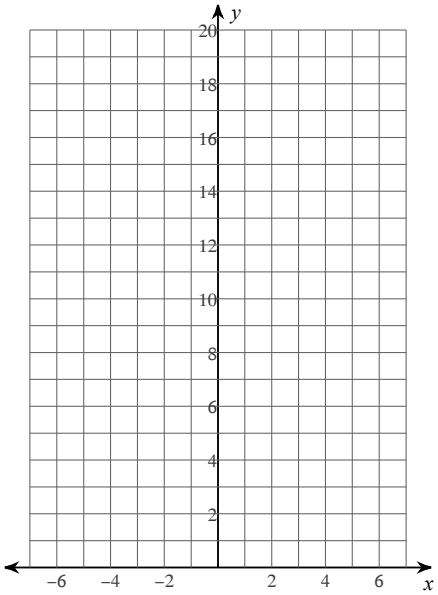
286) $\dfrac{1}{a} + \dfrac{1}{a^2 + a} = \dfrac{7}{a^2 + a}$

287) $\frac{6}{7n} - 1 = \frac{n-5}{7n}$

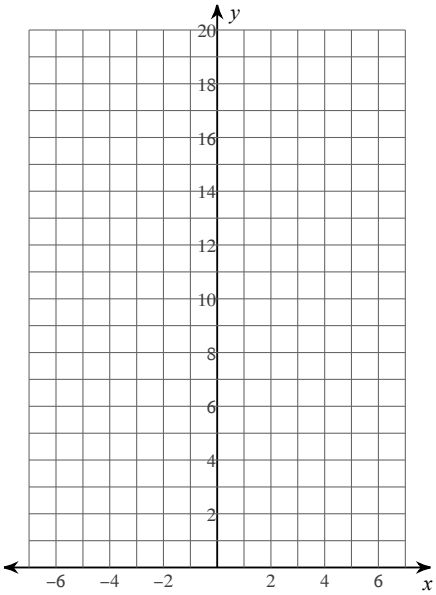
288) $\frac{1}{n} = \frac{n+6}{n^2+n} - \frac{1}{n+1}$

Sketch the graph of each function.

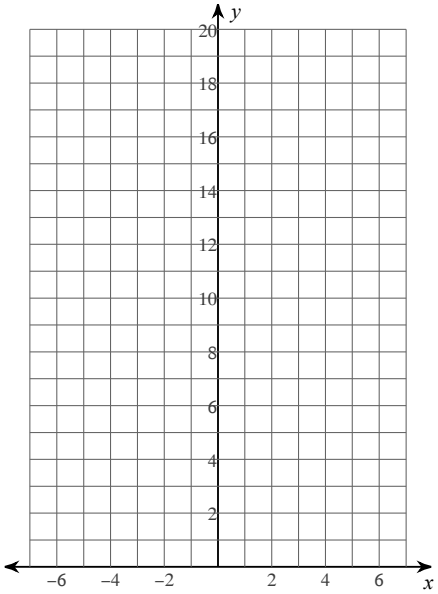
289) $y = 5 \cdot 2^x$



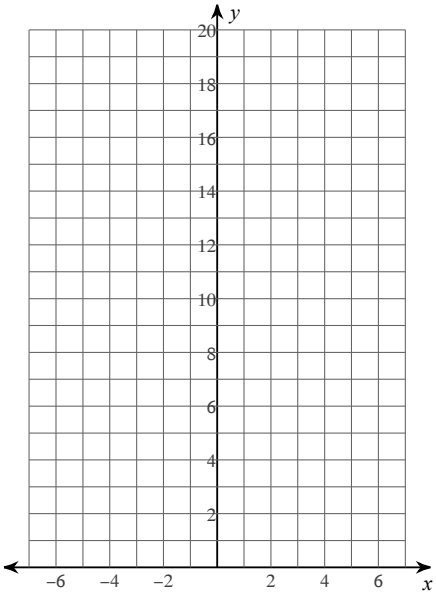
290) $y = 4 \cdot 2^x$



291) $y = \frac{1}{3} \cdot 2^x$



292) $y = 2 \cdot 2^x$



Expand each logarithm.

293) $\log \sqrt[3]{x}$

294) $\log \frac{x}{y}$

295) $\log (u \cdot v)$

296) $\log \sqrt{x}$

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

297) $\log x - \log 3 = 1$

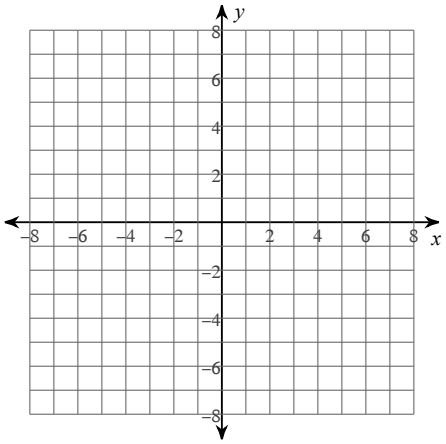
298) $\log x - \log 9 = 1$

299) $\log x - \log 4 = 1$

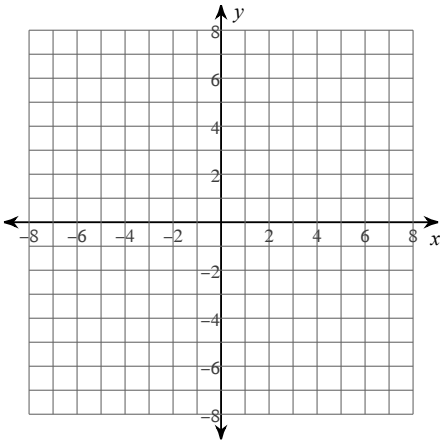
300) $\log x - \log 6 = 1$

Sketch the graph of each function.

301) $y = \log (x - 1) + 5$



302) $y = \log (x + 2) + 4$



Solve each discrete exponential growth/decay problem.

303) 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?

304) An employee receives a 2% raise once per year. If the employee's initial salary is $55,700.00, what will the employee's salary be after 5 years?

Solve each continous exponential growth/decay problem.

305) 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?

306) A savings account balance is compounded continuously. If the interest rate is 4% per year and the current balance is $1,311.00, what will the balance be 10 years from now?

Find the next three terms in each sequence.

307) 5, 7, 10, 14, 19, ...

308) −4, 12, −36, 108, −324, ...

309) −2, −6, −18, −54, −162, ...

310) −1, −2, −6, −24, −120, ...

Determine if the sequence is arithmetic. If it is, find the common difference.

311) 17, 22, 27, 32, ...

312) −13, −20, −27, −34, ...

313) −18, −25, −32, −39, ...

314) −2, −6, −18, −54, ...

Determine if the sequence is geometric. If it is, find the common ratio.

315) 1, −3, 9, −27, ...

316) 4, −12, 36, −108, ...

317) 4, −20, 100, −500, ...

318) −1, 6, −36, 216, ...

Find the missing term or terms in each arithmetic sequence.

319) ..., −6, ___, −16, ...

320) ..., 26, ___, −374, ...

321) ..., −38, ___, −34, ...

322) ..., −24, ___, −14, ...

Rewrite each series as a sum.

323) $\sum_{k=1}^{5} (100 - k^2)$

324) $\sum_{n=1}^{5} (500 - n)$

325) $\sum_{n=1}^{6} 5n^2$

326) $\sum_{k=1}^{4} (300 - k^2)$

Evaluate the related series of each sequence.

327) 14, 19, 24, 29

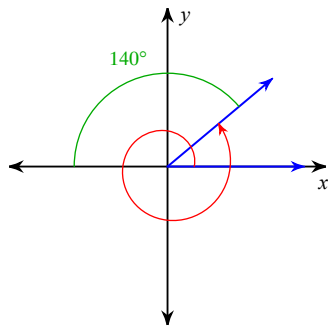
328) 19, 25, 31, 37, 43

329) −1, 5, −25, 125

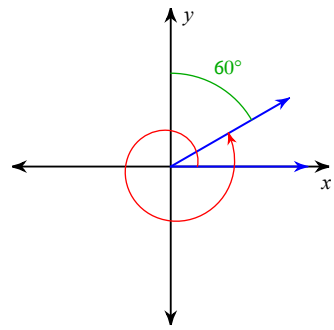
330) −4, −16, −64, −256

Find the measure of each angle.

331)



332)



Convert each degree measure into radians.

333) 120°

334) 60°

335) 150°

336) 225°

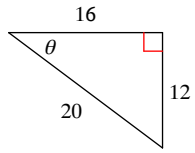
Convert each degree measure into radians and each radian measure into degrees.

337) $\frac{4\pi}{3}$

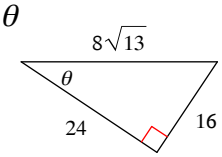
338) -60°

Find the value of the trig function indicated.

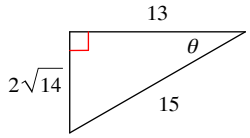
339) $\sin \theta$



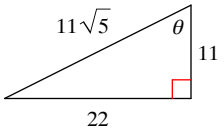
340) $\cos \theta$



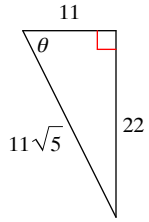
341) sin θ



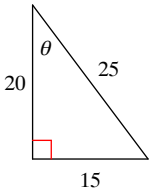
342) tan θ



343) sin θ

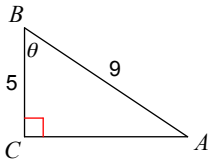


344) tan θ

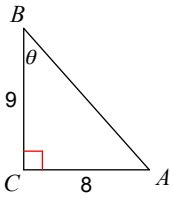


Find the measure of each angle indicated. Round to the nearest tenth.

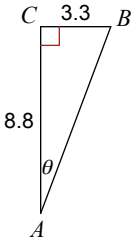
345)



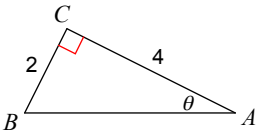
346)



347)

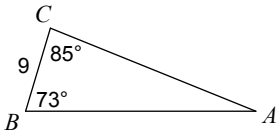


348)

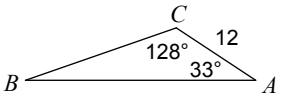


Find each measurement indicated. Round your answers to the nearest tenth.

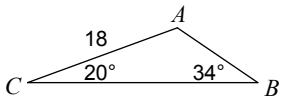
349) Find AB



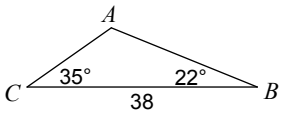
350) Find BC



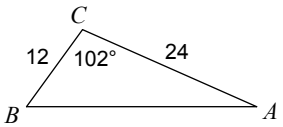
351) Find AB



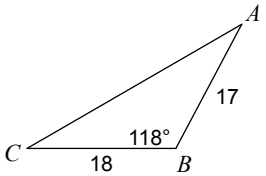
352) Find AB



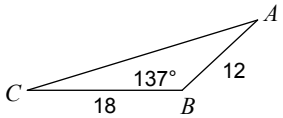
353) Find AB



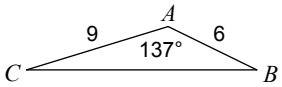
354) Find AC



355) Find AC

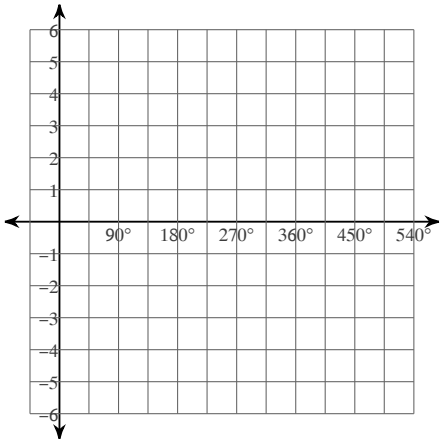


356) Find BC

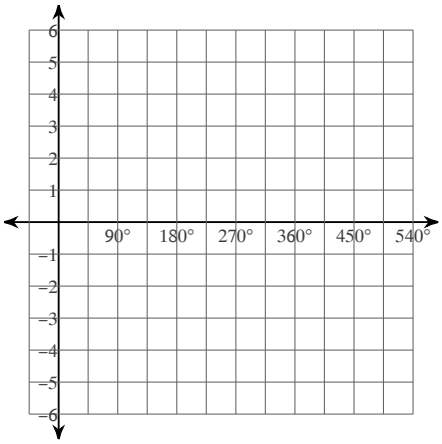


Graph each function using degrees.

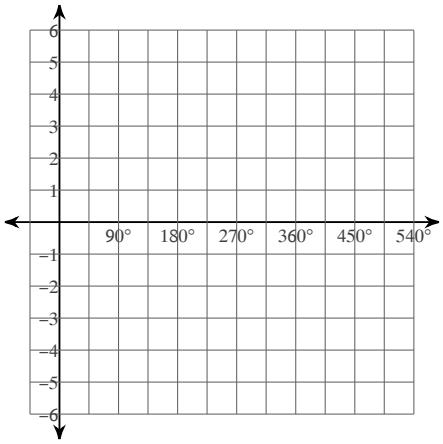
357) $y = -1 + \frac{1}{2} \cdot \sin(\theta + 120)$



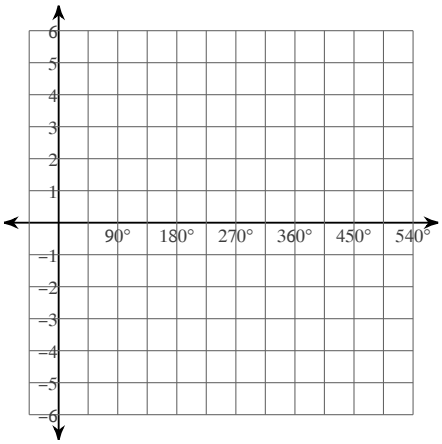
358) $y = 3\sin(\theta + 45) - 1$



359) $y = 3\sin\theta + 2$



360) $y = \frac{1}{2} \cdot \sin(\theta + 45) - 1$



Solve each equation for $0 \le \theta < 360$. Round your answers to the nearest hundredth.

361) $-0.83 = \cos\theta$

362) $\cos\theta = 1$

363) $\cos\theta = -0.12$

364) $-0.61 = \cos\theta$

Solve each equation for $0 \le \theta < 360$.

365) $1 = -3 - 8\cos\theta$

366) $3 = 2 - 2\cos\theta$

367) $\dfrac{-20 + \sqrt{2}}{5} = -4 + \dfrac{2}{5} \cdot \sin\theta$

368) $-5 - \dfrac{1}{4} \cdot \cos\theta = -\dfrac{21}{4}$

Algebra 2 Name_____ ID: 1

Assignment

Date_____ Period____

Evaluate each expression.

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

-7

2) $10 - (9 - 3) - (-10)$

14

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

16

4) $(-2)((-1) + 10 + 9)$

-36

5) $\dfrac{24 \times 2}{-6} - 1$

-9

6) $4 + 3 - 6 \times (-7)$

49

Simplify each and state the excluded values.

7) $\dfrac{2v^2 + 10v}{v^2 + 10v + 25}$

$\dfrac{2v}{v + 5}$; $\{-5\}$

8) $\dfrac{k^2 - k - 90}{k^2 - k - 90}$

1 ; $\{10, -9\}$

9) $\dfrac{63r^2 - 63r}{18r^2 - 81r}$

$\dfrac{7(r - 1)}{2r - 9}$; $\left\{0, \dfrac{9}{2}\right\}$

10) $\dfrac{18x + 42}{12x + 12}$

$\dfrac{3x + 7}{2(x + 1)}$; $\{-1\}$

11) $\dfrac{m^2 + 14m + 45}{9m^2 + 45m}$

$\dfrac{m + 9}{9m}$; $\{0, -5\}$

12) $\dfrac{9m + 54}{m^2 + 11m + 30}$

$\dfrac{9}{m + 5}$; $\{-6, -5\}$

13) $\dfrac{70x - 20}{70x + 70}$

$\dfrac{7x - 2}{7(x + 1)}$; $\{-1\}$

14) $\dfrac{n^2 - n - 90}{n^2 - 3n - 70}$

$\dfrac{n + 9}{n + 7}$; $\{10, -7\}$

Simplify.

15) $-4\sqrt[3]{189m^{10}}$

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

16) $-8\sqrt[3]{-875x^6}$

$40x^2\sqrt[3]{7}$

Solve each equation.

17) $-6(5 - 5x) + 1 = 35 - 2x$

$\{2\}$

18) $7(2k + 4) = -38 + 3k$

$\{-6\}$

19) $25 + 8n = 5(8 + n)$

$\{5\}$

20) $-2 + 5r = 4(r - 2) + 2$

$\{-4\}$

21) $-20 + 2k = -2(6k + 4) + 2k$

$\{1\}$

22) $7(n - 2) = -38 + 3n$

$\{-6\}$

23) 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.?

\$6/oz.

24) How many oz. of a metal containing 60% copper must be combined with 6 oz. of pure copper to form an alloy containing 76% copper?

9 oz.

25) 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.?

10 oz.s

26) 1 fl. oz. of an alcohol solution was mixed with 2 fl. oz. of a 54% alcohol solution to make a 42% alcohol solution. Find the percent concentration of the first solution.

18%

27) 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?

40 km/h

28) An Air Force plane and a jet left London at the same time. The planes flew in opposite directions. The jet flew 271 mph faster than the Air Force plane. After 12 hours they were 8316 mi. apart. Find the Air Force plane's speed.

211 mph

29) 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?

60 km/h

30) Kristin traveled to her friend's house and back. On the trip there she traveled 25 km/h and on the return trip she went 20 km/h. How long did the trip there take if the return trip took five hours?

4 hours

31) 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?

50 mph

32) Rob left school and drove toward the lake at an average speed of 40 mph. Kristin left sometime later driving in the opposite direction with an average speed of 80 mph. After Rob had driven for five hours they were 440 mi. apart. Find the number of hours Kristin drove.

3 hours

Solve each equation.

33) $|x - 7| = 0$

$\{7\}$

34) $|x - 7| = 11$

$\{18, -4\}$

35) $|-6 + 5b| = 0$ $\left\{\frac{6}{5}\right\}$

36) $|5 - 6x| = -1$

No solution.

Solve each inequality and graph its solution.

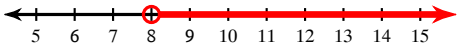
37) $-108 \le -3(6 - 6n)$

$n \ge -5$

38) $-108 < 2(8x + 2)$

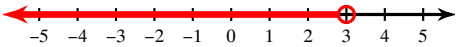
$x > -7$

39) $115 < -5(1 - 3x)$



$x > 8$

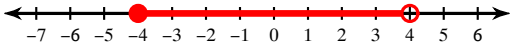
40) $-7 + 6(8 - 8x) > -103$



$x < 3$

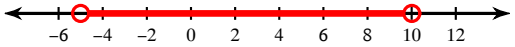
Solve each compound inequality and graph its solution.

41) $-7 > -11 + x \ge -15$



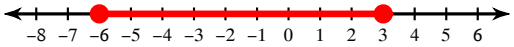
$-4 \le x < 4$

42) $-2n - 6 > -26$ and $12n - 10 > -70$



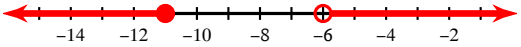
$-5 < n < 10$

43) $3p + 7 \le 16$ and $7p - 1 \ge -43$



$-6 \le p \le 3$

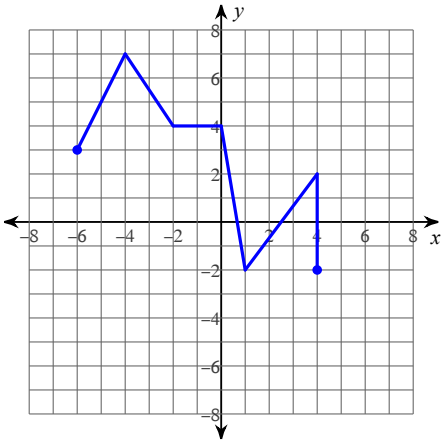
44) $-5 - 11n \ge 116$ or $-1 + n > -7$



$n \le -11$ or $n > -6$

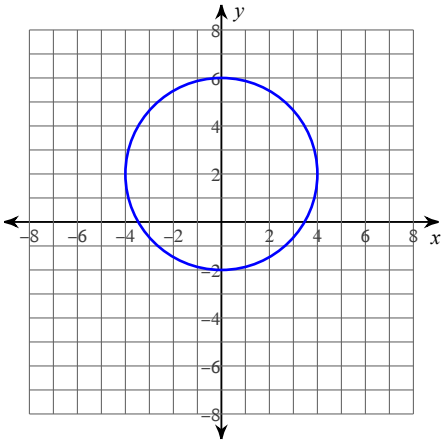
Each graph represents a relation. Determine the domain and range.

45)



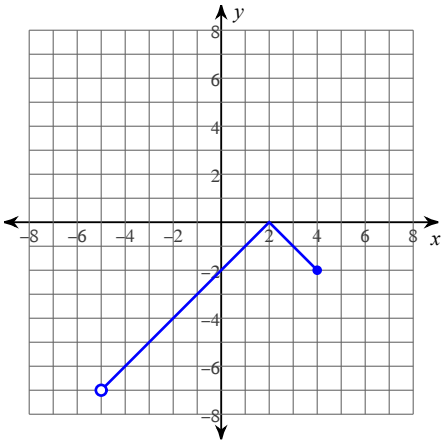
Domain: $-6 \le x \le 4$
Range: $-2 \le y \le 7$

46)



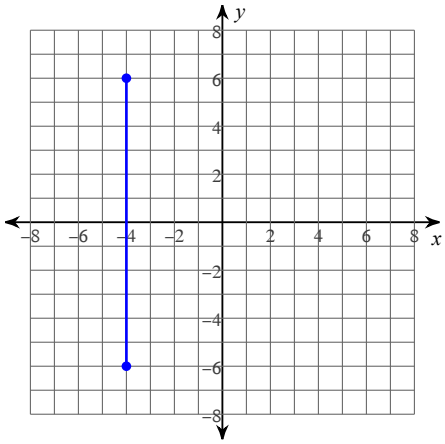
Domain: $-4 \le x \le 4$
Range: $-2 \le y \le 6$

47)



Domain: $-5 < x \le 4$
Range: $-7 < y \le 0$

48)



Domain: $x = -4$
Range: $-6 \le y \le 6$

Evaluate each function for the given value.

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

-6

50) $f(x) = 3|x-2| - 3$; Find $f\left(\frac{16}{5}\right)$

$\frac{3}{5}$

51) $f(x) = -|x-2|$; Find $f\left(-\frac{19}{3}\right)$

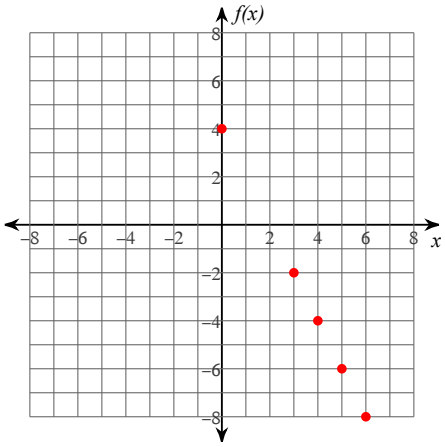
$-\frac{25}{3}$

52) $f(x) = 3|x-2| - 4$; Find $f\left(-\frac{1}{4}\right)$

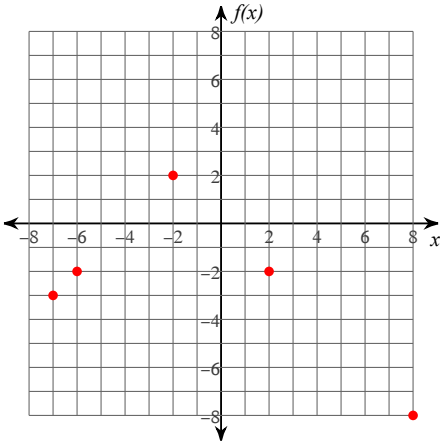
$\frac{11}{4}$

Graph each function for the given domain.

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

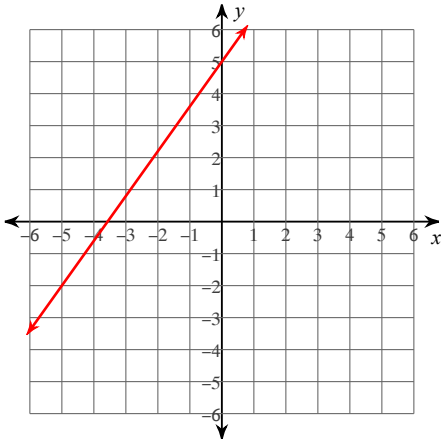


54) $f(x) = -|x+2| + 2$
Domain: $\{-7, -6, -2, 2, 8\}$

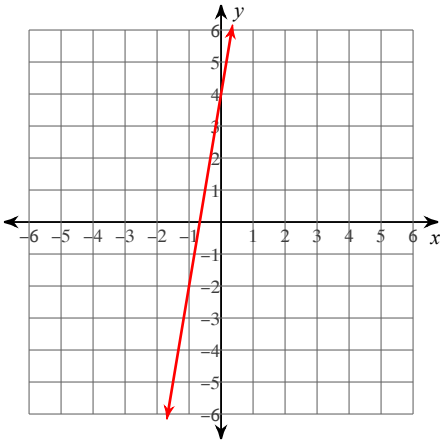


Sketch the graph of each line.

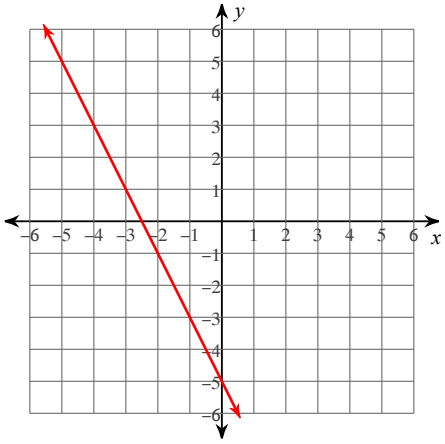
55) $y = \frac{7}{5}x + 5$



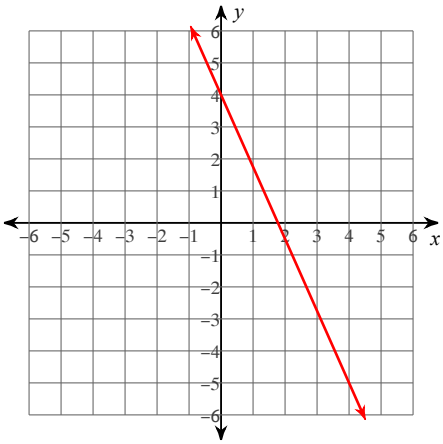
56) $y = 6x + 4$



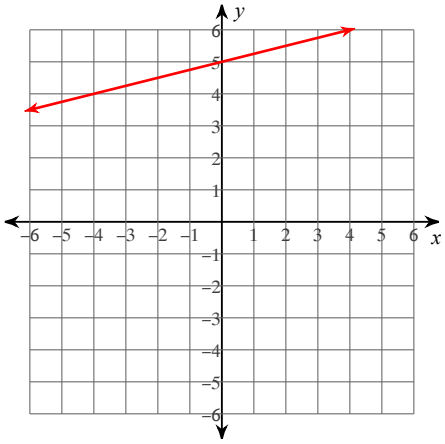
57) $y = -2x - 5$



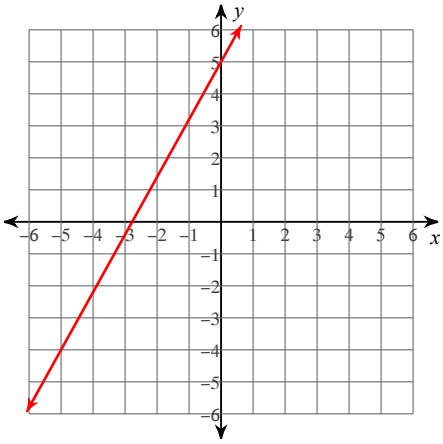
58) $y = -\frac{9}{4}x + 4$



59) $-4y + x = -20$



60) $5y - 25 - 9x = 0$



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

61) through: $(-2, -2)$, slope $= \frac{1}{2}$ $y = \frac{1}{2}x - 1$

62) through: $(-1, -5)$, slope $= 3$
$y = 3x - 2$

63) through: $(4, 1)$, slope $= \frac{2}{9}$ $y = \frac{2}{9}x + \frac{1}{9}$

64) through: $(2, 5)$, slope $= 3$
$y = 3x - 1$

65) through: $(-1, 2)$, slope $= \frac{4}{3}$ $y = \frac{4}{3}x + \frac{10}{3}$

66) through: $(1, -4)$, slope $= -1$
$y = -x - 3$

67) through: $(-3, 0)$, slope = undefined
$x = -3$

68) through: $(-3, 1)$, slope $= -\frac{5}{3}$ $y = -\frac{5}{3}x - 4$

69) through: $(5, 2)$, slope $= 0$
$y = 2$

70) through: $(-2, 2)$, slope $= -1$
$y = -x$

71) through: $(2, 3)$, slope $= 3$
$y = 3x - 3$

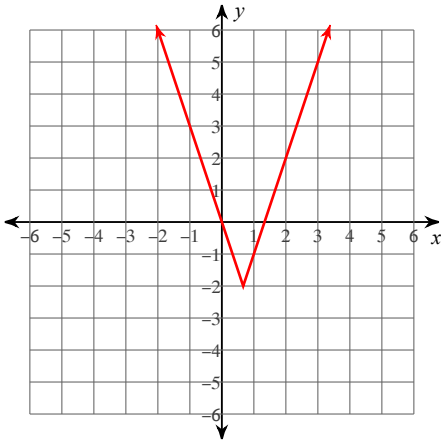
72) through: $(-3, 5)$, slope $= 0$
$y = 5$

73) through: $(-5, 1)$, slope $= -1$
$y = -x - 4$

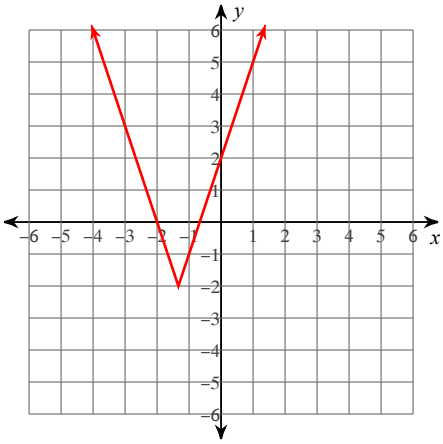
74) through: $(-2, -3)$, slope $= -\frac{1}{2}$ $y = -\frac{1}{2}x - 4$

Graph each equation.

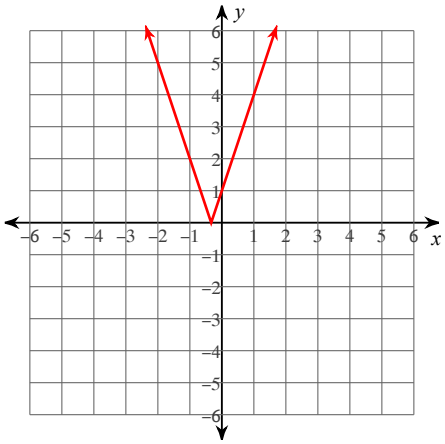
75) $y = |3x - 2| - 2$



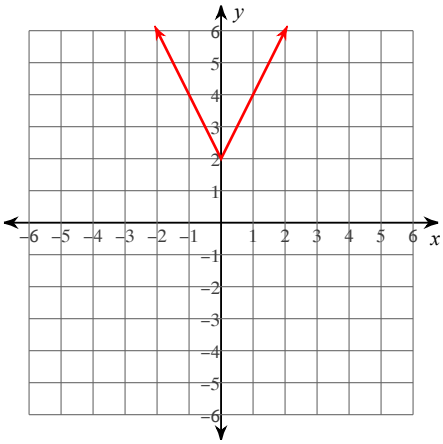
76) $y = |3x + 4| - 2$



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

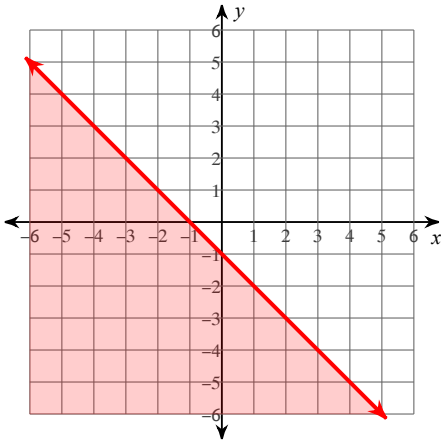


78) $y = |2x| + 2$

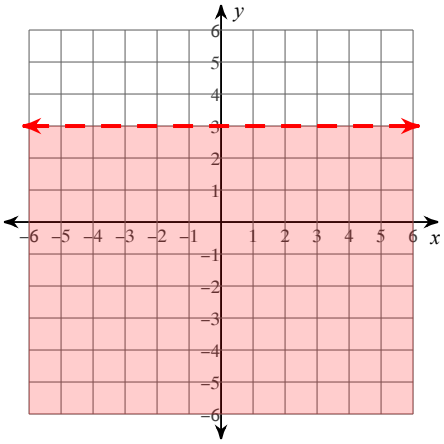


Sketch the graph of each linear inequality.

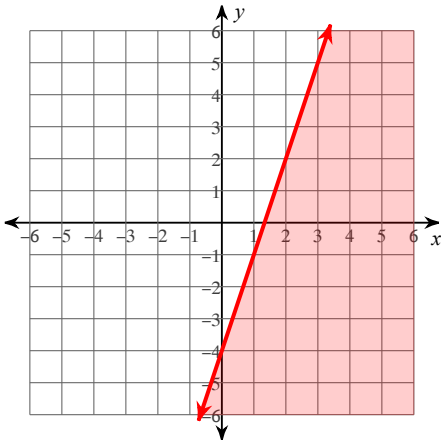
79) $y \le -x - 1$



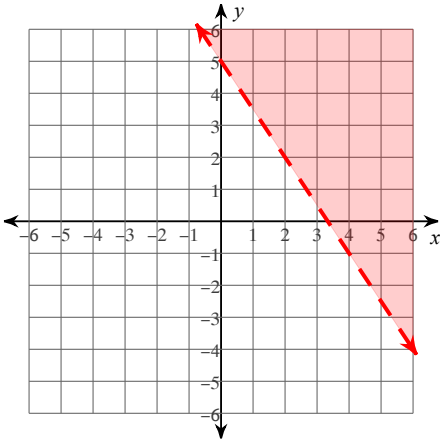
80) $y < 3$



81) $y \le 3x - 4$



82) $y > -\frac{3}{2}x + 5$



Solve each system by graphing.

83) $y = -4x + 5$
$y = -4x + 9$
No solution

84) $y = x + 4$
$y = -4x + 9$
$(1, 5)$

85) $y = -\frac{5}{7}x - 7$

$x = -7$

$(-7, -2)$

86) $y = 4x + 9$

$y = -4x - 7$

$(-2, 1)$

Solve each system by elimination.

87) $-18x + 7y = -18$

$-9x - 6y = -9$

$(1, 0)$

88) $-12x - 9y = -12$

$-6x + 5y = -6$

$(1, 0)$

89) $-3x - 4y = 28$

$-7x - 2y = 14$

$(0, -7)$

90) $-16x - 6y = -28$

$8x + 3y = 14$

Infinite number of solutions

Solve each system by graphing.

91) $y = -\frac{5}{4}x - 3$

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

$(-4, 2)$

92) $y = -\frac{5}{4}x - 3$

$y = \frac{3}{2}x + 8$

$(-4, 2)$

Solve each system by substitution.

93) $6x + 5y = -8$

$6x + y = 8$

$(2, -4)$

94) $6x + y = -6$

$-4x + 4y = 4$

$(-1, 0)$

95) $7x - 4y = -24$

$x - 2y = -2$

$(-4, -1)$

96) $-3x + y = 23$

$-6x + 2y = 46$

Infinite number of solutions

97) 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?

Van: 6, Bus: 32

98) The sum of the digits of a certain two-digit number is 12. When you reverse its digits you increase the number by 36. Find the number.

48

Simplify.

99) $(-6i)(3 - 5i) + (5i)(-3 - 7i)$

$5 - 33i$

100) $(8i)(7i) - (7i)(-5 + i)$

$-49 + 35i$

101) $(2 + 3i) - (7 - 3i)$

$-5 + 6i$

102) $(-4 + 8i)(8 + 4i)$

$-64 + 48i$

103) $(1 - 4i)(-6 + 5i)$

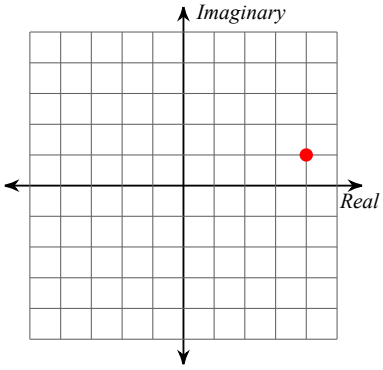
$14 + 29i$

104) $(4i)(-2 + 4i) + (8i)(3 - i)$

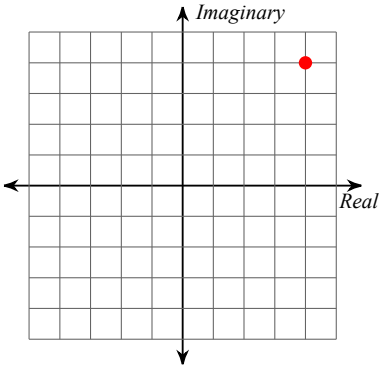
$-8 + 16i$

Graph each number in the complex plane.

105) $4 + i$



106) $4 + 4i$



Find the absolute value of each complex number.

107) $|7 - i|$

$5\sqrt{2}$

108) $|-6 + 3i|$

$3\sqrt{5}$

Simplify.

109) $\dfrac{1}{-7i}$ $\dfrac{i}{7}$

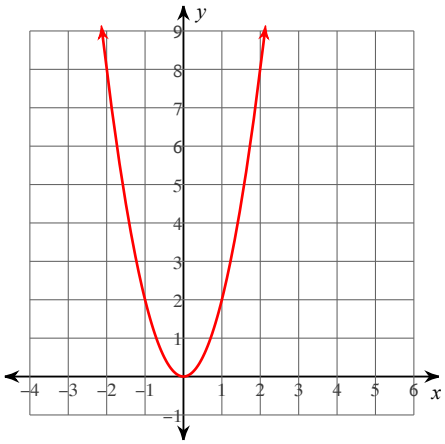
110) $\dfrac{1}{6i}$ $-\dfrac{i}{6}$

111) $\dfrac{9}{-7 + 3i}$ $\dfrac{-63 - 27i}{58}$

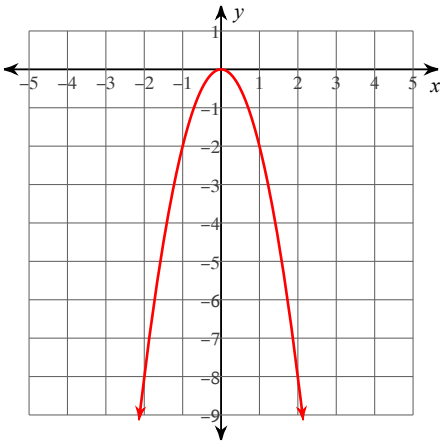
112) $\dfrac{-5 - 10i}{-2 + 3i}$ $\dfrac{-20 + 35i}{13}$

Sketch the graph of each function.

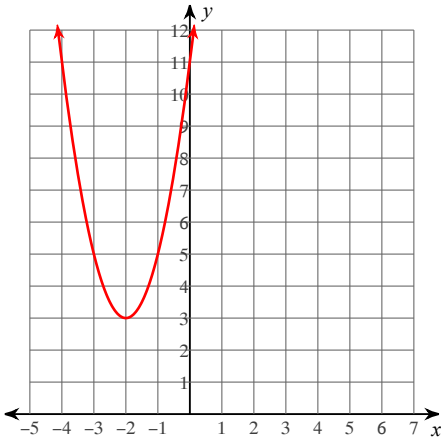
113) $y = 2x^2$



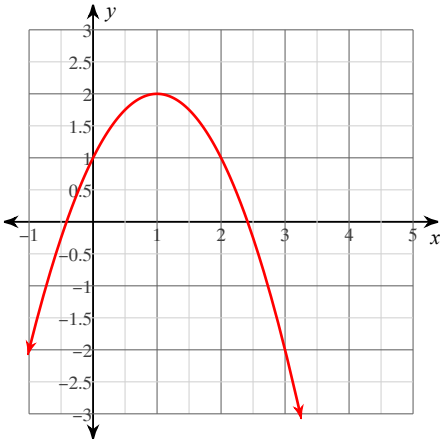
114) $y = -2x^2$



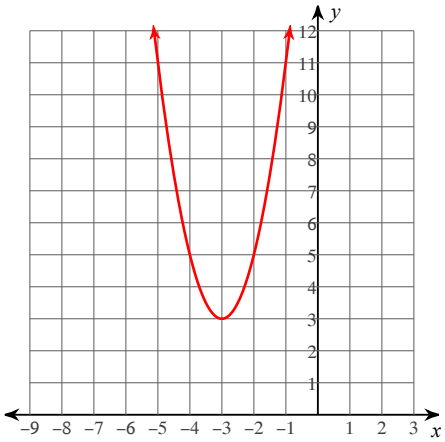
115) $y = 2x^2 + 8x + 11$



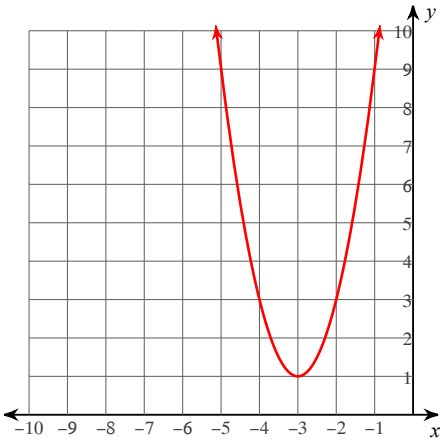
116) $y = -x^2 + 2x + 1$



117) $y = 2x^2 + 12x + 21$

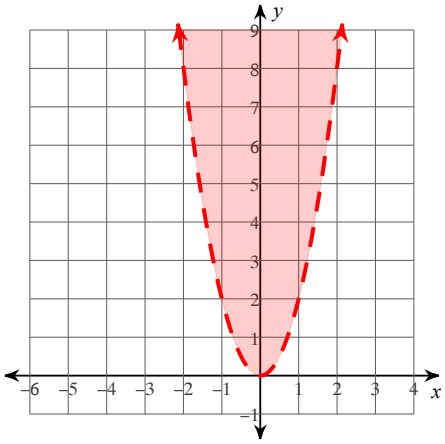


118) $y = 2x^2 + 12x + 19$

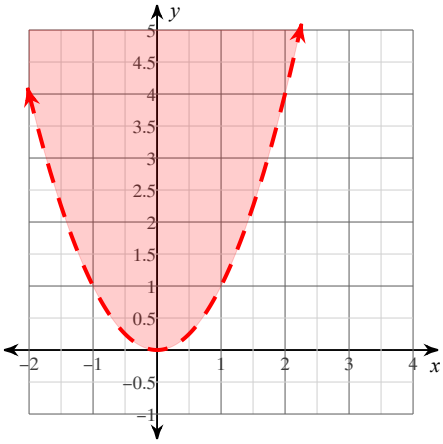


Sketch the graph of each inequality.

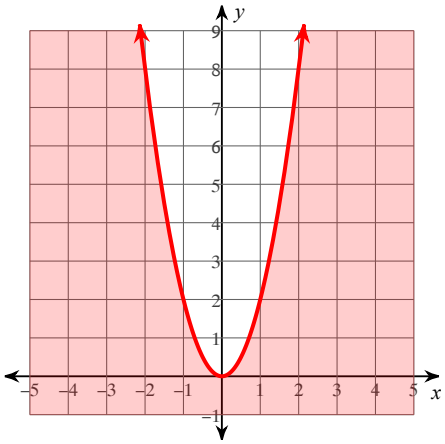
119) $y > 2x^2$



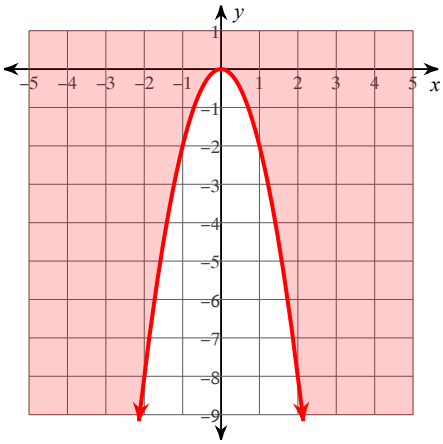
120) $y > x^2$



121) $y \le 2x^2$



122) $y \ge -2x^2$



Solve each equation by factoring.

123) $(2n + 5)(n - 3) = 0$

$\left\{-\frac{5}{2}, 3\right\}$

124) $x(3x + 1) = 0$

$\left\{-\frac{1}{3}, 0\right\}$

125) $(r+1)^2 = 0$

$\{-1\}$

126) $(r-3)(r+5) = 0$

$\{3, -5\}$

127) $a^2 = -13a - 40$

$\{-5, -8\}$

128) $m^2 - 25 = 0$

$\{5, -5\}$

129) $a^2 = -15 - 8a$

$\{-5, -3\}$

130) $5x^2 - 200 = -15x$

$\{-8, 5\}$

Solve each equation by taking square roots.

131) $7a^2 = 196$

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

132) $6n^2 = 384$

$\{8, -8\}$

133) $81n^2 - 2 = 62$ $\left\{\frac{8}{9}, -\frac{8}{9}\right\}$

134) $25p^2 - 4 = 0$ $\left\{\frac{2}{5}, -\frac{2}{5}\right\}$

Solve each equation by factoring.

135) $(b-5)(b-1) = 0$

$\{5, 1\}$

136) $(a+2)(a+4) = 0$

$\{-2, -4\}$

137) $n^2 = -49 + 14n$

$\{7\}$

138) $7b^2 = 7b$

$\{1, 0\}$

139) $v^2 = 36$

$\{6, -6\}$

140) $x^2 - 13x = -42$

$\{6, 7\}$

141) $16b^2 - 41b - 22 = 8b^2 - 4 + 4b$

$\left\{-\frac{3}{8}, 6\right\}$

142) $3x^2 - x + 6 = 8$

$\left\{-\frac{2}{3}, 1\right\}$

Solve each equation by completing the square.

143) $b^2 + 10b + 11 = 0$

$\{-1.258, -8.742\}$

144) $b^2 + 16b + 48 = 0$

$\{-4, -12\}$

145) $8p^2 - 16p - 35 = 7$

$\left\{\frac{7}{2}, -\frac{3}{2}\right\}$

146) $v^2 + 14v + 32 = 8$

$\{-2, -12\}$

Solve each equation with the quadratic formula.

147) $m^2 + 3m + 2 = 0$

$\{-1, -2\}$

148) $r^2 + 4r - 5 = 0$

$\{1, -5\}$

149) $2p^2 + 5p + 3 = 0$

$\{-1, -1.5\}$

150) $2x^2 - 4x - 6 = 0$

$\{3, -1\}$

151) $7m^2 = -1 - 5m$

$\left\{\frac{-5 + i\sqrt{3}}{14}, \frac{-5 - i\sqrt{3}}{14}\right\}$

152) $4r^2 = 49$

$\left\{\frac{7}{2}, -\frac{7}{2}\right\}$

153) $10r^2 + 1 = -6r$

$\left\{\frac{-3 + i}{10}, \frac{-3 - i}{10}\right\}$

154) $2r^2 = -9r + 56$

$\left\{\frac{7}{2}, -8\right\}$

Simplify each expression.

155) $(13n^4 + 14n^5 - 4) - (-10n^4 - 8 + 6n^5)$

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

156) $(9a^2 + 3a - 7a^3) + (-13a^4 - 8a^3 + 9a^2)$

$-13a^4 - 15a^3 + 18a^2 + 3a$

157) $(11p - 11p^2 - 2p^3) - (-13p^2 + 2p^3 + 4p)$

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

158) $(-x^3 + 3x^4 - 7x^5) - (-13x^3 - 8x^4 + 9x^5)$

$-16x^5 + 11x^4 + 12x^3$

Find each product.

159) $(-b - 8)(-7b - 7)$

$7b^2 + 63b + 56$

160) $(-5m + 2)(-m - 5)$

$5m^2 + 23m - 10$

161) $(-5m + 2)(5m - 6)$

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

162) $(-5x - 8)(-5x - 5)$

$25x^2 + 65x + 40$

163) $(4n + 1)(4n - 1)$

$16n^2 - 1$

164) $(3x - 2)^2$

$9x^2 - 12x + 4$

165) $(5v + 7)(5v - 7)$

$25v^2 - 49$

166) $(5x + 1)(5x - 1)$

$25x^2 - 1$

Find each coefficient described.

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

96

168) Coefficient of n in expansion of $(n + 4)^4$

256

Expand completely.

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

$x^8 + 12x^6 + 54x^4 + 108x^2 + 81$

170) $(4n + m)^4$

$256n^4 + 256n^3m + 96n^2m^2 + 16nm^3 + m^4$

Factor each completely.

171) $96xy + 120x + 32y^3 + 40y^2$

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

172) $40xy + 8x + 25y + 5$

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

173) $10xy + 8x - 25y^3 - 20y^2$

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

174) $448xy - 168x + 256y - 96$

$8(7x + 4)(8y - 3)$

175) $x^3 + 1$

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

176) $u^3 + 8$

$(u + 2)(u^2 - 2u + 4)$

177) $-125x^4 - 64x$

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

178) $125u^5 - 64u^2$

$u^2(5u - 4)(25u^2 + 20u + 16)$

179) $x^4 - 8x^2 + 15$

$(x^2 - 5)(x^2 - 3)$

180) $x^4 - 3x^2 - 10$

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

181) $3x^5 - 28x^3 + 49x$

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

182) $7x^4 - 57x^2 + 56$

$(7x^2 - 8)(x^2 - 7)$

183) $5m^4 - 17m^2 + 14$

$(5m^2 - 7)(m^2 - 2)$

184) $7a^5 - 39a^3 - 18a$

$a(7a^2 + 3)(a^2 - 6)$

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

185) $\sqrt{3},\ \ -2 + \sqrt{3}$

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

186) $\sqrt{3},\ \ 3 + \sqrt{7}$

$-\sqrt{3},\ \ 3 - \sqrt{7}$

187) $-1,\ \ -3 - 2i$

$-3 + 2i$

188) $-3 + \sqrt{7},\ \ -2 - i$

$-3 - \sqrt{7},\ \ -2 + i$

Evaluate each function.

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

-38

190) $f(a) = -2a$; Find $f(-10)$

20

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

6

192) $h(a) = a^3 - a^2$; Find $h(-5)$

-150

193) $h(a) = 2|2a| - 2$; Find $h(-2)$

6

194) $f(x) = x^2 + 3x$; Find $f(-2)$

-2

Perform the indicated operation.

195) $g(a) = 2a - 3$
$f(a) = 4a - 1$
Find $(g + f)(a)$

$6a - 4$

196) $h(x) = 4x - 4$
$g(x) = -x^3 + 5x$
Find $(h - g)(x)$

$x^3 - x - 4$

197) $g(x) = -x - 1$
$h(x) = 4x - 4$
Find $(g + h)(x)$

$3x - 5$

198) $h(x) = x^2 + 5x$
$g(x) = 4x$
Find $(h - g)(x)$

$x^2 + x$

Find the inverse of each function.

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

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

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

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

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

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

202) $f(x) = \sqrt[3]{x-2} + 1$

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

Simplify. Your answer should contain only positive exponents.

203) $-x^0 \cdot \left(-x^{-2}y^{-1}\right)^5$ $\frac{1}{x^{10}y^5}$

204) $\left(-u^0\right)^{-1} \cdot u^3v^5$

$-u^3v^5$

205) $\left(-a^2b^{-2}\right)^{-5} \cdot b^4$ $-\frac{b^{14}}{a^{10}}$

206) $\left(x^{-2}y^{-1}\right)^5 \cdot x$ $\frac{1}{x^9y^5}$

Simplify.

207) $\sqrt{3}\left(4 - 4\sqrt{3}\right)$

$4\sqrt{3} - 12$

208) $\sqrt{15}\left(\sqrt{10} + 2\right)$

$5\sqrt{6} + 2\sqrt{15}$

209) $\sqrt{3}\left(4\sqrt{10} + \sqrt{3}\right)$

$4\sqrt{30} + 3$

210) $\sqrt{3}\left(-2\sqrt{6} + \sqrt{2}\right)$

$-6\sqrt{2} + \sqrt{6}$

211) $3\sqrt{3} - 3\sqrt{6} + 2\sqrt{54}$

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

212) $3\sqrt{5} - 3\sqrt{3} + 2\sqrt{3}$

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

213) $3\sqrt{24} - \sqrt{5} - 3\sqrt{5}$

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

214) $3\sqrt[3]{-40} + 3\sqrt[3]{24} + 3\sqrt[3]{-3}$

$-6\sqrt[3]{5} + 3\sqrt[3]{3}$

215) $\frac{4\sqrt{3}}{3\sqrt{16}}$ $\frac{\sqrt{3}}{3}$

216) $\frac{\sqrt{3}}{5\sqrt{16}}$ $\frac{\sqrt{3}}{20}$

217) $\frac{3}{4+\sqrt{2}}$ $\frac{12 - 3\sqrt{2}}{14}$

218) $-\frac{4}{2\sqrt{3} - 4}$

$2\sqrt{3} + 4$

Write each expression in radical form.

219) $6^{\frac{1}{3}}$

$\sqrt[3]{6}$

220) $10^{\frac{7}{4}}$

$\left(\sqrt[4]{10}\right)^7$

221) $3^{\frac{1}{2}}$

$\sqrt{3}$

222) $6^{\frac{1}{2}}$

$\sqrt{6}$

Write each expression in exponential form.

223) $\sqrt{6v}$

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

224) $\left(\sqrt{2x}\right)^5$

$(2x)^{\frac{5}{2}}$

225) $\left(\sqrt[3]{a}\right)^4$

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

226) $\sqrt{10k}$

$(10k)^{\frac{1}{2}}$

Simplify.

227) $3v^0 \cdot 2v^3$

$6v^3$

228) $2n \cdot 2n^3$

$4n^4$

Simplify. Your answer should contain only positive exponents.

229) $\left(\left(-x^4\right)^{-4} \cdot -xx^2\right)^0$

1

230) $\left(\left(a^4b^0\right)^2 \cdot b^5\right)^5$

$a^{40}b^{25}$

231) $\left(uv^3 \cdot -u \cdot uv^2\right)^3$

$-u^9v^{15}$

232) $\left(-a^{-4} \cdot a^{-4}b^5\right)^{-3}$ $-\dfrac{a^{24}}{b^{15}}$

Solve each equation. Remember to check for extraneous solutions.

233) $\sqrt{-2 - 17m} = 10$

$\{-6\}$

234) $v = \sqrt{80 + 2v}$

$\{10\}$

235) $1 = \sqrt{6 - x}$

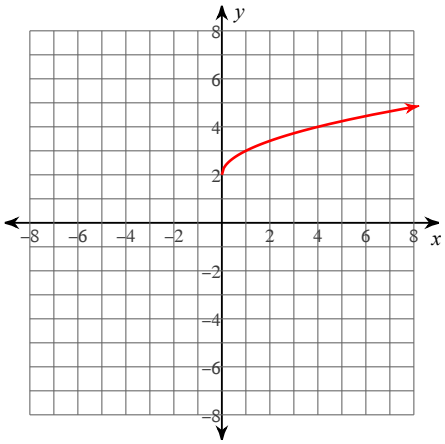
$\{5\}$

236) $\sqrt{\dfrac{n}{4}} = \sqrt{90 - 2n}$

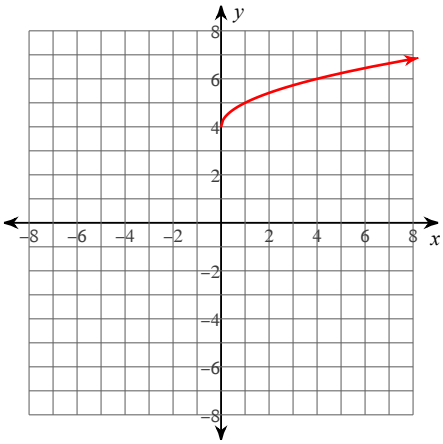
$\{40\}$

Sketch the graph of each function.

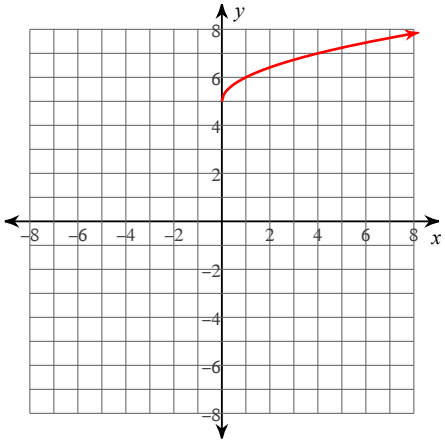
237) $y = \sqrt{x} + 2$



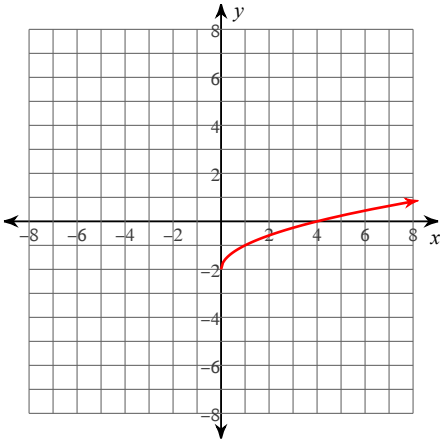
238) $y = \sqrt{x} + 4$



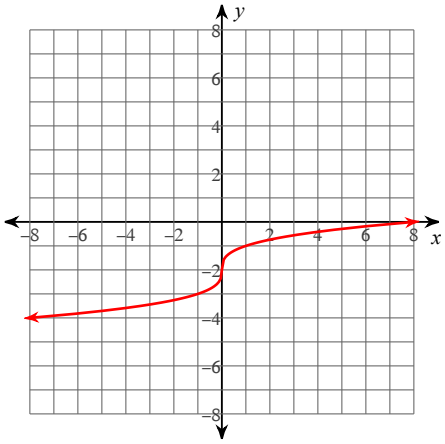
239) $y = \sqrt{x} + 5$



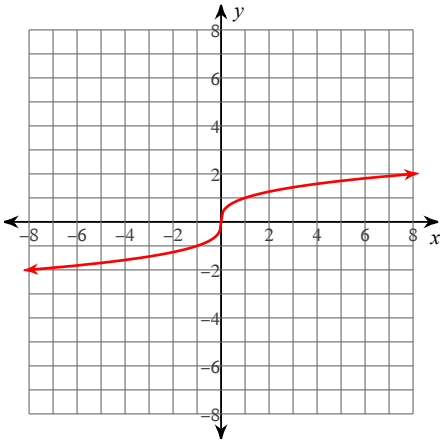
240) $y = \sqrt{x} - 2$



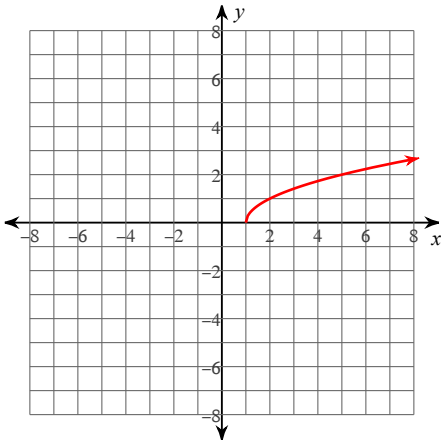
241) $y = \sqrt[3]{x} - 2$



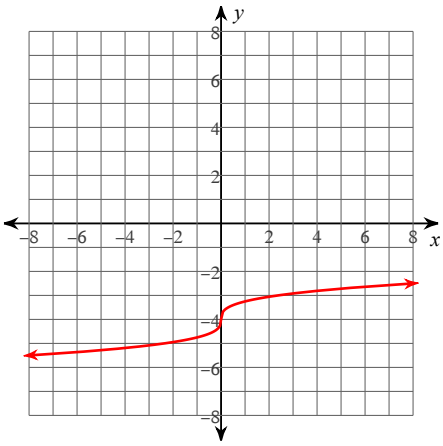
242) $y = \sqrt[3]{x}$



243) $y = \sqrt{x - 1}$



244) $y = -4 + \frac{3}{4}\sqrt[3]{x}$



Identify the domain and range of each.

245) $y = \sqrt{x - 2}$

Domain: $x \geq 2$
Range: $y \geq 0$

246) $y = \sqrt{x} - 3$

Domain: $x \geq 0$
Range: $y \geq -3$

247) $y = \sqrt{x}$

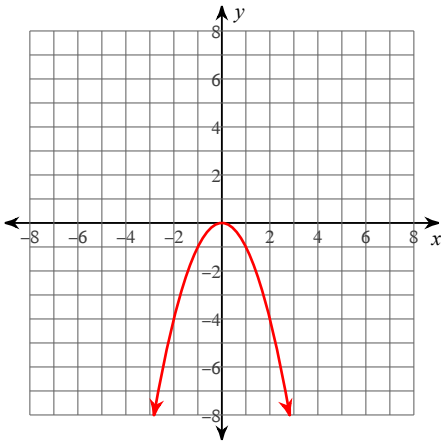
Domain: $x \geq 0$
Range: $y \geq 0$

248) $y = \sqrt{x} + 3$

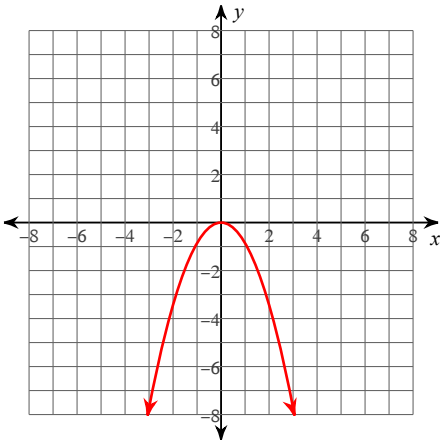
Domain: $x \geq 0$
Range: $y \geq 3$

Graph each equation.

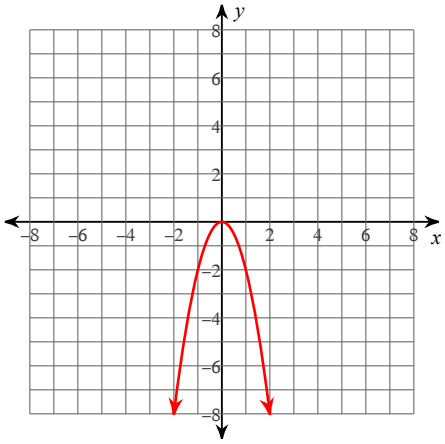
249) $y = -x^2$



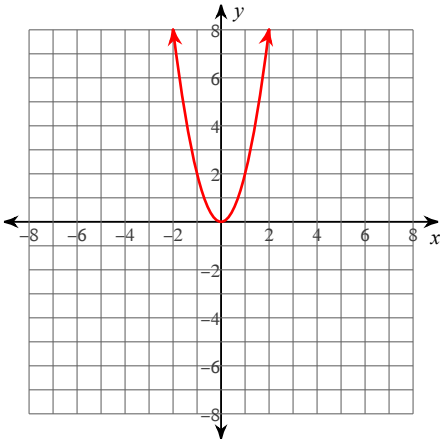
250) $y = -\frac{6}{7}x^2$



251) $y = -2x^2$

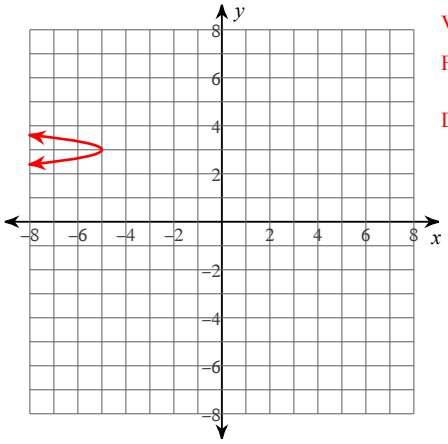


252) $y = 2x^2$



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

253) $x = -8y^2 + 48y - 77$

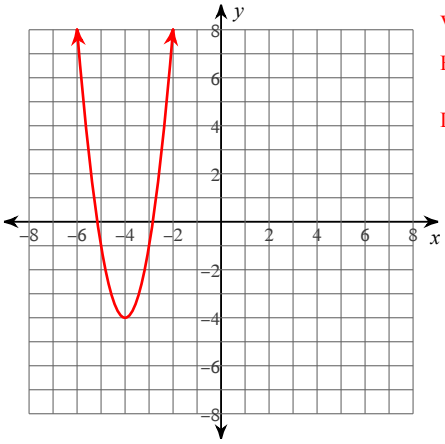


Vertex: $(-5, 3)$

Focus: $\left(-\frac{161}{32}, 3\right)$

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

254) $y = 3x^2 + 24x + 44$

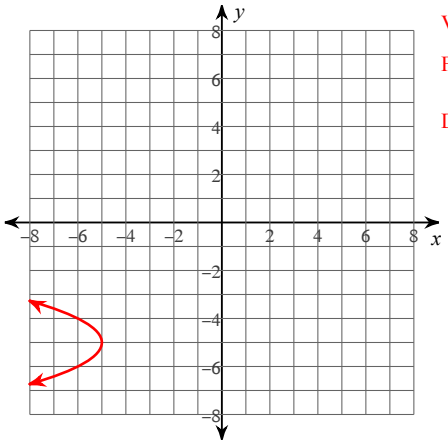


Vertex: $(-4, -4)$

Focus: $\left(-4, -\frac{47}{12}\right)$

Directrix: $y = -\frac{49}{12}$

255) $x = -y^2 - 10y - 30$

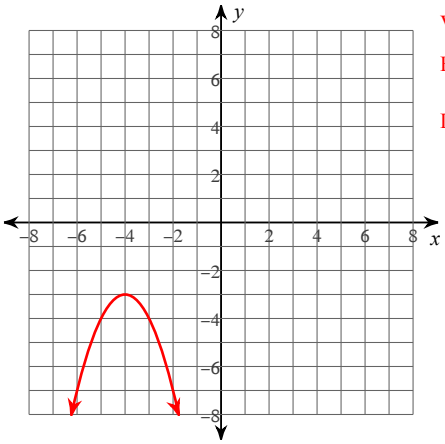


Vertex: $(-5, -5)$

Focus: $\left(-\frac{21}{4}, -5\right)$

Directrix: $x = -\frac{19}{4}$

256) $y = -x^2 - 8x - 19$



Vertex: $(-4, -3)$

Focus: $\left(-4, -\frac{13}{4}\right)$

Directrix: $y = -\frac{11}{4}$

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

257) Vertex at origin, Focus: $\left(0, \frac{1}{2}\right)$

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

258) Vertex at origin, Focus: $\left(0, \frac{1}{16}\right)$

$y = 4x^2$

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

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

260) Vertex: $(-4, 7)$, Directrix: $x = -\frac{17}{4}$

$x = (y - 7)^2 - 4$

261) Vertex: $(7, -4)$, Directrix: $x = \frac{141}{20}$

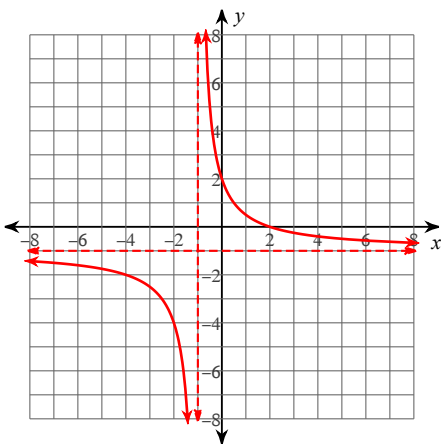
$x = -5(y + 4)^2 + 7$

262) Vertex: $(0, 0)$, Directrix: $x = -\frac{1}{4}$

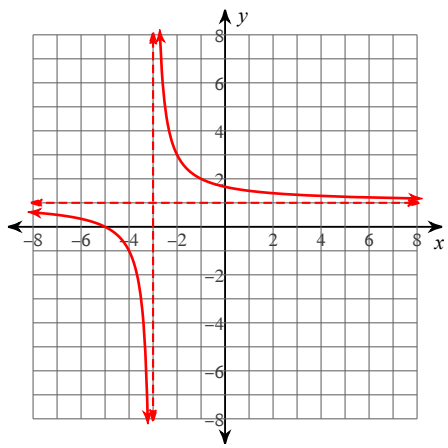
$x = y^2$

Graph each function.

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

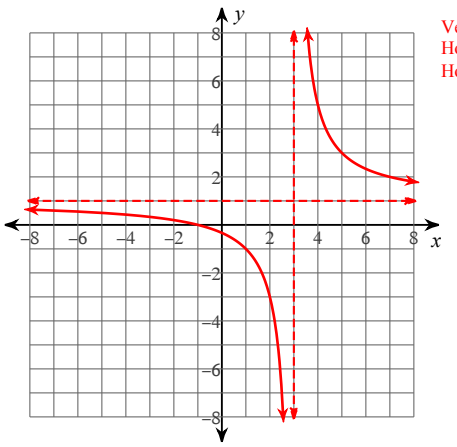


264) $f(x) = \frac{2}{x + 3} + 1$



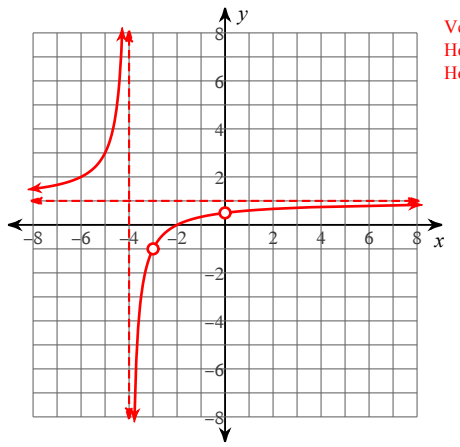
Identify the holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

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



Vertical Asym.: $x = 3$
Holes: None
Horz. Asym.: $y = 1$

266) $f(x) = \frac{x^3 + 5x^2 + 6x}{x^3 + 7x^2 + 12x}$



Vertical Asym.: $x = -4$
Holes: $x = -3$, $x = 0$
Horz. Asym.: $y = 1$

Simplify each and state the excluded values.

267) $\dfrac{10}{6r-8}$

$\dfrac{5}{3r-4}$; $\left\{\dfrac{4}{3}\right\}$

268) $\dfrac{r-1}{r^2+4r-5}$

$\dfrac{1}{r+5}$; $\{1, -5\}$

269) $\dfrac{k^2+3k-28}{k^2+3k-28}$

1 ; $\{4, -7\}$

270) $\dfrac{b^2-9b+20}{b^2-8b+15}$

$\dfrac{b-4}{b-3}$; $\{5, 3\}$

Simplify each expression.

271) $\dfrac{2v}{84v^2+24v}+5v$

$\dfrac{210v^2+60v+1}{6(7v+2)}$

272) $\dfrac{r+1}{5}+\dfrac{r-1}{r+1}$

$\dfrac{r^2+7r-4}{5(r+1)}$

273) $\dfrac{8v}{3v^2-3v}-\dfrac{8}{3}$

$\dfrac{16-8v}{3(v-1)}$

274) $\dfrac{v-8}{2v+14}+5$

$\dfrac{11v+62}{2(v+7)}$

275) $\dfrac{3m^3-9m^2}{3m^2}\div\dfrac{m-3}{4}$

4

276) $\dfrac{r+5}{r+2}\div\dfrac{r^2+r-12}{r-3}$ $\dfrac{r+5}{(r+2)(r+4)}$

277) $\dfrac{4r^2}{8r}\cdot\dfrac{13r}{4}$ $\dfrac{13r^2}{8}$

278) $\dfrac{16}{8n^2}\cdot\dfrac{12}{16n}$ $\dfrac{3}{2n^3}$

279) $\dfrac{r+8}{5r}\div\dfrac{r^2-2r-24}{5r^2-30r}$ $\dfrac{r+8}{r+4}$

280) $\dfrac{n^2-11n+30}{48}\cdot\dfrac{1}{n-5}$ $\dfrac{n-6}{48}$

Solve each equation. Remember to check for extraneous solutions.

281) $\dfrac{x+1}{x^2}+\dfrac{1}{6x}=\dfrac{1}{x}$

$\{-6\}$

282) $\dfrac{1}{3n^2}-\dfrac{1}{3n}=\dfrac{4n+8}{3n^2}$ $\left\{-\dfrac{7}{5}\right\}$

283) $\dfrac{1}{5n^2}+\dfrac{4}{5n}=\dfrac{n-6}{5n^2}$ $\left\{-\dfrac{7}{3}\right\}$

284) $\dfrac{1}{3n}=\dfrac{5}{3n}-\dfrac{1}{3}$

$\{4\}$

285) $\dfrac{1}{6n}+\dfrac{n-8}{6n}=1$ $\left\{-\dfrac{7}{5}\right\}$

286) $\dfrac{1}{a}+\dfrac{1}{a^2+a}=\dfrac{7}{a^2+a}$

$\{5\}$

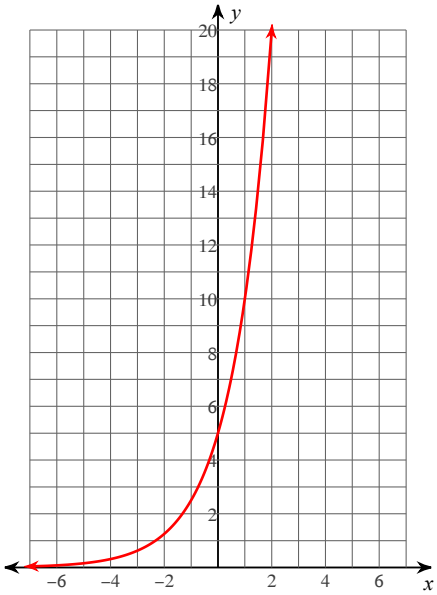
287) $\frac{6}{7n} - 1 = \frac{n-5}{7n}$ $\left\{\frac{11}{8}\right\}$

288) $\frac{1}{n} = \frac{n+6}{n^2+n} - \frac{1}{n+1}$

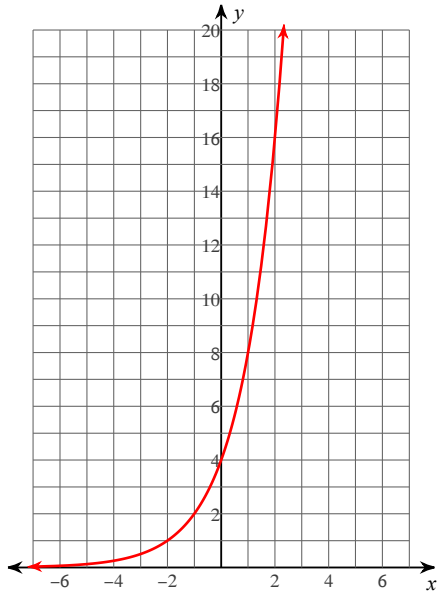
$\{5\}$

Sketch the graph of each function.

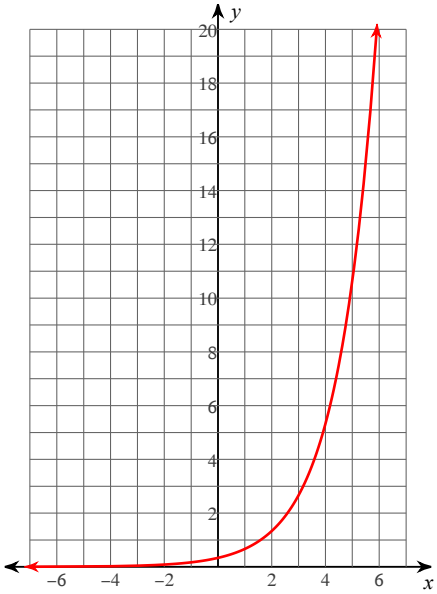
289) $y = 5 \cdot 2^x$



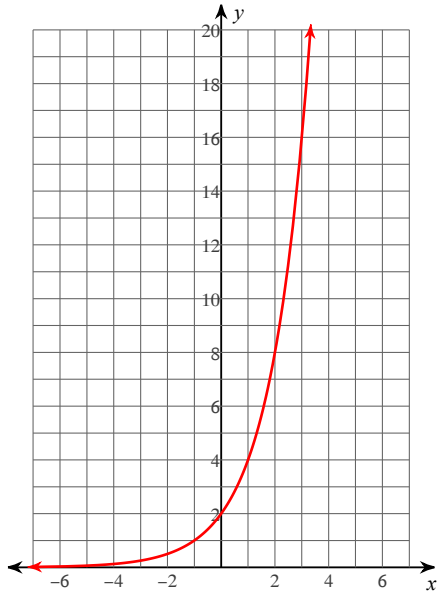
290) $y = 4 \cdot 2^x$



291) $y = \frac{1}{3} \cdot 2^x$



292) $y = 2 \cdot 2^x$



Expand each logarithm.

293) $\log \sqrt[3]{x}$

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

294) $\log \frac{x}{y}$

$\log x - \log y$

295) $\log(u \cdot v)$

$\log u + \log v$

296) $\log \sqrt{x}$

$\frac{\log x}{2}$

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

297) $\log x - \log 3 = 1$

$\{30\}$

298) $\log x - \log 9 = 1$

$\{90\}$

299) $\log x - \log 4 = 1$

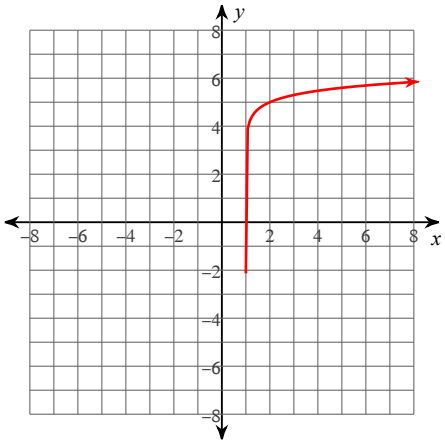
$\{40\}$

300) $\log x - \log 6 = 1$

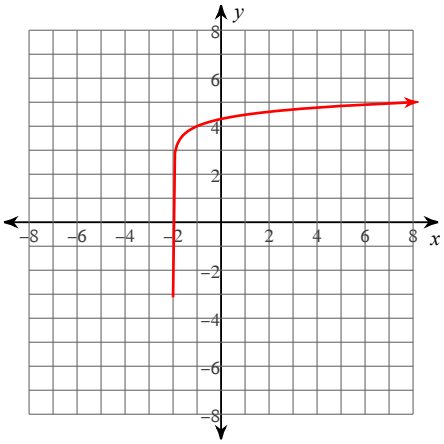
$\{60\}$

Sketch the graph of each function.

301) $y = \log(x - 1) + 5$



302) $y = \log(x + 2) + 4$



Solve each discrete exponential growth/decay problem.

303) 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?

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

304) An employee receives a 2% raise once per year. If the employee's initial salary is \$55,700.00, what will the employee's salary be after 5 years?

$55700 \cdot 1.02^5 \approx \$61,497.30$

Solve each continous exponential growth/decay problem.

305) 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?

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

306) A savings account balance is compounded continuously. If the interest rate is 4% per year and the current balance is $1,311.00, what will the balance be 10 years from now?

$1311e^{0.04 \cdot 10} \approx \$1,955.78$

Find the next three terms in each sequence.

307) 5, 7, 10, 14, 19, ...

25, 32, 40

308) −4, 12, −36, 108, −324, ...

972, −2916, 8748

309) −2, −6, −18, −54, −162, ...

−486, −1458, −4374

310) −1, −2, −6, −24, −120, ...

−720, −5040, −40320

Determine if the sequence is arithmetic. If it is, find the common difference.

311) 17, 22, 27, 32, ...

$d = 5$

312) −13, −20, −27, −34, ...

$d = -7$

313) −18, −25, −32, −39, ...

$d = -7$

314) −2, −6, −18, −54, ...

Not arithmetic

Determine if the sequence is geometric. If it is, find the common ratio.

315) 1, −3, 9, −27, ...

$r = -3$

316) 4, −12, 36, −108, ...

$r = -3$

317) 4, −20, 100, −500, ...

$r = -5$

318) −1, 6, −36, 216, ...

$r = -6$

Find the missing term or terms in each arithmetic sequence.

319) ..., −6, ___, −16, ...

−11

320) ..., 26, ___, −374, ...

−174

321) ..., −38, ___, −34, ...

−36

322) ..., −24, ___, −14, ...

−19

Rewrite each series as a sum.

323) $\sum_{k=1}^{5} (100 - k^2)$

99 + 96 + 91 + 84 + 75

324) $\sum_{n=1}^{5} (500 - n)$

499 + 498 + 497 + 496 + 495

325) $\sum_{n=1}^{6} 5n^2$

5 + 20 + 45 + 80 + 125 + 180

326) $\sum_{k=1}^{4} (300 - k^2)$

299 + 296 + 291 + 284

Evaluate the related series of each sequence.

327) 14, 19, 24, 29

86

328) 19, 25, 31, 37, 43

155

329) −1, 5, −25, 125

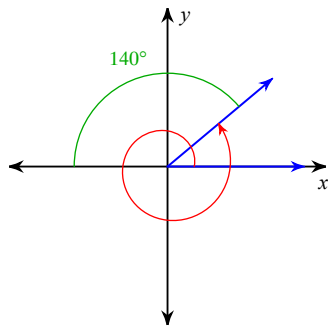
104

330) −4, −16, −64, −256

−340

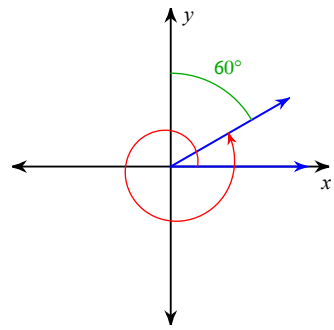
Find the measure of each angle.

331)



400°

332)



390°

Convert each degree measure into radians.

333) 120° $\frac{2\pi}{3}$

334) 60° $\frac{\pi}{3}$

335) 150° $\frac{5\pi}{6}$

336) 225° $\frac{5\pi}{4}$

Convert each degree measure into radians and each radian measure into degrees.

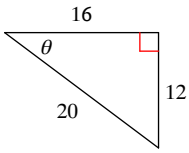
337) $\frac{4\pi}{3}$

240°

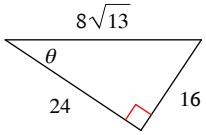
338) -60° $-\frac{\pi}{3}$

Find the value of the trig function indicated.

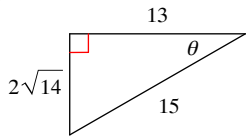
339) sin θ $\frac{3}{5}$



340) cos θ $\frac{3\sqrt{13}}{13}$

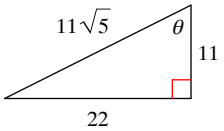


341) $\sin\theta$



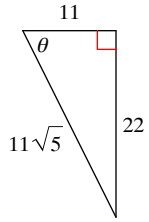
$\frac{2\sqrt{14}}{15}$

342) $\tan\theta$



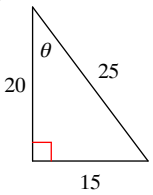
2

343) $\sin\theta$



$\frac{2\sqrt{5}}{5}$

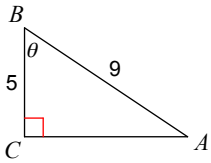
344) $\tan\theta$



$\frac{3}{4}$

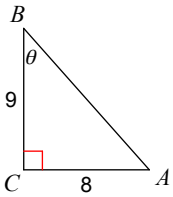
Find the measure of each angle indicated. Round to the nearest tenth.

345)



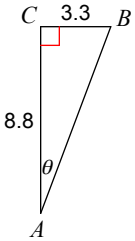
56.3°

346)



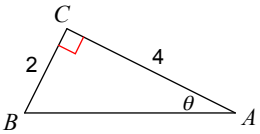
41.6°

347)



20.6°

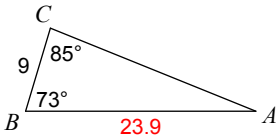
348)



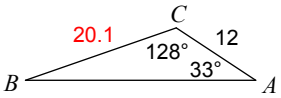
26.6°

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

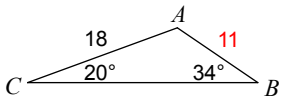
349) Find AB



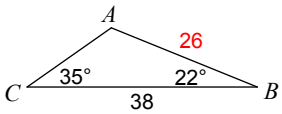
350) Find BC



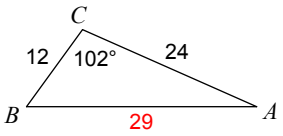
351) Find AB



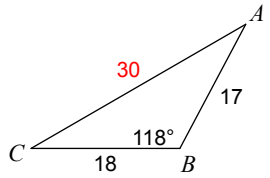
352) Find AB



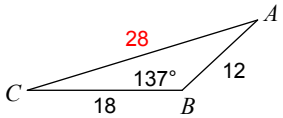
353) Find AB



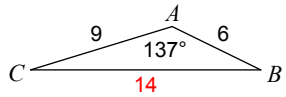
354) Find AC



355) Find AC

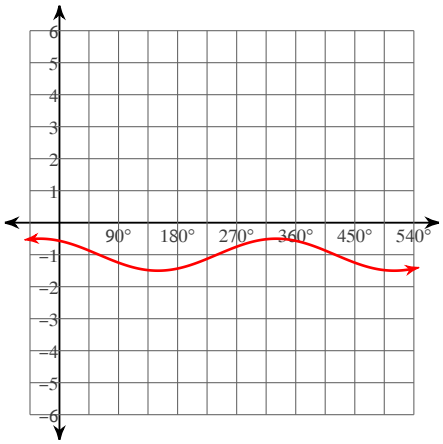


356) Find BC

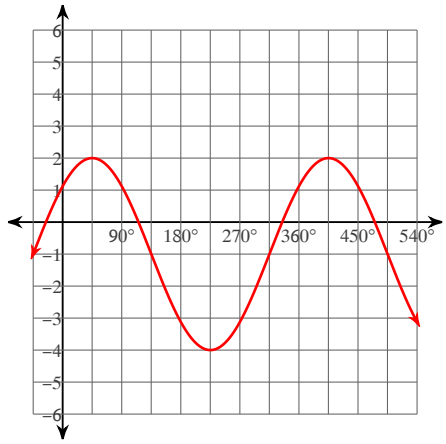


Graph each function using degrees.

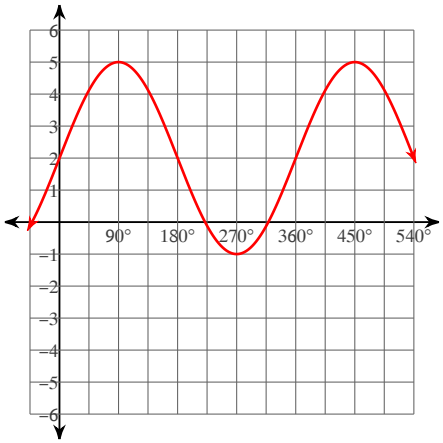
357) $y = -1 + \frac{1}{2} \cdot \sin(\theta + 120)$



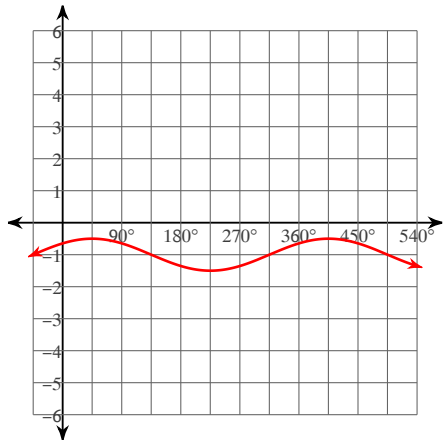
358) $y = 3\sin(\theta + 45) - 1$



359) $y = 3\sin\theta + 2$



360) $y = \frac{1}{2} \cdot \sin(\theta + 45) - 1$



Solve each equation for $0 \le \theta < 360$. Round your answers to the nearest hundredth.

361) $-0.83 = \cos\theta$

$\{146.1, 213.9\}$

362) $\cos\theta = 1$

$\{0\}$

363) $\cos\theta = -0.12$

$\{96.89, 263.11\}$

364) $-0.61 = \cos\theta$

$\{127.59, 232.41\}$

Solve each equation for $0 \le \theta < 360$.

365) $1 = -3 - 8\cos\theta$

$\{120, 240\}$

366) $3 = 2 - 2\cos\theta$

$\{120, 240\}$

367) $\dfrac{-20 + \sqrt{2}}{5} = -4 + \dfrac{2}{5} \cdot \sin\theta$

$\{45, 135\}$

368) $-5 - \dfrac{1}{4} \cdot \cos\theta = -\dfrac{21}{4}$

$\{0\}$