

Final Review Packet

Date _____ Period _____

6-1 Simplify

1) $-\sqrt{112h^2jk^4}$

2) $7\sqrt{20uv^3}$

3) $5\sqrt[3]{1000}$

4) $3\sqrt{80}$

6-2: Multiply

5) $\sqrt{3} \cdot \sqrt{10}$

6) $\sqrt{10} \cdot \sqrt{5}$

7) $\sqrt[3]{64} \cdot -2\sqrt[3]{20}$

8) $\sqrt[3]{-5} \cdot \sqrt[3]{75}$

Divide- simplify first

9) $\frac{3\sqrt{6}}{3\sqrt{25}}$

10) $\frac{\sqrt{10}}{\sqrt{32}}$

11) $\frac{4\sqrt{25}}{2\sqrt{16}}$

12) $\frac{\sqrt{5}}{3\sqrt{80}}$

Divide- Multiply to get rid of the radical in the denominator

13) $\frac{\sqrt{2n^4 + 3}}{3\sqrt{8n^2}}$

14) $\frac{-1 + 3\sqrt{3x^4}}{3\sqrt{12x^3}}$

15) $\frac{-3k + \sqrt{k^3}}{\sqrt{12k^2}}$

16) $\frac{3 - \sqrt{3x^2}}{2\sqrt{17x}}$

Divide- Multiply by the conjugate

17) $\frac{\sqrt{3}}{4 - 5\sqrt{5}}$

18) $\frac{3\sqrt{5}}{4\sqrt{2} - 3\sqrt{3}}$

19) $\frac{2}{-3 + 4\sqrt{3}}$

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

6-3 Adding and Subtracting

21) $-3\sqrt{3} + 3\sqrt{8} + 3\sqrt{18}$

22) $2\sqrt{8} - 3\sqrt{2} - 2\sqrt{24}$

23) $-3\sqrt[3]{2} - 2\sqrt[3]{108} + 2\sqrt[3]{2}$

24) $2\sqrt{24} - \sqrt{54} - 2\sqrt{6}$

Multiply

25) $3\sqrt{3}(\sqrt{2} - \sqrt{10})$

26) $\sqrt{15}(4 + \sqrt{6})$

27) $\sqrt{6}(4 + \sqrt{2})$

28) $\sqrt{10}(\sqrt{10} + \sqrt{2})$

FOIL

29) $(-2 - 4\sqrt{2})(5 + \sqrt{2})$

30) $(-5\sqrt{2} + \sqrt{5})(\sqrt{4} + \sqrt{5})$

31) $(5\sqrt{2} - 5\sqrt{3})(\sqrt{2} + \sqrt{5})$

32) $(-4\sqrt{3} - \sqrt{2})(\sqrt{4} + \sqrt{2})$

6-4 Write each expression in radical form.

33) $(2v)^{\frac{7}{6}}$

34) $(6x)^{\frac{1}{2}}$

35) $(6x)^{\frac{4}{3}}$

36) $(5k)^{\frac{5}{4}}$

Write each expression in exponential form.

37) $(\sqrt[4]{k})^5$

38) $(\sqrt{6x})^3$

39) $(\sqrt[4]{2b})^7$

40) $(\sqrt[3]{10n})^5$

Simplify.

41) $(b^{12})^{\frac{1}{4}}$

42) $(216b^3)^{\frac{1}{3}}$

43) $(4r^2)^{\frac{1}{2}}$

44) $(r^8)^{\frac{1}{4}}$

6-5 Solve each equation. Remember to check for extraneous solutions.

45) $\sqrt{a+7} = \sqrt{-1-a}$

46) $(3a-11)^{\frac{1}{2}} + 7 = 8$

47) $\sqrt{12-b} = \sqrt{2b-18}$

48) $6 = \sqrt{2m+44}$

Solve each equation.

49) $\sqrt{-63+16n} = n$

50) $(a-1)^{\frac{1}{2}} = a-3$

51) $\sqrt{4a+8} - 3 = a$

52) $n-5 = \sqrt{n-5}$

6-6: Add

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

54) $g(x) = 4x + 5$
 $h(x) = x^2 - 3x$
Find $g(x) + h(x)$

55) $g(n) = -n - 4$
 $h(n) = n + 3$
Find $g(n) + h(n)$

56) $g(n) = n - 4$
 $f(n) = 3n + 2$
Find $(g+f)(n)$

Evaluate.

57) $g(n) = 2n^3 - 5$
 $h(n) = 2n - 3$
Find $(g+h)(-1)$

58) $g(x) = 2x - 2$
 $f(x) = -2x^2 - 3$
Find $g(-1) + f(-1)$

59) $g(n) = 2n + 4$
 $h(n) = n - 4$
Find $g(-7) + h(-7)$

60) $g(x) = -2x - 3$
 $f(x) = 2x - 1$
Find $g(7) + f(7)$

Subtract

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

62) $f(t) = t^3 - 3 + 2t$
 $g(t) = 2t + 1$
Find $(f-g)(t)$

63) $h(x) = x^3 - 5x^2 + x$
 $g(x) = -x + 1$
Find $h(x) - g(x)$

64) $f(n) = 3n^2 + 5n$
 $g(n) = n + 5$
Find $(f-g)(n)$

Evaluate

65) $f(x) = x^2 + 2$
 $g(x) = -2x$
Find $(f-g)(x)$

66) $g(n) = 4n - 3$
 $f(n) = n^3 + 1$
Find $g(n) - f(n)$

67) $g(x) = x^3 - 5x$
 $f(x) = 3x - 3$
 Find $(g - f)(x)$

Multiply

69) $g(x) = 3x + 5$
 $h(x) = -x - 2$
 Find $g(x) \cdot h(x)$

71) $f(t) = 2t - 2$
 $g(t) = t - 1$
 Find $f(t) \cdot g(t)$

Evaluate

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

75) $f(t) = 2t - 4$
 $g(t) = t^3 - 1$
 Find $(f \cdot g)(t)$

Divide

77) $g(x) = x^2 - 2$
 $f(x) = 2x - 2$
 Find $g(x) \div f(x)$

79) $f(x) = 2x + 3$
 $g(x) = 3x^2 + 5x$
 Find $\left(\frac{f}{g}\right)(x)$

Evaluate

81) $f(x) = -4x - 5$
 $g(x) = 2x - 2$
 Find $\left(\frac{f}{g}\right)(-6)$

83) $g(t) = 3t$
 $h(t) = t^3 - 2$
 Find $g(-5) \div h(-5)$

Composition

85) $h(n) = n + 5$
 Find $(h \circ h)(n)$

87) $h(x) = x + 2$
 Find $h(h(x))$

Evaluate

89) $g(n) = n - 2$
 Find $(g \circ g)(-2)$

91) $g(x) = 2x - 1$
 Find $(g \circ g)(-1)$

68) $h(t) = 4t + 5$
 $g(t) = t^2 + 3$
 Find $h(t) - g(t)$

70) $f(n) = -n + 3$
 $g(n) = 2n + 4$
 Find $f(n) \cdot g(n)$

72) $f(x) = 2x + 3$
 $g(x) = 3x^3 + 5x^2$
 Find $(f \cdot g)(x)$

74) $g(x) = 4x + 1$
 $h(x) = -2x - 1$
 Find $(g \cdot h)(x)$

76) $f(x) = x^2 + x$
 $g(x) = 2x + 5$
 Find $f(x) \cdot g(x)$

78) $f(n) = n^3 + 3n^2$
 $g(n) = -n + 3$
 Find $f(n) \div g(n)$

80) $h(a) = a^2 + 3a$
 $g(a) = 4a - 2$
 Find $h(a) \div g(a)$

82) $g(x) = x^3 + 2x^2$
 $h(x) = 3x$
 Find $g(1) \div h(1)$

84) $f(n) = 4n - 1$
 $g(n) = n^2 + 2n$
 Find $f(-5) \div g(-5)$

86) $f(x) = x - 2$
 Find $f(f(x))$

88) $f(a) = 3a - 3$
 $g(a) = a - 2$
 Find $f(g(a))$

90) $g(x) = 2x + 5$
 Find $g(g(4))$

92) $h(n) = n + 1$
 $g(n) = n^3 - 4n^2$
 Find $(h \circ g)(3)$

Evaluate at an expression

93) $f(n) = 2n + 3$
 $g(n) = n^3 + 3$
 Find $f(2a) \div g(2a)$

95) $g(n) = 2n + 1$
 $h(n) = n^3 + 5n^2$
 Find $(g \circ h)\left(\frac{n}{2}\right)$

97) $h(x) = x^3 - 4$
 $g(x) = -2x + 1$
 Find $h(-3x) - g(-3x)$

99) $h(a) = 2a + 2$
 $g(a) = -2a^2 - a$
 Find $(h \cdot g)\left(\frac{a}{2}\right)$

94) $g(a) = a^3 + 4a$
 Find $(g \circ g)(-a)$

96) $g(t) = t + 4$
 $f(t) = t^3 - 4t$
 Find $\left(\frac{g}{f}\right)(x + 2)$

98) $g(n) = n^2 + 1$
 $f(n) = 2n + 4$
 Find $g(3 - n) \cdot f(3 - n)$

100) $g(n) = -3n - 5$
 $h(n) = n^2 - 4$
 Find $g(3t) + h(3t)$

6-7 Find the inverse of each function.

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

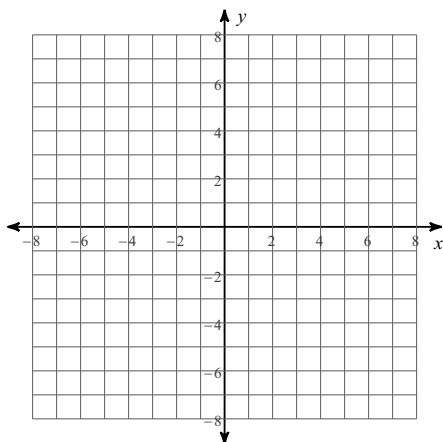
103) $g(x) = \frac{4}{5}x$

102) $g(n) = -n - 3$

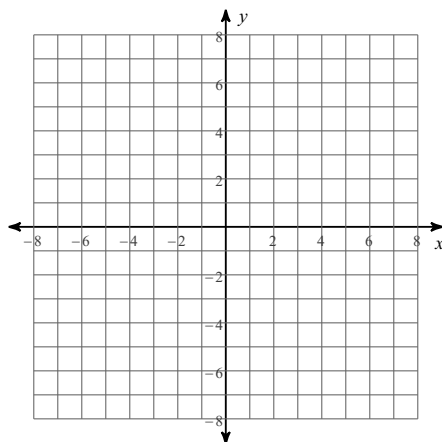
104) $g(x) = \frac{2}{x + 3} - 1$

6-8 Sketch the graph of the square root function.

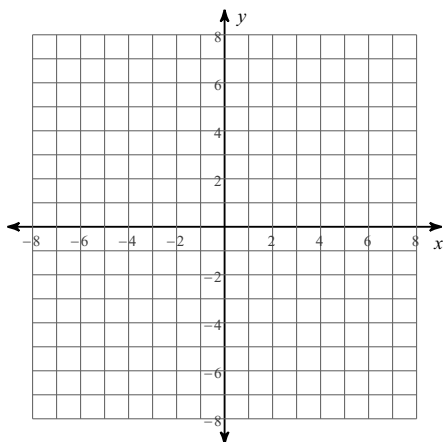
105) $y = \sqrt{x + 4} - 1$



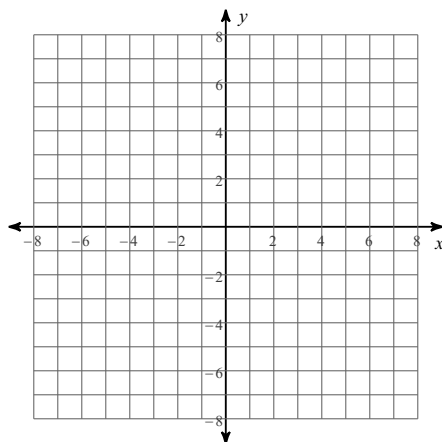
106) $y = \sqrt{x}$



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

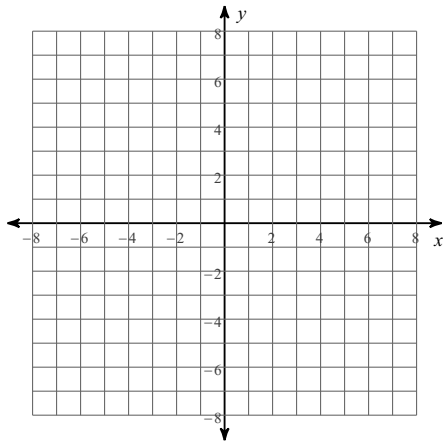


108) $y = \sqrt{x + 3} + 3$

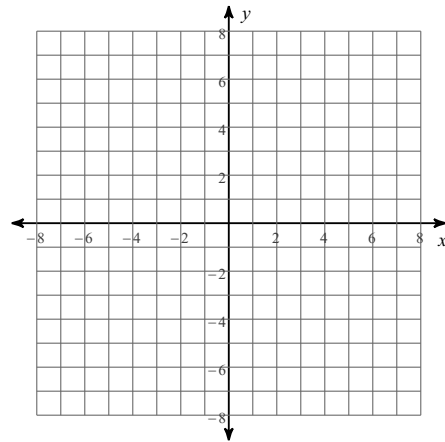


Sketch the graph of the cube function.

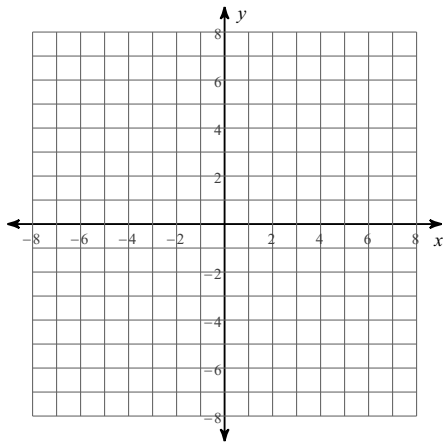
109) $y = \sqrt[3]{x} - 2$



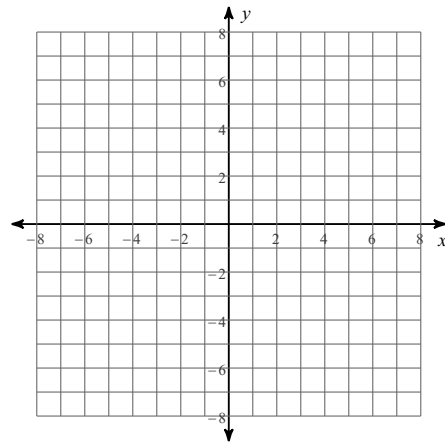
110) $y = \sqrt[3]{x + 3}$



111) $y = \sqrt[3]{x + 1}$

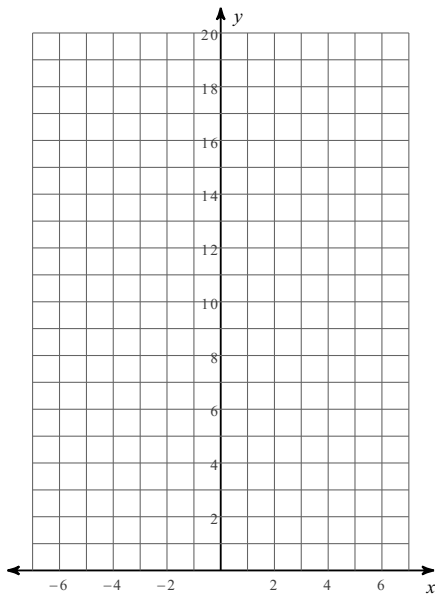


112) $y = \sqrt[3]{x}$

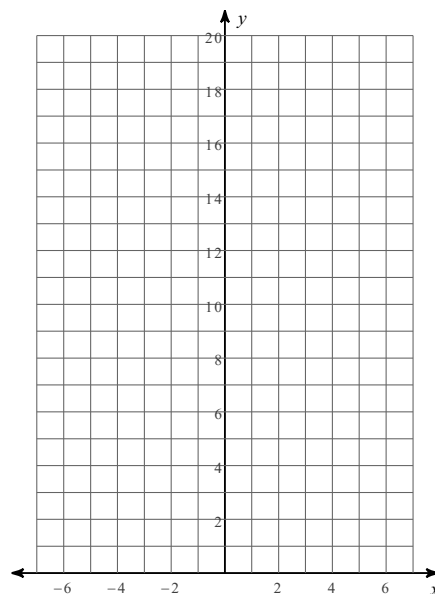


7-1 Graphing Exponential Equations

113) $y = 3 \cdot 2^x$

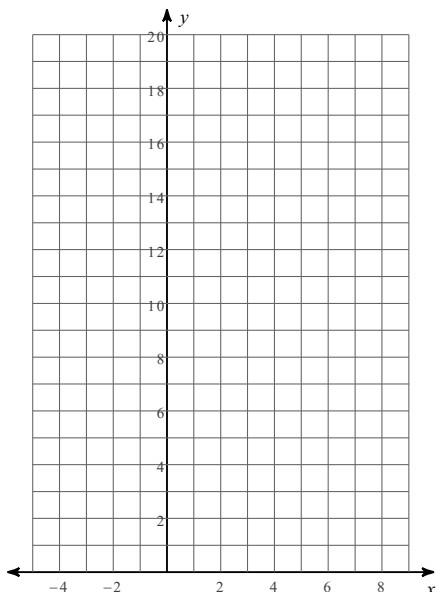


114) $y = 3 \cdot \left(\frac{1}{2}\right)^x$

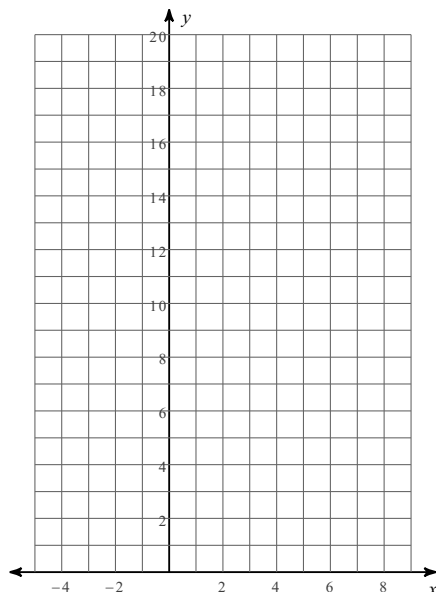


Sketch the graph of each function.

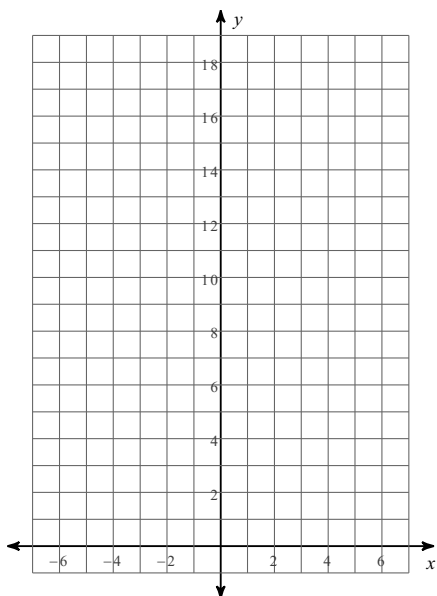
115) $y = 3 \cdot \left(\frac{1}{2}\right)^{x-2}$



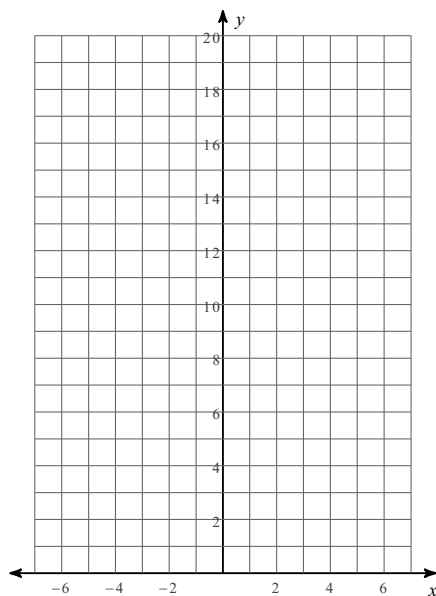
116) $y = 5 \cdot \left(\frac{1}{2}\right)^{x-2}$



117) $y = \frac{1}{4} \cdot 2^x - 1$



118) $y = \frac{1}{4} \cdot 7^x + 1$



7-3 Rewrite each equation in exponential form.

119) $\log_{18} \frac{1}{324} = -2$

120) $\log_3 27 = 3$

121) $\log_{13} 169 = 2$

122) $\log_{20} \frac{1}{400} = -2$

Rewrite each equation in logarithmic form.

123) $17^1 = 17$

124) $15^2 = 225$

125) $11^0 = 1$

126) $\left(\frac{1}{18}\right)^2 = \frac{1}{324}$

Evaluate each expression.

$$127) \log_6 \frac{1}{36}$$

$$129) \log_{64} 4$$

$$128) \log_6 216$$

$$130) \log_5 25$$

7-4 Expand each logarithm.

$$131) \log_9 \frac{10^3}{3^5}$$

$$133) \log_5 \frac{3^5}{10^2}$$

$$132) \log_8 \frac{12^3}{7^6}$$

$$134) \log_3 \frac{x^3}{y^5}$$

Condense each expression to a single logarithm.

$$135) 2 \log_7 u - 3 \log_7 v$$

$$137) 2 \log_8 x - 6 \log_8 y$$

$$136) \log_3 2 + \log_3 5 + 5 \log_3 7$$

$$138) 3 \log u - 6 \log v$$

Use a calculator to approximate each to the nearest thousandth.

$$139) \log_5 6$$

$$141) \log_5 56$$

$$140) \log_6 58$$

$$142) \log_3 1.4$$

7-5 Solve each equation not using logarithms.

$$143) 36^{3m} = 216$$

$$145) 3^{-3a} = 3^5$$

$$144) 4^{-v} = 4^3$$

$$146) 64^{-3n} = 4^{3n}$$

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

$$147) 11^{n-3} - 6 = 54$$

$$149) 6e^{9.9n} = 58$$

$$148) 3^{v-6} + 8 = 104$$

$$150) 3 \cdot 18^{b-8} = 18$$

Solve each equation.

$$151) \log_3 (5p + 7) = \log_3 (p + 7)$$

$$153) \log_{18} (-5n - 7) = \log_{18} (4 - 4n)$$

$$152) \log_{15} (7 - 2v) = \log_{15} (3v - 2)$$

$$154) \log_6 16 = \log_6 (-v - 2)$$

Solve each equation using properties

$$155) \log_2 2x - \log_2 5 = 4$$

$$157) \log_5 (x + 3) - \log_5 x = 3$$

$$156) \log_6 9 - \log_6 5x = 1$$

$$158) \log 3 - \log (x + 4) = \log 44$$

8-4 Simplify each and state the excluded values.

$$159) \frac{45x - 54}{63x + 81}$$

$$161) \frac{x^2 - 8x + 12}{x^2 - 10x + 24}$$

$$160) \frac{x^2 - 11x + 24}{x^2 - 13x + 40}$$

$$162) \frac{a^2 - 10a + 9}{4a - 4}$$

Multiply each expression.

$$163) \frac{x^2 + 2x - 24}{x + 2} \cdot \frac{x + 2}{x - 4}$$

$$165) \frac{4x - 20}{x + 2} \cdot \frac{1}{x - 5}$$

$$164) \frac{3x}{6x - 60} \cdot \frac{x^2 - 12x + 20}{3x}$$

$$166) \frac{r + 1}{r + 3} \cdot \frac{r^2 - 3r - 18}{r - 6}$$

Divide each expression.

$$167) \frac{3n}{9} \div \frac{21n^2 + 30n}{49n + 70}$$

$$169) \frac{6}{6b - 6} \div \frac{1}{b^2 + b - 2}$$

$$168) \frac{p + 1}{p^2 - 6p - 7} \div \frac{1}{p + 9}$$

$$170) \frac{n - 10}{3} \div \frac{n^2 - 9n - 10}{n^2 - 4n - 5}$$

8-5 Add each expression.

$$171) \frac{4x}{3x + 4} + \frac{5}{6}$$

$$173) \frac{6n}{2n + 1} + \frac{5}{n - 3}$$

$$172) \frac{6n}{3} + \frac{6}{15n - 3}$$

$$174) \frac{6p}{3p - 12} + \frac{2}{3p}$$

Subtract each expression.

$$175) \frac{5k}{2} - \frac{k - 4}{2k^2 + 2k}$$

$$177) \frac{4r}{r - 4} - \frac{3}{r + 6}$$

$$176) \frac{2n}{3} - \frac{2n}{9n + 15}$$

$$178) \frac{5}{3} - \frac{x + 6}{6x - 9}$$

8-6 Solve each equation. Remember to check for extraneous solutions.

$$179) \frac{1}{p - 6} = \frac{1}{p^2 - 6p} + \frac{5}{p - 6}$$

$$181) \frac{1}{4r} = \frac{1}{8r} + \frac{r - 1}{4r}$$

$$180) 1 + \frac{3}{4n} = \frac{1}{n}$$

$$182) \frac{1}{3b + 2} + \frac{2}{3b^2 + 2b} = \frac{5}{6b^2 + 4b}$$

9-2 Determine if the sequence is arithmetic. If it is, find the common difference, the 52nd term, and the explicit formula.

$$183) 18, 13, 8, 3, \dots$$

$$185) 0, -30, -60, -90, \dots$$

$$184) 6, 1, -4, -9, \dots$$

$$186) -12, -9, -6, -3, \dots$$

Given the explicit formula for an arithmetic sequence find the 52nd term.

$$187) a_n = -23 + 10n$$

$$189) a_n = 3 + 30n$$

$$188) a_n = 33 - 2n$$

$$190) a_n = 31 - 6n$$

9-3 Determine if the sequence is geometric. If it is, find the common ratio and the 8th term.

$$191) -3, -9, -27, -81, \dots$$

$$193) -3, 12, -48, 192, \dots$$

$$192) 3, 6, 12, 24, \dots$$

$$194) -4, -20, -100, -500, \dots$$

Given the explicit formula for a geometric sequence find the 8th term.

$$195) a_n = -4 \cdot 5^{n-1}$$

$$197) a_n = -3 \cdot 3^{n-1}$$

$$196) a_n = 3 \cdot 4^{n-1}$$

$$198) a_n = 3 \cdot 3^{n-1}$$

9-3 Evaluate the related series of each sequence.

$$199) a_1 = 46, a_n = 352, n = 35$$

$$201) a_1 = 17, a_n = 45, n = 5$$

$$200) a_1 = 32, a_n = 64, n = 5$$

$$202) a_1 = 11, a_n = 89, n = 14$$

Evaluate each arithmetic series described.

$$203) 40 + 50 + 60 + 70 \dots, n = 13$$

$$205) 30 + 38 + 46 + 54 \dots, n = 10$$

$$204) 29 + 37 + 45 + 53 \dots, n = 14$$

$$206) 9 + 14 + 19 + 24 \dots, n = 9$$

9-5 Evaluate each geometric series described.

207) $-1 - 3 - 9 - 27\dots, n = 6$

208) $-3 - 9 - 27 - 81\dots, n = 6$

209) $-1 + 4 - 16 + 64\dots, n = 7$

210) $-3 - 12 - 48 - 192\dots, n = 6$

Evaluate each finite geometric series described.

211) $-1 + 4 - 16 + 64\dots, n = 8$

212) $-4 - 16 - 64 - 256\dots, n = 7$

213) $-2 - 10 - 50 - 250\dots, n = 7$

214) $-4 - 12 - 36 - 108\dots, n = 8$

Determine if each geometric series converges or diverges.

215) $125 + 25 + 5 + 1\dots$

216) $2 + 4 + 8 + 16\dots$

217) $3 - 1 + \frac{1}{3} - \frac{1}{9}\dots$

218) $1250 + 250 + 50 + 10\dots$

Evaluate each infinite geometric series described.

219) $2 + \frac{2}{5} + \frac{2}{25} + \frac{2}{125}\dots$

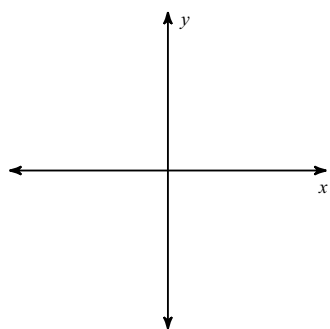
220) $-32 - 16 - 8 - 4\dots$

221) $9.6 + 3.84 + 1.536 + 0.6144\dots$

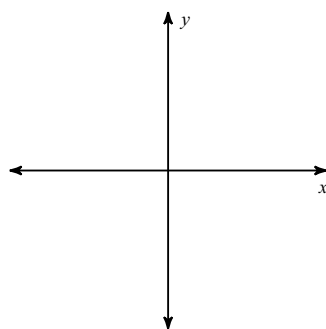
222) $4 - 1 + \frac{1}{4} - \frac{1}{16}\dots$

13-2 Draw an angle with the given measure in standard position.

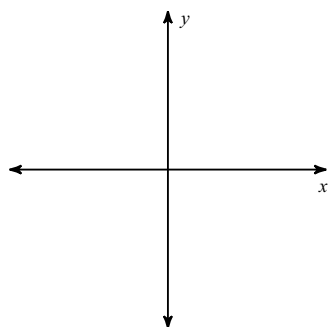
223) 140°



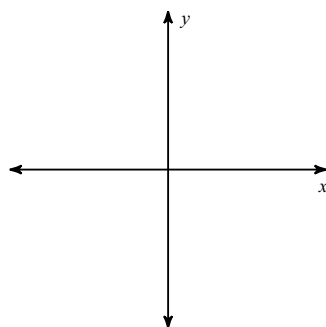
224) 385°



225) 105°

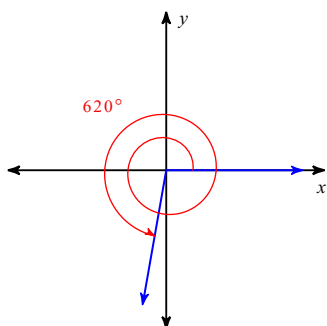


226) 165°

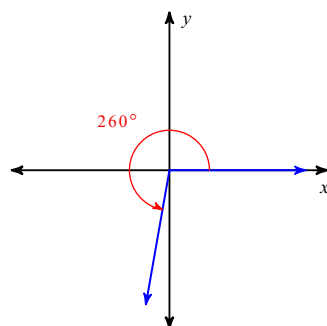


Find the reference angle.

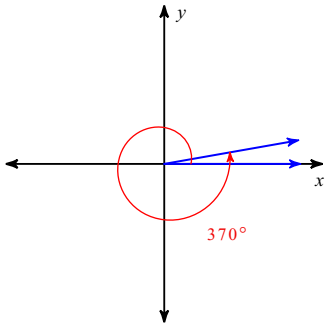
227)



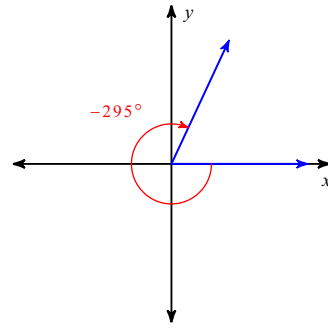
228)



229)



230)



Find a positive and a negative coterminal angle for each given angle.

231) 105°

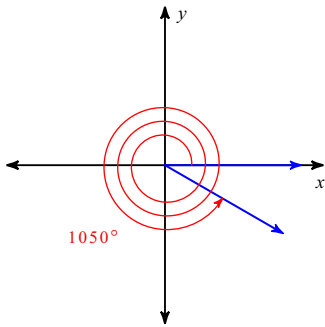
232) 70°

233) 60°

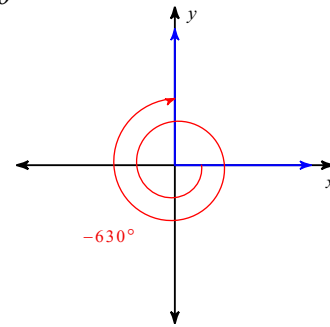
234) 285°

Find the exact value of each trigonometric function.

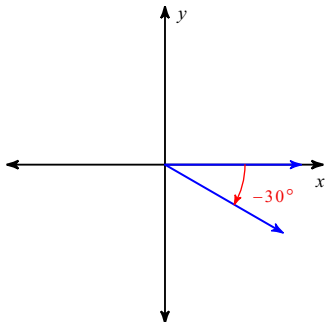
235) $\cos \theta$



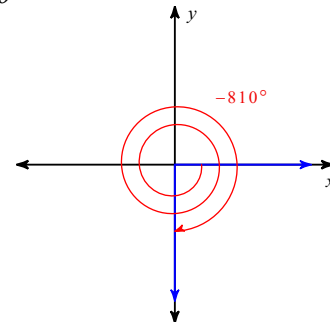
236) $\sin \theta$



237) $\cos \theta$



238) $\sin \theta$



239) $\cos 675^\circ$

240) $\sin 720^\circ$

241) $\tan -570^\circ$

242) $\sin -570^\circ$

Convert each degree measure into radians.

243) 10°

244) 340°

245) -30°

246) 210°

Convert each radian measure into degrees.

247) $\frac{11\pi}{3}$

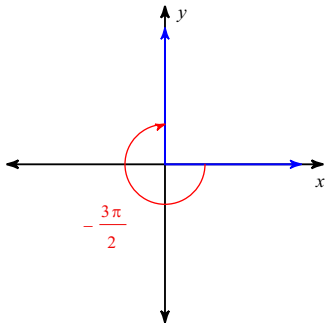
248) $-\frac{11\pi}{6}$

249) $-\frac{151\pi}{36}$

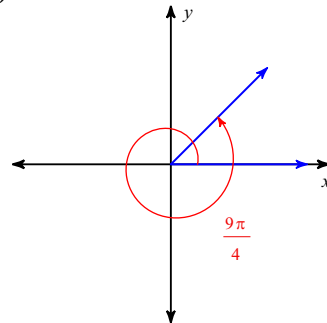
250) $-\frac{17\pi}{12}$

Find the exact value of each trigonometric function.

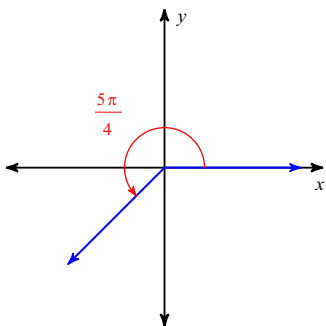
251) $\cos \theta$



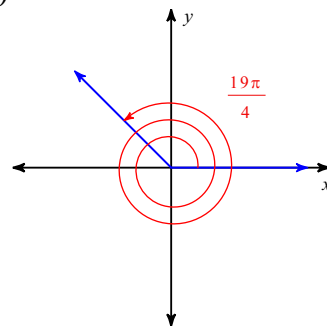
252) $\sin \theta$



253) $\tan \theta$



254) $\cos \theta$



255) $\cos 0$

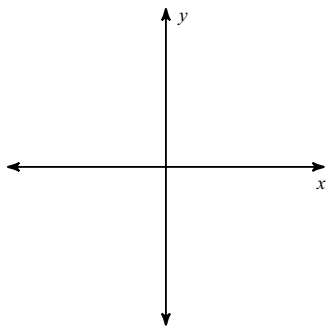
256) $\tan 3\pi$

257) $\cos -\frac{9\pi}{2}$

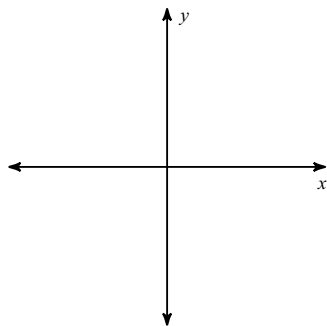
258) $\cos -\frac{9\pi}{4}$

Draw an angle with the given measure in standard position.

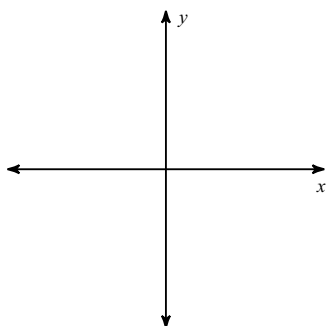
259) $-\frac{19\pi}{9}$



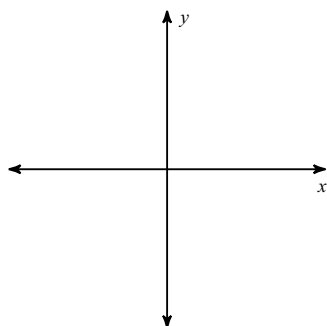
260) $-\frac{13\pi}{12}$



261) $-\frac{5\pi}{18}$

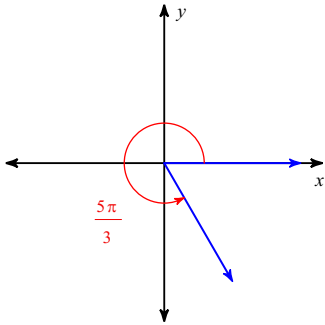


262) $-\frac{35\pi}{9}$

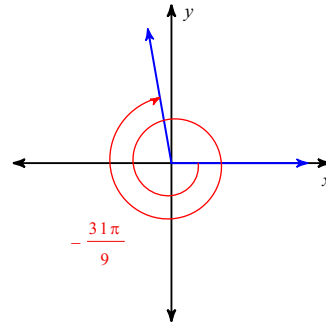


Find the reference angle.

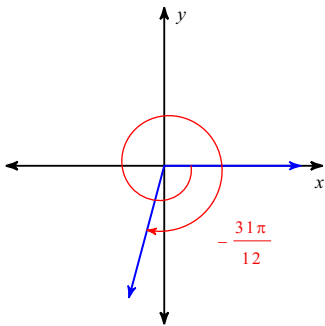
263)



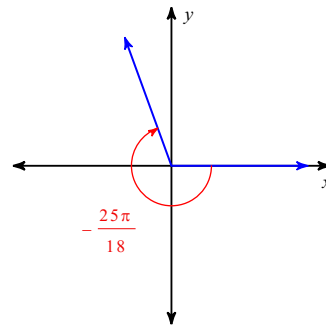
264)



265)

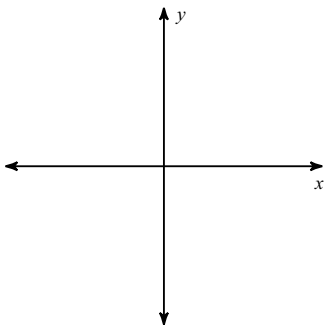


266)

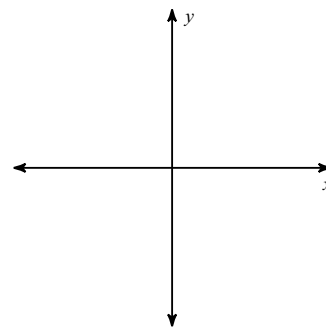


Draw an angle with the given measure in standard position.

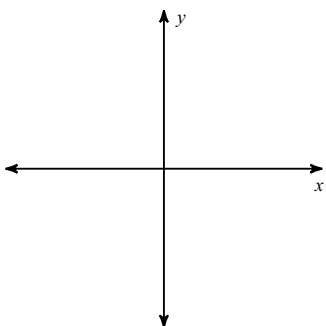
267) π



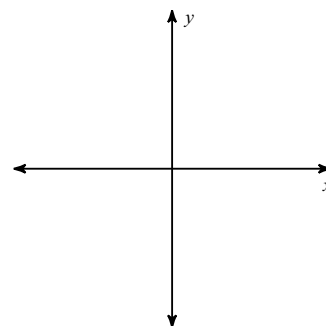
268) $-\frac{25\pi}{12}$



269) $\frac{5\pi}{4}$



270) $-\frac{7\pi}{6}$



Final Review Packet

6-1 Simplify

1) $-\sqrt{112h^2jk^4}$ $-4k^2h\sqrt{7j}$

2) $7\sqrt{20uv^3}$ $14v\sqrt{5uv}$

3) $5\sqrt[3]{1000}$ 50

4) $3\sqrt{80}$ $12\sqrt{5}$

6-2: Multiply

5) $\sqrt{3} \cdot \sqrt{10}$ $\sqrt{30}$

6) $\sqrt{10} \cdot \sqrt{5}$ $5\sqrt{2}$

7) $\sqrt[3]{64} \cdot -2\sqrt[3]{20}$ $-8\sqrt[3]{20}$

8) $\sqrt[3]{-5} \cdot \sqrt[3]{75}$ $-5\sqrt[3]{3}$

Divide- simplify first

9) $\frac{3\sqrt{6}}{3\sqrt{25}}$ $\frac{\sqrt{6}}{5}$

10) $\frac{\sqrt{10}}{\sqrt{32}}$ $\frac{\sqrt{5}}{4}$

11) $\frac{4\sqrt{25}}{2\sqrt{16}}$ $\frac{5}{2}$

12) $\frac{\sqrt{5}}{3\sqrt{80}}$ $\frac{1}{12}$

Divide- Multiply to get rid of the radical in the denominator

13) $\frac{\sqrt{2n^4 + 3}}{3\sqrt{8n^2}}$ $\frac{2n^2 + 3\sqrt{2}}{12n}$

14) $\frac{-1 + 3\sqrt{3x^4}}{3\sqrt{12x^3}}$ $\frac{-\sqrt{3x} + 9x^2\sqrt{x}}{18x^2}$

15) $\frac{-3k + \sqrt{k^3}}{\sqrt{12k^2}}$ $\frac{-3\sqrt{3} + \sqrt{3k}}{6}$

16) $\frac{3 - \sqrt{3x^2}}{2\sqrt{17x}}$ $\frac{3\sqrt{17x} - x\sqrt{51x}}{34x}$

Divide- Multiply by the conjugate

17) $\frac{\sqrt{3}}{4 - 5\sqrt{5}}$ $\frac{-4\sqrt{3} - 5\sqrt{15}}{109}$

18) $\frac{3\sqrt{5}}{4\sqrt{2} - 3\sqrt{3}}$ $\frac{12\sqrt{10} + 9\sqrt{15}}{5}$

19) $\frac{2}{-3 + 4\sqrt{3}}$ $\frac{6 + 8\sqrt{3}}{39}$

20) $\frac{3}{3\sqrt{2} + 4}$ $\frac{9\sqrt{2} - 12}{2}$

6-3 Adding and Subtracting

21) $-3\sqrt{3} + 3\sqrt{8} + 3\sqrt{18}$ $-3\sqrt{3} + 15\sqrt{2}$

22) $2\sqrt{8} - 3\sqrt{2} - 2\sqrt{24}$ $\sqrt{2} - 4\sqrt{6}$

23) $-3\sqrt[3]{2} - 2\sqrt[3]{108} + 2\sqrt[3]{2}$ $-\sqrt[3]{2} - 6\sqrt[3]{4}$

24) $2\sqrt{24} - \sqrt{54} - 2\sqrt{6}$ $-\sqrt{6}$

Multiply

25) $3\sqrt{3}(\sqrt{2} - \sqrt{10})$ $3\sqrt{6} - 3\sqrt{30}$

26) $\sqrt{15}(4 + \sqrt{6})$ $4\sqrt{15} + 3\sqrt{10}$

27) $\sqrt{6}(4 + \sqrt{2})$ $4\sqrt{6} + 2\sqrt{3}$

28) $\sqrt{10}(\sqrt{10} + \sqrt{2})$ $10 + 2\sqrt{5}$

FOIL

29) $(-2 - 4\sqrt{2})(5 + \sqrt{2})$ $-18 - 22\sqrt{2}$

30) $(-5\sqrt{2} + \sqrt{5})(\sqrt{4} + \sqrt{5})$ $-10\sqrt{2} - 5\sqrt{10} + 2\sqrt{5} + 5$

31) $(5\sqrt{2} - 5\sqrt{3})(\sqrt{2} + \sqrt{5})$ $10 + 5\sqrt{10} - 5\sqrt{6} - 5\sqrt{15}$

32) $(-4\sqrt{3} - \sqrt{2})(\sqrt{4} + \sqrt{2})$ $-8\sqrt{3} - 4\sqrt{6} - 2\sqrt{2} - 2$

6-4 Write each expression in radical form.

33) $(2v)^{\frac{7}{6}}$ $(\sqrt[6]{2v})^7$

34) $(6x)^{\frac{1}{2}}$ $\sqrt{6x}$

35) $(6x)^{\frac{4}{3}}$ $(\sqrt[3]{6x})^4$

36) $(5k)^{\frac{5}{4}}$ $(\sqrt[4]{5k})^5$

Write each expression in exponential form.

$$37) (\sqrt[4]{k})^5 k^{\frac{5}{4}}$$

$$38) (\sqrt{6x})^3 (6x)^{\frac{3}{2}}$$

$$39) (\sqrt[4]{2b})^7 (2b)^{\frac{7}{4}}$$

$$40) (\sqrt[3]{10n})^5 (10n)^{\frac{5}{3}}$$

Simplify.

$$41) (b^{12})^{\frac{1}{4}} b^3$$

$$42) (216b^3)^{\frac{1}{3}} 6b$$

$$43) (4r^2)^{\frac{1}{2}} 2r$$

$$44) (r^8)^{\frac{1}{4}} r^2$$

6-5 Solve each equation. Remember to check for extraneous solutions.

$$45) \sqrt{a+7} = \sqrt{-1-a} \quad \{-4\}$$

$$46) (3a-11)^{\frac{1}{2}} + 7 = 8 \quad \{4\}$$

$$47) \sqrt{12-b} = \sqrt{2b-18} \quad \{10\}$$

$$48) 6 = \sqrt{2m+44} \quad \{-4\}$$

Solve each equation.

$$49) \sqrt{-63+16n} = n \quad \{7, 9\}$$

$$50) (a-1)^{\frac{1}{2}} = a-3 \quad \{5\}$$

$$51) \sqrt{4a+8} - 3 = a \quad \{-1\}$$

$$52) n-5 = \sqrt{n-5} \quad \{6, 5\}$$

6-6: Add

$$53) \begin{aligned} f(x) &= 2x && 6x-4 \\ g(x) &= 4x-4 \\ \text{Find } (f+g)(x) \end{aligned}$$

$$54) \begin{aligned} g(x) &= 4x+5 && x^2+x+5 \\ h(x) &= x^2-3x \\ \text{Find } g(x)+h(x) \end{aligned}$$

$$55) \begin{aligned} g(n) &= -n-4 && -1 \\ h(n) &= n+3 \\ \text{Find } g(n)+h(n) \end{aligned}$$

$$56) \begin{aligned} g(n) &= n-4 && 4n-2 \\ f(n) &= 3n+2 \\ \text{Find } (g+f)(n) \end{aligned}$$

Evaluate.

$$57) \begin{aligned} g(n) &= 2n^3-5 && -12 \\ h(n) &= 2n-3 \\ \text{Find } (g+h)(-1) \end{aligned}$$

$$58) \begin{aligned} g(x) &= 2x-2 && -9 \\ f(x) &= -2x^2-3 \\ \text{Find } g(-1)+f(-1) \end{aligned}$$

$$59) \begin{aligned} g(n) &= 2n+4 && -21 \\ h(n) &= n-4 \\ \text{Find } g(-7)+h(-7) \end{aligned}$$

$$60) \begin{aligned} g(x) &= -2x-3 && -4 \\ f(x) &= 2x-1 \\ \text{Find } g(7)+f(7) \end{aligned}$$

Subtract

$$61) \begin{aligned} f(x) &= x+2 && -2 \\ g(x) &= x+4 \\ \text{Find } f(x)-g(x) \end{aligned}$$

$$62) \begin{aligned} f(t) &= t^3-3+2t && t^3-4 \\ g(t) &= 2t+1 \\ \text{Find } (f-g)(t) \end{aligned}$$

$$63) \begin{aligned} h(x) &= x^3-5x^2+x && x^3-5x^2+2x-1 \\ g(x) &= -x+1 \\ \text{Find } h(x)-g(x) \end{aligned}$$

$$64) \begin{aligned} f(n) &= 3n^2+5n && 3n^2+4n-5 \\ g(n) &= n+5 \\ \text{Find } (f-g)(n) \end{aligned}$$

Evaluate

$$65) \begin{aligned} f(x) &= x^2+2 && x^2+2x+2 \\ g(x) &= -2x \\ \text{Find } (f-g)(x) \end{aligned}$$

$$66) \begin{aligned} g(n) &= 4n-3 && -n^3+4n-4 \\ f(n) &= n^3+1 \\ \text{Find } g(n)-f(n) \end{aligned}$$

$$67) \begin{aligned} g(x) &= x^3 - 5x & x^3 - 8x + 3 \\ f(x) &= 3x - 3 \\ \text{Find } (g - f)(x) \end{aligned}$$

Multiply

$$69) \begin{aligned} g(x) &= 3x + 5 & -3x^2 - 11x - 10 \\ h(x) &= -x - 2 \\ \text{Find } g(x) \cdot h(x) \end{aligned}$$

$$71) \begin{aligned} f(t) &= 2t - 2 & 2t^2 - 4t + 2 \\ g(t) &= t - 1 \\ \text{Find } f(t) \cdot g(t) \end{aligned}$$

Evaluate

$$73) \begin{aligned} h(x) &= x^3 - 4 & 2x^4 + 5x^3 - 8x - 20 \\ g(x) &= 2x + 5 \\ \text{Find } h(x) \cdot g(x) \end{aligned}$$

$$75) \begin{aligned} f(t) &= 2t - 4 & 2t^4 - 4t^3 - 2t + 4 \\ g(t) &= t^3 - 1 \\ \text{Find } (f \cdot g)(t) \end{aligned}$$

Divide

$$77) \begin{aligned} g(x) &= x^2 - 2 & \frac{x^2 - 2}{2x - 2} \\ f(x) &= 2x - 2 \\ \text{Find } g(x) \div f(x) \end{aligned}$$

$$79) \begin{aligned} f(x) &= 2x + 3 & \frac{2x + 3}{3x^2 + 5x} \\ g(x) &= 3x^2 + 5x \\ \text{Find } \left(\frac{f}{g}\right)(x) \end{aligned}$$

Evaluate

$$81) \begin{aligned} f(x) &= -4x - 5 & -\frac{19}{14} \\ g(x) &= 2x - 2 \\ \text{Find } \left(\frac{f}{g}\right)(-6) \end{aligned}$$

$$83) \begin{aligned} g(t) &= 3t & \frac{15}{127} \\ h(t) &= t^3 - 2 \\ \text{Find } g(-5) \div h(-5) \end{aligned}$$

Composition

$$85) \begin{aligned} h(n) &= n + 5 & n + 10 \\ \text{Find } (h \circ h)(n) \end{aligned}$$

$$87) \begin{aligned} h(x) &= x + 2 & x + 4 \\ \text{Find } h(h(x)) \end{aligned}$$

Evaluate

$$89) \begin{aligned} g(n) &= n - 2 & -6 \\ \text{Find } (g \circ g)(-2) \end{aligned}$$

$$91) \begin{aligned} g(x) &= 2x - 1 & -7 \\ \text{Find } (g \circ g)(-1) \end{aligned}$$

$$68) \begin{aligned} h(t) &= 4t + 5 & -t^2 + 4t + 2 \\ g(t) &= t^2 + 3 \\ \text{Find } h(t) - g(t) \end{aligned}$$

$$70) \begin{aligned} f(n) &= -n + 3 & -2n^2 + 2n + 12 \\ g(n) &= 2n + 4 \\ \text{Find } f(n) \cdot g(n) \end{aligned}$$

$$72) \begin{aligned} f(x) &= 2x + 3 & 6x^4 + 19x^3 + 15x^2 \\ g(x) &= 3x^3 + 5x^2 \\ \text{Find } (f \cdot g)(x) \end{aligned}$$

$$74) \begin{aligned} g(x) &= 4x + 1 & -8x^2 - 6x - 1 \\ h(x) &= -2x - 1 \\ \text{Find } (g \cdot h)(x) \end{aligned}$$

$$76) \begin{aligned} f(x) &= x^2 + x & 2x^3 + 7x^2 + 5x \\ g(x) &= 2x + 5 \\ \text{Find } f(x) \cdot g(x) \end{aligned}$$

$$78) \begin{aligned} f(n) &= n^3 + 3n^2 & \frac{n^3 + 3n^2}{-n + 3} \\ g(n) &= -n + 3 \\ \text{Find } f(n) \div g(n) \end{aligned}$$

$$80) \begin{aligned} h(a) &= a^2 + 3a & \frac{a^2 + 3a}{4a - 2} \\ g(a) &= 4a - 2 \\ \text{Find } h(a) \div g(a) \end{aligned}$$

$$82) \begin{aligned} g(x) &= x^3 + 2x^2 & 1 \\ h(x) &= 3x \\ \text{Find } g(1) \div h(1) \end{aligned}$$

$$84) \begin{aligned} f(n) &= 4n - 1 & -\frac{7}{5} \\ g(n) &= n^2 + 2n \\ \text{Find } f(-5) \div g(-5) \end{aligned}$$

$$86) \begin{aligned} f(x) &= x - 2 & x - 4 \\ \text{Find } f(f(x)) \end{aligned}$$

$$88) \begin{aligned} f(a) &= 3a - 3 & 3a - 9 \\ g(a) &= a - 2 \\ \text{Find } f(g(a)) \end{aligned}$$

$$90) \begin{aligned} g(x) &= 2x + 5 & 31 \\ \text{Find } g(g(4)) \end{aligned}$$

$$92) \begin{aligned} h(n) &= n + 1 & -8 \\ g(n) &= n^3 - 4n^2 \\ \text{Find } (h \circ g)(3) \end{aligned}$$

Evaluate at an expression

93) $f(n) = 2n + 3$ $\frac{4a + 3}{8a^3 + 3}$
 $g(n) = n^3 + 3$
 Find $f(2a) \div g(2a)$

95) $g(n) = 2n + 1$ $\frac{4 + n^3 + 10n^2}{4}$
 $h(n) = n^3 + 5n^2$
 Find $(g \circ h)\left(\frac{n}{2}\right)$

97) $h(x) = x^3 - 4$ $-27x^3 - 6x - 5$
 $g(x) = -2x + 1$
 Find $h(-3x) - g(-3x)$

99) $h(a) = 2a + 2$ $\frac{-a^3 - 3a^2 - 2a}{2}$
 $g(a) = -2a^2 - a$
 Find $(h \cdot g)\left(\frac{a}{2}\right)$

94) $g(a) = a^3 + 4a$ $-a^9 - 12a^7 - 48a^5 - 68a^3 - 16a$
 Find $(g \circ g)(-a)$

96) $g(t) = t + 4$ $\frac{x + 6}{x^3 + 6x^2 + 8x}$
 $f(t) = t^3 - 4t$
 Find $\left(\frac{g}{f}\right)(x + 2)$

98) $g(n) = n^2 + 1$ $-2n^3 + 22n^2 - 80n + 100$
 $f(n) = 2n + 4$
 Find $g(3 - n) \cdot f(3 - n)$

100) $g(n) = -3n - 5$ $9t^2 - 9t - 9$
 $h(n) = n^2 - 4$
 Find $g(3t) + h(3t)$

6-7 Find the inverse of each function.

101) $f(x) = 2 + (x - 1)^5$ $f^{-1}(x) = \sqrt[5]{x - 2} + 1$

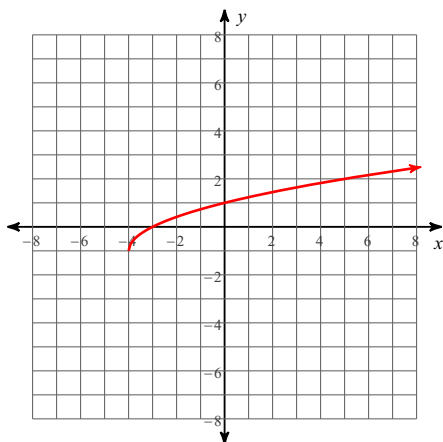
103) $g(x) = \frac{4}{5}x$ $g^{-1}(x) = \frac{5}{4}x$

102) $g(n) = -n - 3$ $g^{-1}(n) = -n - 3$

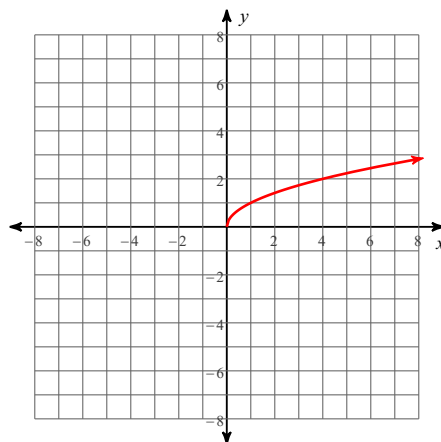
104) $g(x) = \frac{2}{x + 3} - 1$ $g^{-1}(x) = \frac{2}{x + 1} - 3$

6-8 Sketch the graph of the square root function.

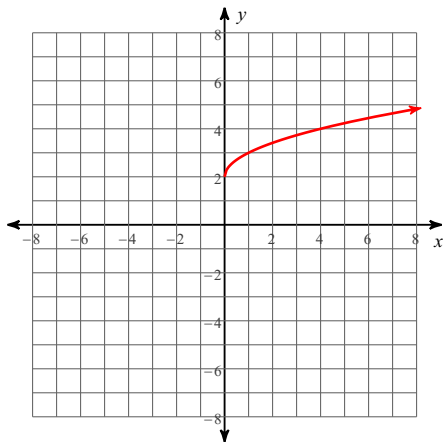
105) $y = \sqrt{x + 4} - 1$



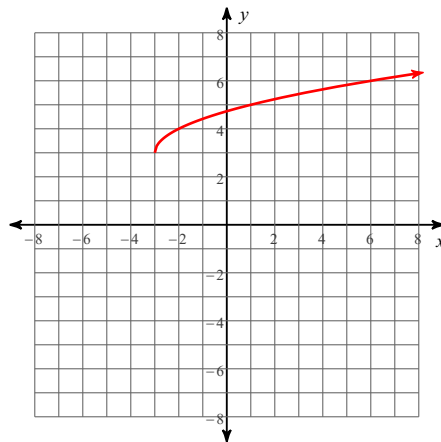
106) $y = \sqrt{x}$



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

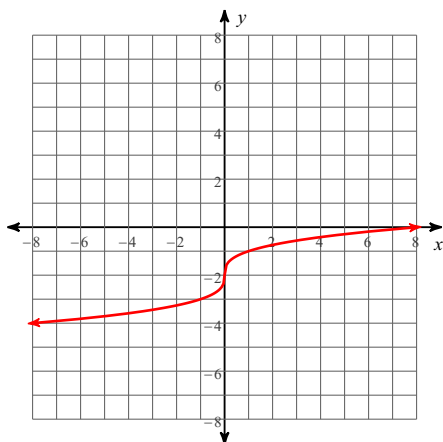


108) $y = \sqrt{x + 3} + 3$

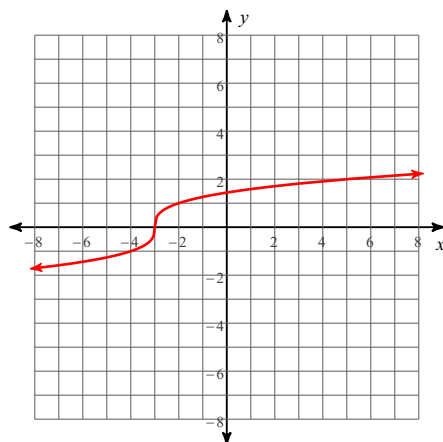


Sketch the graph of the cube function.

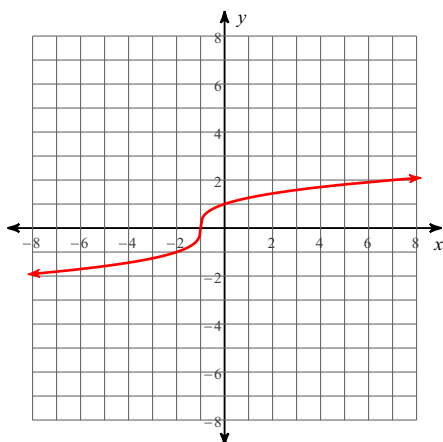
109) $y = \sqrt[3]{x} - 2$



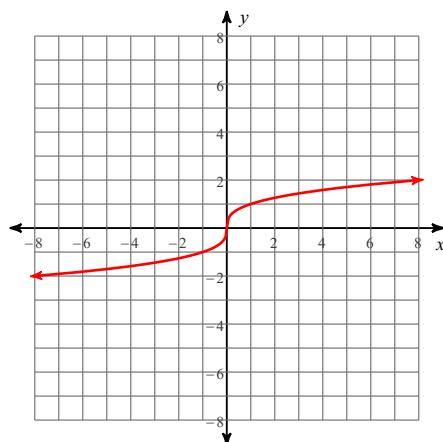
110) $y = \sqrt[3]{x + 3}$



111) $y = \sqrt[3]{x + 1}$

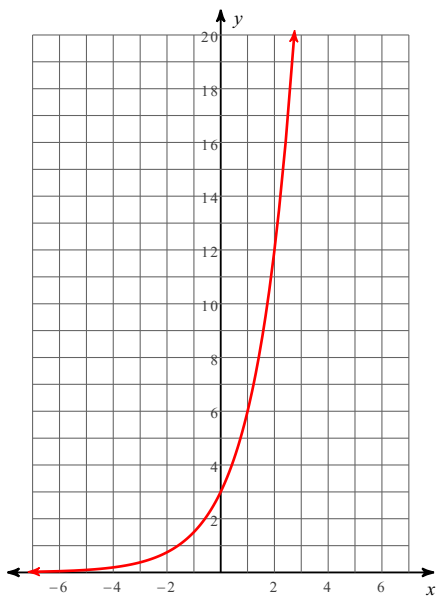


112) $y = \sqrt[3]{x}$

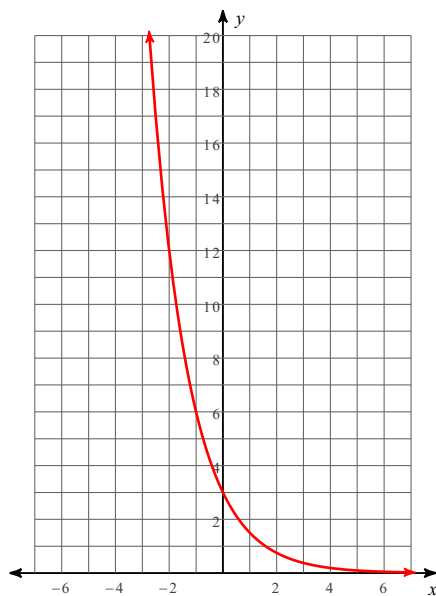


7-1 Graphing Exponential Equations

113) $y = 3 \cdot 2^x$

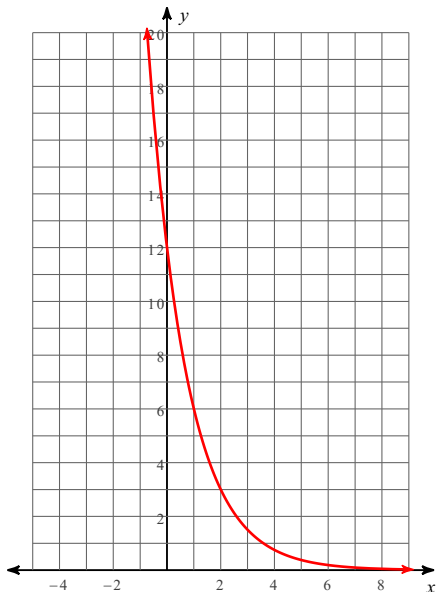


114) $y = 3 \cdot \left(\frac{1}{2}\right)^x$

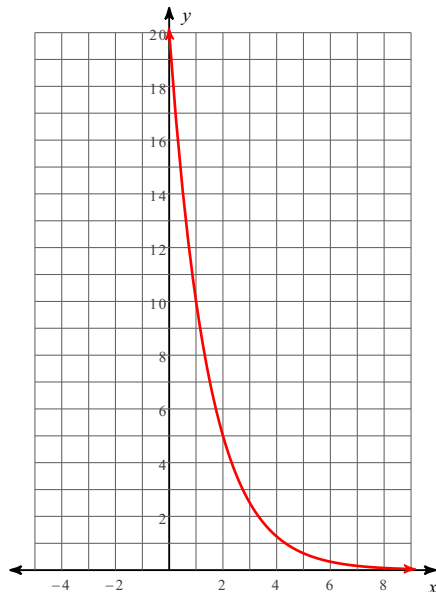


Sketch the graph of each function.

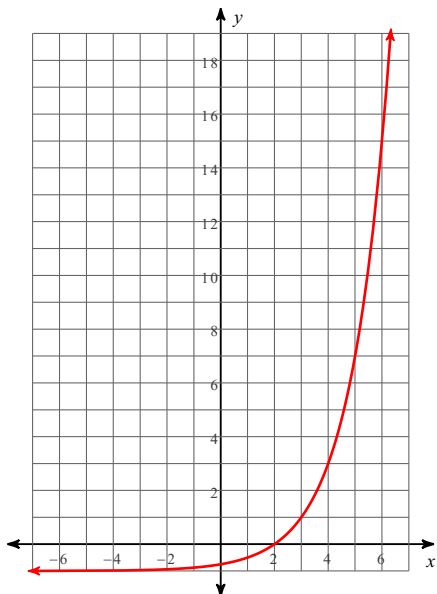
115) $y = 3 \cdot \left(\frac{1}{2}\right)^{x-2}$



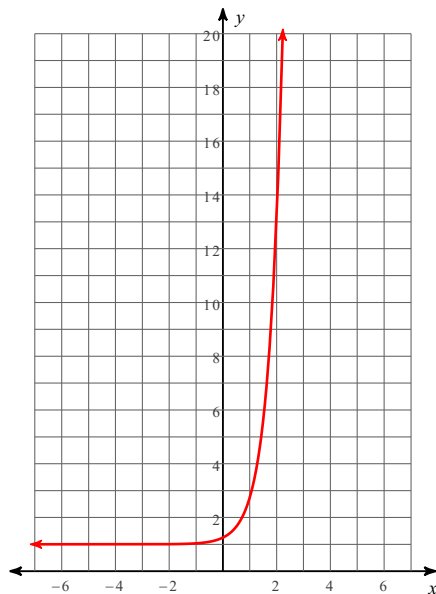
116) $y = 5 \cdot \left(\frac{1}{2}\right)^{x-2}$



117) $y = \frac{1}{4} \cdot 2^x - 1$



118) $y = \frac{1}{4} \cdot 7^x + 1$



7-3 Rewrite each equation in exponential form.

119) $\log_{18} \frac{1}{324} = -2$ $18^{-2} = \frac{1}{324}$

120) $\log_3 27 = 3$ $3^3 = 27$

121) $\log_{13} 169 = 2$ $13^2 = 169$

122) $\log_{20} \frac{1}{400} = -2$ $20^{-2} = \frac{1}{400}$

Rewrite each equation in logarithmic form.

123) $17^1 = 17$ $\log_{17} 17 = 1$

124) $15^2 = 225$ $\log_{15} 225 = 2$

125) $11^0 = 1$ $\log_{11} 1 = 0$

126) $\left(\frac{1}{18}\right)^2 = \frac{1}{324}$ $\log_{\frac{1}{18}} \frac{1}{324} = 2$

Evaluate each expression.

$$127) \log_6 \frac{1}{36} \quad -2$$

$$129) \log_{64} 4 \quad \frac{1}{3}$$

$$128) \log_6 216 \quad 3$$

$$130) \log_5 25 \quad 2$$

7-4 Expand each logarithm.

$$131) \log_9 \frac{10^3}{3^5} \quad 3 \log_9 10 - 5 \log_9 3$$

$$133) \log_5 \frac{3^5}{10^2} \quad 5 \log_5 3 - 2 \log_5 10$$

$$132) \log_8 \frac{12^3}{7^6} \quad 3 \log_8 12 - 6 \log_8 7$$

$$134) \log_3 \frac{x^3}{y^5} \quad 3 \log_3 x - 5 \log_3 y$$

Condense each expression to a single logarithm.

$$135) 2 \log_7 u - 3 \log_7 v \quad \log_7 \frac{u^2}{v^3}$$

$$137) 2 \log_8 x - 6 \log_8 y \quad \log_8 \frac{x^2}{y^6}$$

$$136) \log_3 2 + \log_3 5 + 5 \log_3 7 \quad \log_3 (10 \cdot 7^5)$$

$$138) 3 \log u - 6 \log v \quad \log \frac{u^3}{v^6}$$

Use a calculator to approximate each to the nearest thousandth.

$$139) \log_5 6 \quad 1.113$$

$$141) \log_5 56 \quad 2.501$$

$$140) \log_6 58 \quad 2.266$$

$$142) \log_3 1.4 \quad 0.306$$

7-5 Solve each equation not using logarithms.

$$143) 36^{3m} = 216 \quad \left\{ \frac{1}{3} \right\}$$

$$145) 3^{-3a} = 3^5 \quad \left\{ -\frac{2}{3} \right\}$$

$$144) 4^{-v} = 4^3 \quad \{-3\}$$

$$146) 64^{-3n} = 4^{3n} \quad \{0\}$$

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

$$147) 11^{n-3} - 6 = 54 \quad 4.7075$$

$$149) 6e^{9.9n} = 58 \quad 0.2292$$

$$148) 3^{v-6} + 8 = 104 \quad 10.1546$$

$$150) 3 \cdot 18^{b-8} = 18 \quad 8.6199$$

Solve each equation.

$$151) \log_3 (5p + 7) = \log_3 (p + 7) \quad \{0\}$$

$$153) \log_{18} (-5n - 7) = \log_{18} (4 - 4n) \quad \{-11\}$$

$$152) \log_{15} (7 - 2v) = \log_{15} (3v - 2) \quad \left\{ \frac{9}{5} \right\}$$

$$154) \log_6 16 = \log_6 (-v - 2) \quad \{-18\}$$

Solve each equation using properties

$$155) \log_2 2x - \log_2 5 = 4 \quad \{40\}$$

$$157) \log_5 (x + 3) - \log_5 x = 3 \quad \left\{ \frac{3}{124} \right\}$$

$$156) \log_6 9 - \log_6 5x = 1 \quad \left\{ \frac{3}{10} \right\}$$

$$158) \log 3 - \log (x + 4) = \log 44 \quad \left\{ -\frac{173}{44} \right\}$$

8-4 Simplify each and state the excluded values.

$$159) \frac{45x - 54}{63x + 81} \cdot \frac{5x - 6}{7x + 9}; \left\{ -\frac{9}{7} \right\}$$

$$161) \frac{x^2 - 8x + 12}{x^2 - 10x + 24} \cdot \frac{x - 2}{x - 4}; \{6, 4\}$$

$$160) \frac{x^2 - 11x + 24}{x^2 - 13x + 40} \cdot \frac{x - 3}{x - 5}; \{8, 5\}$$

$$162) \frac{a^2 - 10a + 9}{4a - 4} \cdot \frac{a - 9}{4}; \{1\}$$

Multiply each expression.

$$163) \frac{x^2 + 2x - 24}{x + 2} \cdot \frac{x + 2}{x - 4} \quad x + 6$$

$$165) \frac{4x - 20}{x + 2} \cdot \frac{1}{x - 5} \cdot \frac{4}{x + 2}$$

$$164) \frac{3x}{6x - 60} \cdot \frac{x^2 - 12x + 20}{3x} \cdot \frac{x - 2}{6}$$

$$166) \frac{r + 1}{r + 3} \cdot \frac{r^2 - 3r - 18}{r - 6} \quad r + 1$$

Divide each expression.

$$167) \frac{3n}{9} \div \frac{21n^2 + 30n}{49n + 70} \quad \frac{7}{9}$$

$$168) \frac{p + 1}{p^2 - 6p - 7} \div \frac{1}{p + 9} \quad \frac{p + 9}{p - 7}$$

$$169) \frac{6}{6b - 6} \div \frac{1}{b^2 + b - 2} \quad b + 2$$

$$170) \frac{n - 10}{3} \div \frac{n^2 - 9n - 10}{n^2 - 4n - 5} \quad \frac{n - 5}{3}$$

8-5 Add each expression.

$$171) \frac{4x}{3x + 4} + \frac{5}{6} \quad \frac{39x + 20}{6(3x + 4)}$$

$$172) \frac{6n}{3} + \frac{6}{15n - 3} \quad \frac{10n^2 - 2n + 2}{5n - 1}$$

$$173) \frac{6n}{2n + 1} + \frac{5}{n - 3} \quad \frac{6n^2 - 8n + 5}{(n - 3)(2n + 1)}$$

$$174) \frac{6p}{3p - 12} + \frac{2}{3p} \quad \frac{6p^2 + 2p - 8}{3p(p - 4)}$$

Subtract each expression.

$$175) \frac{5k}{2} - \frac{k - 4}{2k^2 + 2k} \quad \frac{5k^3 + 5k^2 - k + 4}{2k(k + 1)}$$

$$176) \frac{2n}{3} - \frac{2n}{9n + 15} \quad \frac{6n^2 + 8n}{3(3n + 5)}$$

$$177) \frac{4r}{r - 4} - \frac{3}{r + 6} \quad \frac{4r^2 + 21r + 12}{(r - 4)(r + 6)}$$

$$178) \frac{5}{3} - \frac{x + 6}{6x - 9} \quad \frac{3x - 7}{2x - 3}$$

8-6 Solve each equation. Remember to check for extraneous solutions.

$$179) \frac{1}{p - 6} = \frac{1}{p^2 - 6p} + \frac{5}{p - 6} \quad \left\{ -\frac{1}{4} \right\}$$

$$180) 1 + \frac{3}{4n} = \frac{1}{n} \quad \left\{ \frac{1}{4} \right\}$$

$$181) \frac{1}{4r} = \frac{1}{8r} + \frac{r - 1}{4r} \quad \left\{ \frac{3}{2} \right\}$$

$$182) \frac{1}{3b + 2} + \frac{2}{3b^2 + 2b} = \frac{5}{6b^2 + 4b} \quad \left\{ \frac{1}{2} \right\}$$

9-2 Determine if the sequence is arithmetic. If it is, find the common difference, the 52nd term, and the explicit formula.

183) 18, 13, 8, 3, ... Common Difference: $d = -5$ 184) 6, 1, -4, -9, ... Common Difference: $d = -5$

185) 0, -30, -60, -90, ... Common Difference: $d = -30$ 186) -12, -9, -6, -3, ... Common Difference: $d = 3$

Given the explicit formula for an arithmetic sequence find the 52nd term. Explicit: $a_n = -15 + 3n$

187) $a_n = -23 + 10n$ $a_{52} = 497$

188) $a_n = 33 - 2n$ $a_{52} = -71$

189) $a_n = 3 + 30n$ $a_{52} = 1563$

190) $a_n = 31 - 6n$ $a_{52} = -281$

9-3 Determine if the sequence is geometric. If it is, find the common ratio and the 8th term.

191) -3, -9, -27, -81, ... Common Ratio: $r = 3$ 192) 3, 6, 12, 24, ... Common Ratio: $r = 2$

193) -3, 12, -48, 192, ... Common Ratio: $r = -4$ 194) -4, -20, -100, -500, ... Common Ratio: $r = 5$

Given the explicit formula for a geometric sequence find the 8th term. $a_8 = -312500$

195) $a_n = -4 \cdot 5^{n-1}$ $a_8 = -312500$

196) $a_n = 3 \cdot 4^{n-1}$ $a_8 = 49152$

197) $a_n = -3 \cdot 3^{n-1}$ $a_8 = -6561$

198) $a_n = 3 \cdot 3^{n-1}$ $a_8 = 6561$

9-3 Evaluate the related series of each sequence.

199) $a_1 = 46$, $a_n = 352$, $n = 35$ 6965

200) $a_1 = 32$, $a_n = 64$, $n = 5$ 240

201) $a_1 = 17$, $a_n = 45$, $n = 5$ 155

202) $a_1 = 11$, $a_n = 89$, $n = 14$ 700

Evaluate each arithmetic series described.

203) $40 + 50 + 60 + 70 \dots$, $n = 13$ 1300

204) $29 + 37 + 45 + 53 \dots$, $n = 14$ 1134

205) $30 + 38 + 46 + 54 \dots$, $n = 10$ 660

206) $9 + 14 + 19 + 24 \dots$, $n = 9$ 261

9-5 Evaluate each geometric series described.

207) $-1 - 3 - 9 - 27\dots, n = 6$ **-364**

208) $-3 - 9 - 27 - 81\dots, n = 6$ **-1092**

209) $-1 + 4 - 16 + 64\dots, n = 7$ **-3277**

210) $-3 - 12 - 48 - 192\dots, n = 6$ **-4095**

Evaluate each finite geometric series described.

211) $-1 + 4 - 16 + 64\dots, n = 8$ **13107**

212) $-4 - 16 - 64 - 256\dots, n = 7$ **-21844**

213) $-2 - 10 - 50 - 250\dots, n = 7$ **-39062**

214) $-4 - 12 - 36 - 108\dots, n = 8$ **-13120**

Determine if each geometric series converges or diverges.

215) $125 + 25 + 5 + 1\dots$ **Converges**

216) $2 + 4 + 8 + 16\dots$ **Diverges**

217) $3 - 1 + \frac{1}{3} - \frac{1}{9}\dots$ **Converges**

218) $1250 + 250 + 50 + 10\dots$ **Converges**

Evaluate each infinite geometric series described.

219) $2 + \frac{2}{5} + \frac{2}{25} + \frac{2}{125}\dots$ **$\frac{5}{2}$**

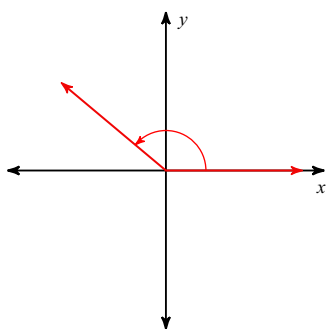
220) $-32 - 16 - 8 - 4\dots$ **-64**

221) $9.6 + 3.84 + 1.536 + 0.6144\dots$ **16**

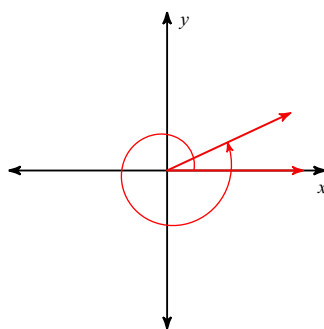
222) $4 - 1 + \frac{1}{4} - \frac{1}{16}\dots$ **$\frac{16}{5}$**

13-2 Draw an angle with the given measure in standard position.

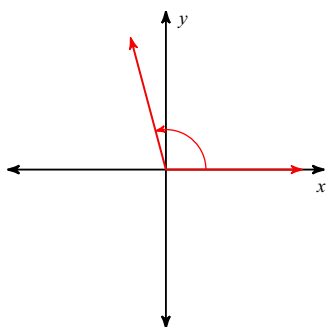
223) 140°



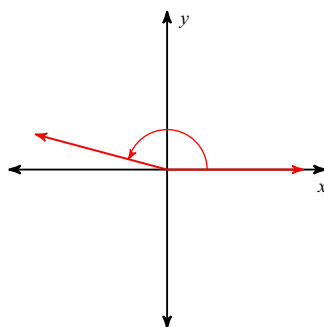
224) 385°



225) 105°



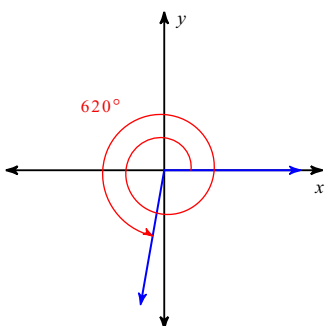
226) 165°



Find the reference angle.

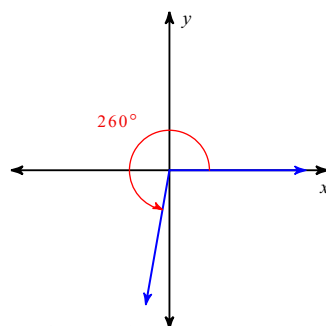
227)

80°

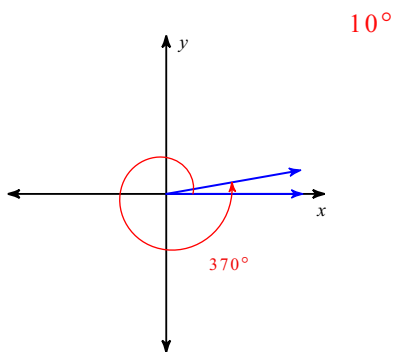


228)

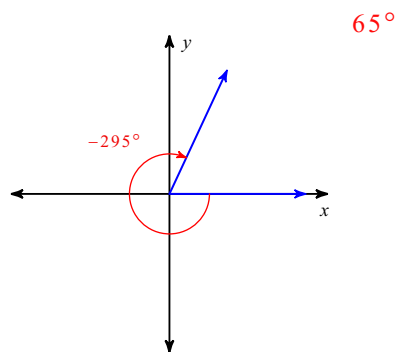
80°



229)



230)



Find a positive and a negative coterminal angle for each given angle.

231) 105° 465° and -255°

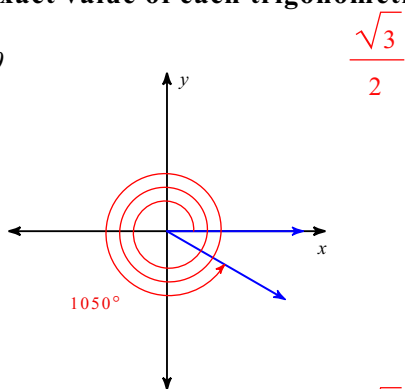
232) 70° 430° and -290°

233) 60° 420° and -300°

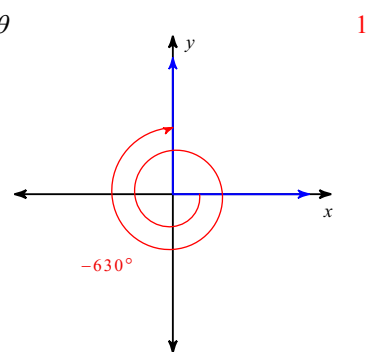
234) 285° 645° and -75°

Find the exact value of each trigonometric function.

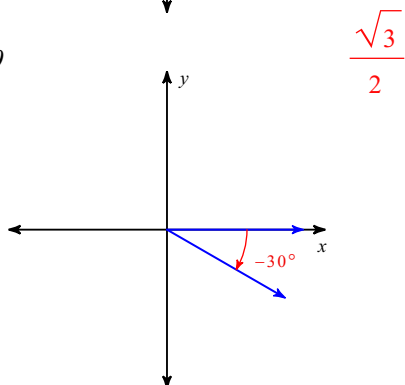
235) $\cos \theta$



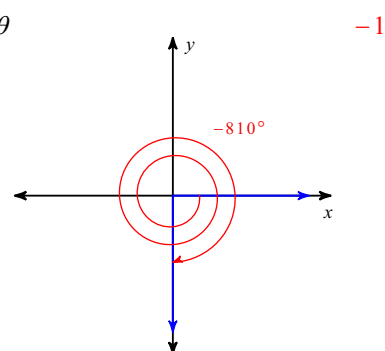
236) $\sin \theta$



237) $\cos \theta$



238) $\sin \theta$



239) $\cos 675^\circ$ $\frac{\sqrt{2}}{2}$

240) $\sin 720^\circ$ 0

241) $\tan -570^\circ$ $-\frac{\sqrt{3}}{3}$

242) $\sin -570^\circ$ $\frac{1}{2}$

Convert each degree measure into radians.

243) 10° $\frac{\pi}{18}$

244) 340° $\frac{17\pi}{9}$

245) -30° $-\frac{\pi}{6}$

246) 210° $\frac{7\pi}{6}$

Convert each radian measure into degrees.

247) $\frac{11\pi}{3}$ 660°

248) $-\frac{11\pi}{6}$ -330°

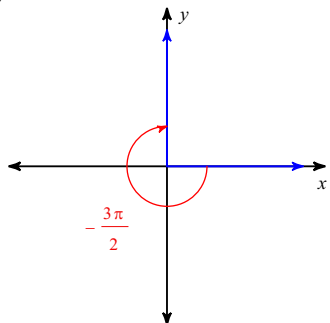
249) $-\frac{151\pi}{36}$ -755°

250) $-\frac{17\pi}{12}$ -255°

Find the exact value of each trigonometric function.

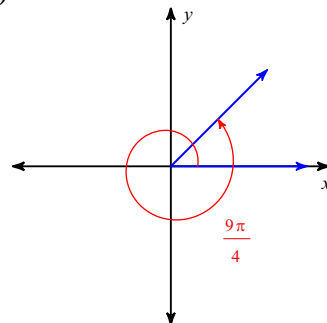
251) $\cos \theta$

0



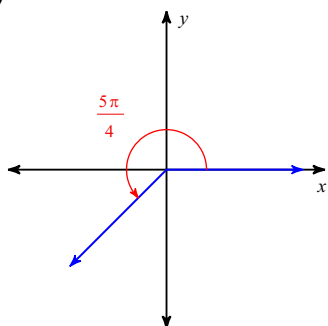
252) $\sin \theta$

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



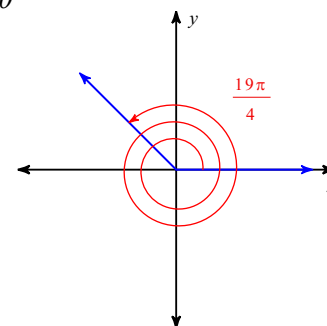
253) $\tan \theta$

1



254) $\cos \theta$

$-\frac{\sqrt{2}}{2}$



255) $\cos 0$

1

256) $\tan 3\pi$

0

257) $\cos -\frac{9\pi}{2}$

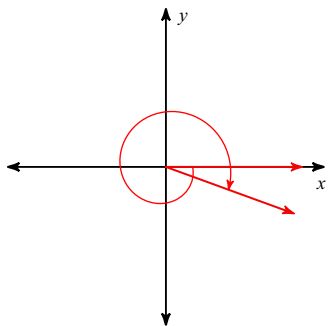
0

258) $\cos -\frac{9\pi}{4}$

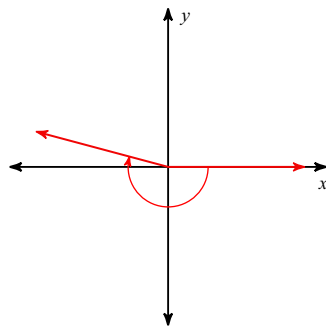
$\frac{\sqrt{2}}{2}$

Draw an angle with the given measure in standard position.

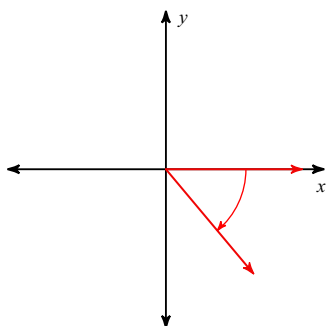
259) $-\frac{19\pi}{9}$



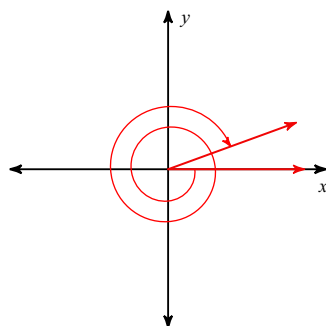
260) $-\frac{13\pi}{12}$



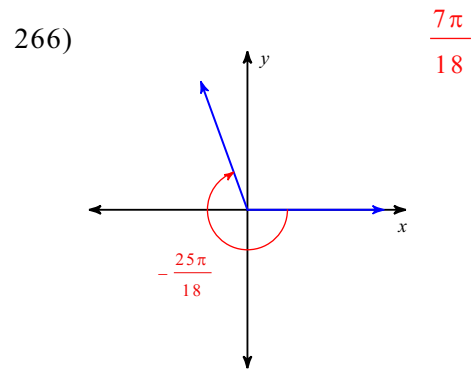
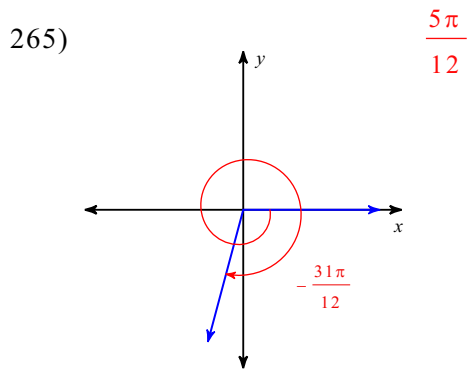
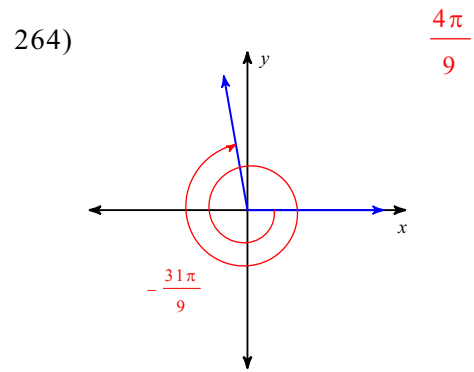
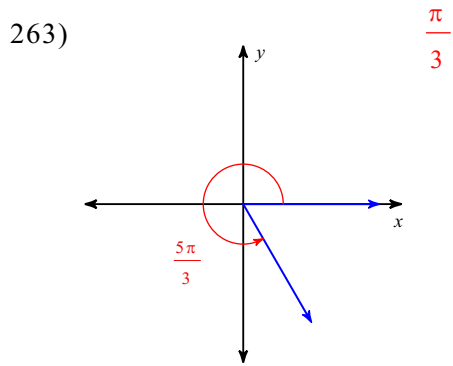
261) $-\frac{5\pi}{18}$



262) $-\frac{35\pi}{9}$



Find the reference angle.



Draw an angle with the given measure in standard position.

