Integrated Math 3 Name_____ ID: 1

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Final Exam Review 1 Semester 1

Date_____ Period____

Simplify each expression.

1) $(1 - 4x + 5x^2) - (2x + 1 - x^2)$

2) $(5v^3 - 5v - 4v^4) - (6v^3 + 2 + 2v^4)$

Find each product.

3) $8(6x - 4)$

4) $8(8n - 4)$

5) $(7k - 5)(6k + 3)$

6) $(7k - 5)(5k + 3)$

7) $(2x + 6)(3x^2 - 7x - 5)$

8) $(2n + 8)(3n^2 - 7n - 3)$

9) $(6x - 6)^2$

10) $(3k + 1)^2$

11) $(8x - 8)(8x + 8)$

12) $(4x + 8)(4x - 8)$

Expand completely.

13) $(2y + 1)^3$

14) $(x - 4y)^4$

State if the given binomial is a factor of the given polynomial.

15) $(v^5 - 12v^4 + 35v^3 - 2v^2 - 33v - 26) \div (v - 4)$

16) $(n^4 - 13n^3 + 36n^2 + 34n + 12) \div (n - 6)$

Divide.

17) $(n^3 - 12n^2 + 37n - 22) \div (n - 4)$

18) $(x^4 + 8x^3 + 21x^2 + 26x - 24) \div (x + 5)$

Factor each completely.

19) $12x^3 + 16x^2 - 9x - 12$

20) $7r^3 + 6r^2 - 7r - 6$

21) $250x^3 + 432$

22) $500x^3 - 32$

23) $2x^4 + 16x^2 + 32$

24) $5a^4 - 30a^2 - 80$

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25) $20x^4 - 156x^2 - 216$

26) $7x^4 - 11x^2 + 4$

27) $-10m^4 + 37m^2 + 36$

28) $40x^4 - 10x^2 - 225$

Factor each.

29) $3x^4 - 11x^2 - 42 = 0$

30) $2x^4 - 5x^2 - 42 = 0$

Factor each. One root has been given.

31) $2x^6 + 6x^5 - 15x^4 - 45x^3 + 28x^2 + 84x = 0;\ -3$

32) $6x^4 + 13x^3 - 10x^2 + x = 0;\ \frac{1}{2}$

Factor each and find all roots. One root has been given.

33) $2x^4 + 5x^3 - 5x^2 - 5x + 3 = 0;\ -3$

34) $30x^4 + 74x^3 + 89x^2 - 66x + 9 = 0;\ \frac{1}{5}$

Factor each and find all roots.

35) $2x^5 + 4x^4 - 15x^3 - 30x^2 - 8x - 16 = 0$

36) $x^6 - 64 = 0$

Evaluate each function at the given value.

37) $f(a) = a^6 + 9a^5 + 18a^4 - 5a^3 - 34a^2 - 18a + 24$ at $a = -6$

38) $f(m) = m^6 + m^5 - 19m^4 + 11m^3 + 33m^2 + 19m + 24$ at $m = -5$

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

39) $2\sqrt{2},\ -2\sqrt{2},\ -i$

40) $1,\ -3 + \sqrt{10}$

Factor each. One root has been given.

41) $x^4 - 4x^3 - 9x^2 + 26x - 30 = 0;\ 1 + i$

42) $x^4 - 9x^3 + 26x^2 - 34x + 20 = 0;\ 1 + i$

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

43) $\sqrt{2},\ -\sqrt{2},\ 2 + \sqrt{5}$

44) $-2 + \sqrt{2},\ -2i$

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

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

46) $f(x) = x^3 + 8x^2 - 41x + 24$

Find all roots.

47) $4x^3 - 8x^2 + 5x - 1 = 0$

48) $15x^5 + 6x^4 + 145x^3 + 58x^2 + 90x + 36 = 0$

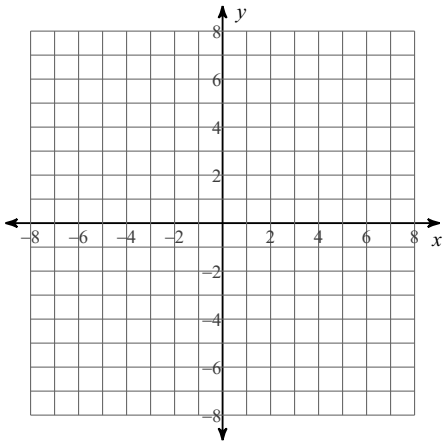
Sketch the general shape of each function.

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

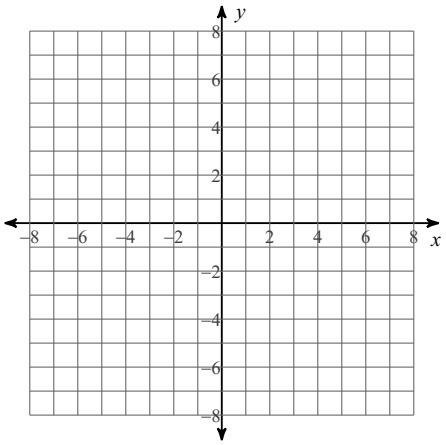
50) $f(x) = -x^4 + 2x^3 + 2x^2 - 2$

State the maximum number of turns the graph of each function could make. Then sketch the graph. State the number of real zeros.

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



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



Evaluate each function.

53) $h(n) = 2n + 5$; Find $h(n - 2)$

54) $h(n) = n^3 - n^2$; Find $h(4n)$

Perform the indicated operation.

55) $f(n) = 3n + 2$
$g(n) = n^3 - n^2$
Find $\left(\frac{f}{g}\right)(n)$

56) $g(x) = -4x - 2$
$f(x) = x^2 - 5$
Find $(g \circ f)(x)$

57) $g(x) = 3x + 2$
$h(x) = 3x^2 + 1$
Find $g(x) + h(x)$

58) $g(t) = t - 3$
$h(t) = 3t - 5$
Find $(g \cdot h)(t)$

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59) $g(t) = t^3 - t$
$h(t) = 4t - 5$
Find $g(-t) \div h(-t)$

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

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

62) $h(a) = 2a + 5$
$g(a) = a^3 + 2a$
Find $h(g(a - 3))$

State if the given functions are inverses.

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

64) $g(x) = \frac{3}{x} + 3$
$f(x) = -\frac{2}{x + 2} + 3$

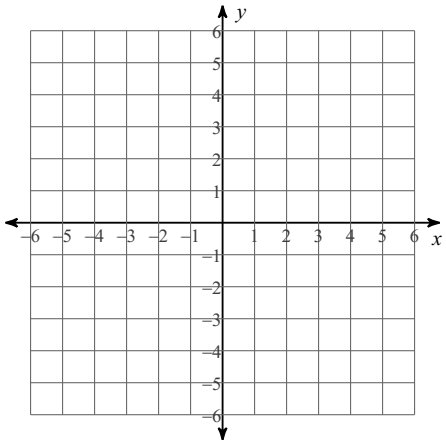
Find the inverse of each function.

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

66) $g(x) = -x + 5$

Find the inverse of each function. Then graph the function and its inverse.

67) $h(n) = \sqrt[3]{n - 1} - 2$



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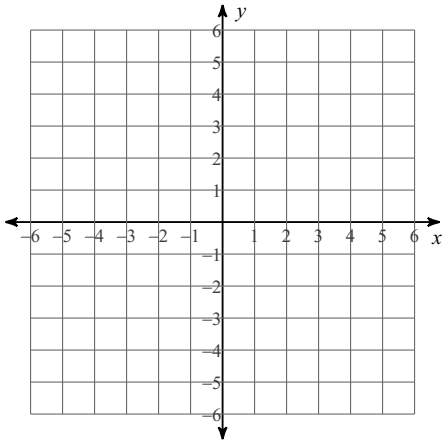
68) $g(n) = \dfrac{2}{n-2} - 2$



Simplify. Use absolute value signs when necessary.

69) $-6\sqrt{32}$

70) $5\sqrt{8x^4y^4}$

Simplify.

71) $3\sqrt{2} - \sqrt{3} + 2\sqrt{3}$

72) $2\sqrt{3} - \sqrt{5} + 3\sqrt{5}$

73) $-3\sqrt[4]{3} - \sqrt[4]{486} + 3\sqrt[4]{486} - 3\sqrt[4]{3}$

74) $2\sqrt[3]{108} + 2\sqrt[3]{4} + 2\sqrt[3]{135} + 3\sqrt[3]{24}$

75) $5\sqrt{3x^2} \cdot \sqrt{6x}$

76) $\sqrt{3r^2} \cdot \sqrt{12r^2}$

77) $\sqrt{15}\left(\sqrt{6} + \sqrt{5a}\right)$

78) $\sqrt{10p}\left(\sqrt{5} + 3\sqrt{2p}\right)$

79) $\left(-3\sqrt{3n} + \sqrt{2}\right)\left(3\sqrt{3} + \sqrt{3}\right)$

80) $\left(-5\sqrt{3n} + 2\sqrt{5n}\right)\left(\sqrt{3} + 2\sqrt{5n}\right)$

81) $\dfrac{\sqrt{25}}{2\sqrt{16}}$

82) $\dfrac{5\sqrt{25}}{\sqrt{16}}$

83) $\dfrac{2 - \sqrt[4]{3}}{5\sqrt[4]{81}}$

84) $\dfrac{\sqrt{2} - \sqrt{3}}{5\sqrt{4}}$

85) $\dfrac{3}{-1 - \sqrt{3}}$

86) $\dfrac{\sqrt{5}}{3 - 4\sqrt{5}}$

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87) $\dfrac{2+2\sqrt{2}}{5+3\sqrt{2}}$

88) $\dfrac{4\sqrt{5}-3\sqrt{2}}{2+\sqrt{3}}$

Write each expression in radical form.

89) $x^{-\frac{5}{6}}$

90) $(4n)^{\frac{4}{3}}$

Write each expression in exponential form.

91) $\left(\sqrt[3]{10x}\right)^5$

92) $\left(\sqrt[3]{7x}\right)^5$

Simplify.

93) $\left(n^4\right)^{-\frac{3}{2}}$

94) $\left(27x^6\right)^{\frac{5}{3}}$

95) $\left(100n^4\right)^{\frac{1}{2}}$

96) $\left(343v^3\right)^{-\frac{1}{3}}$

97) $\left(64k^2\right)^{\frac{3}{2}}$

98) $\left(100k^2\right)^{\frac{3}{2}}$

Simplify. Your answer should contain only positive exponents.

99) $\left(\dfrac{2^{-2}}{4\cdot 2^{-4}}\right)^{-1}$

100) $\left(\dfrac{2^0\cdot 2^4\cdot 2^4}{2^{-1}}\right)^3$

101) $\dfrac{a^2b^2\cdot 2a^{-1}b^{-4}}{\left(a^0\right)^{-4}}$

102) $\dfrac{x^2y^{-3}\cdot x^{-1}y^{-3}}{\left(y^{-3}\right)^{-1}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

103) $3x^{\frac{2}{3}}y^{-\frac{3}{2}}\cdot 2x^0y^2\cdot 4x^{-1}y^{\frac{1}{2}}$

104) $3y^0\cdot 2yx^{-2}$

105) $\dfrac{yx^{-2}}{\left(x^2y^{-\frac{2}{3}}\right)^{-\frac{2}{3}}\cdot x^0}$

106) $\dfrac{\left(m^{\frac{5}{4}}n^{\frac{1}{2}}\right)^{-\frac{1}{3}}\cdot\left(m^{\frac{4}{3}}n^{-2}\right)^{\frac{1}{2}}}{m^4n^{\frac{3}{4}}\cdot m^{-\frac{2}{3}}n^2}$

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Solve each equation. Remember to check for extraneous solutions.

107) $21 = 3\sqrt{\frac{b}{2}}$

108) $\sqrt{x-4} = \sqrt{14-x}$

109) $\sqrt{2v-9} = v-6$

110) $\sqrt{4v+45} = v+6$

111) $\sqrt{5b-29} = b-5$

112) $b-5 = \sqrt{7-b}$

113) $(3x+7)^{\frac{1}{2}} = 5 + (6-x)^{\frac{1}{2}}$

114) $1 + (3x+4)^{\frac{1}{2}} = (7x-3)^{\frac{1}{2}}$

Solve each equation.

115) $383 = 8 + 3(v+12)^{\frac{3}{2}}$

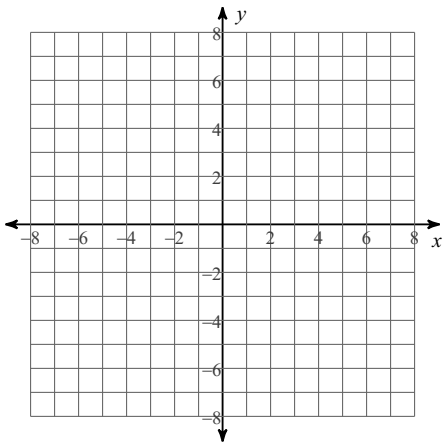
116) $6 + 5(3x-26)^{\frac{1}{3}} = 26$

117) $-2(13-3p)^{\frac{3}{2}} = -2000$

118) $\frac{1}{5} = (a+29)^{-\frac{1}{2}}$

Identify the domain and range of each. Then sketch the graph.

119) $y = 1 - \sqrt[3]{x+4}$



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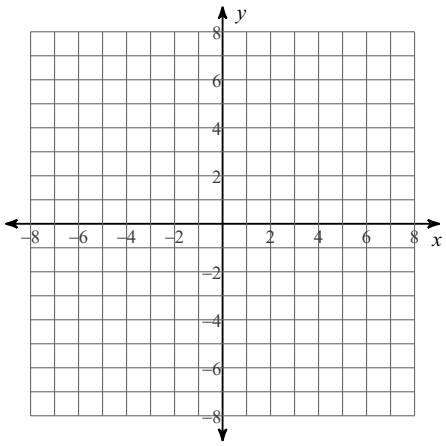
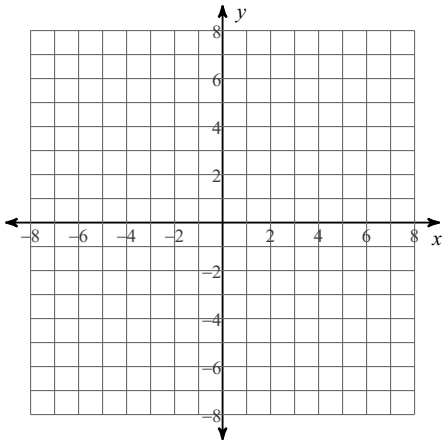
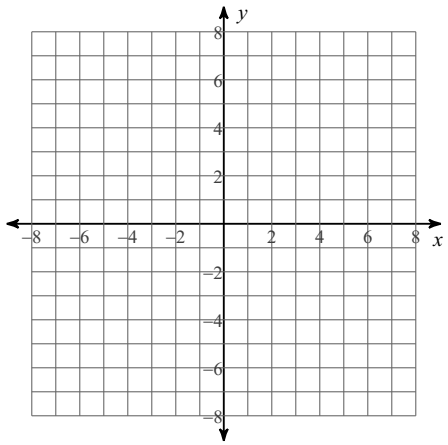
120) $y = -\frac{1}{2}\sqrt[3]{x-3} + 5$



121) $y = -\frac{1}{2}\sqrt{x+1} - 1$

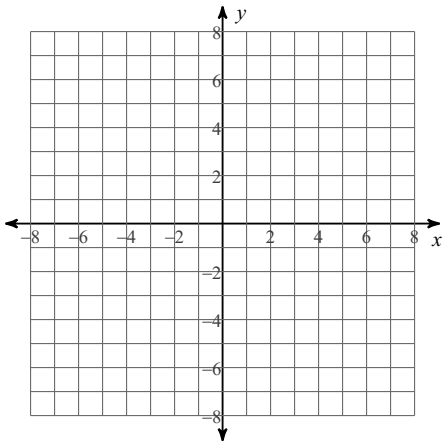


122) $y = -1 + 4\sqrt{x-3}$

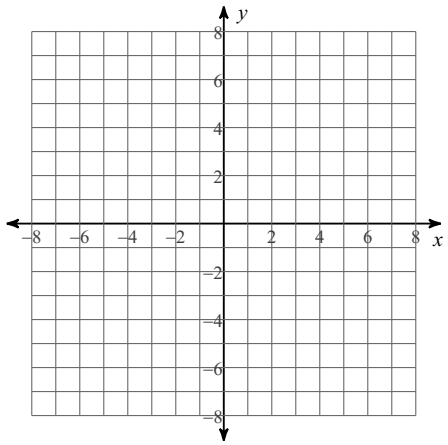


Graph each function.

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



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



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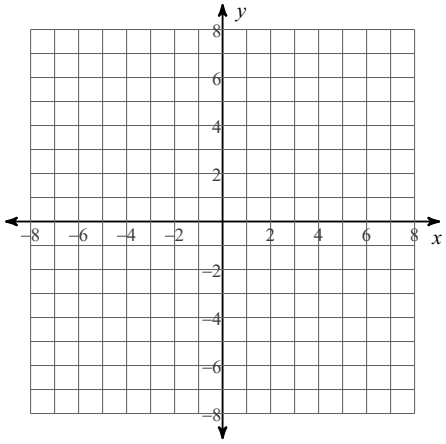
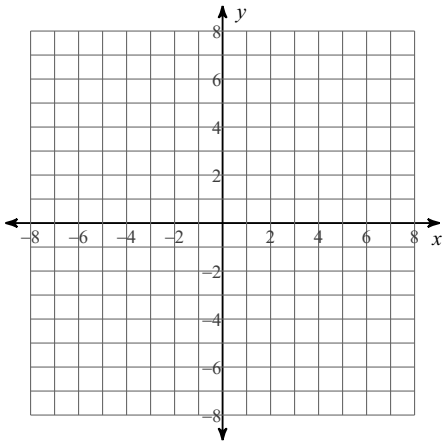
Identify the holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each. Then sketch the graph.

125) $f(x) = \dfrac{x^2 + 2x}{4x - 8}$



126) $f(x) = \dfrac{x^3 - 9x}{-4x^2 + 16}$



Simplify each and state the excluded values.

127) $\dfrac{3p^2 + 2p - 8}{10p^2 + 40p + 40}$

128) $\dfrac{2n^2 + 4n - 6}{8n^2 + 8n - 16}$

129) $\dfrac{56x^2}{40x^2 + 40x}$

130) $\dfrac{63x}{18x^2 - 9x}$

131) $\dfrac{49x^2 + 28x}{7x^2 + 32x + 16} \div \dfrac{1}{x + 7}$

132) $\dfrac{2}{8r^3 - 56r^2} \cdot \dfrac{6r^2}{2}$

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133) $\frac{1}{3x-7} \cdot \frac{24x-56}{2}$

134) $\frac{1}{9x} \div \frac{2x^2}{2x^3-10x^2}$

Simplify each expression.

135) $\frac{5n-6}{5n^2-28n+15} - \frac{5}{5n^2-28n+15}$

136) $\frac{6}{a^2-a-6} + \frac{a-6}{a^2-a-6}$

137) $\frac{5}{x-9} + \frac{7x}{x-7}$

138) $\frac{5}{p-7} + \frac{p+7}{p+6}$

Solve each equation. Remember to check for extraneous solutions.

139) $\frac{1}{m^2+8m} + \frac{m-5}{m} = \frac{m-3}{m+8}$

140) $\frac{r^2+13r+36}{r^2+9r-10} = \frac{r}{r-1} + \frac{1}{r^2+9r-10}$

141) $\frac{r-9}{r^2-4r} + \frac{2}{r^3-4r^2} = \frac{1}{r-4}$

142) $\frac{p+1}{2p^2} = \frac{1}{4p^3+28p^2} + \frac{p+6}{4p^3+28p^2}$

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