Winter 2013 Math 085
Exam 2 7.1–7.6 and 8.1–8.6 Prep v01
Dressler – No Book/No Notes/Yes Calculator

Name_____

Find all values that make the rational expression undefined. If the rational expression is defined for all real numbers, so state.

1) $\frac{x + 5}{(x + 9)(x - 8)}$

2) $\frac{z - 9}{4 - z}$

3) $\frac{z - 5}{2 - z}$

4) $\frac{6}{7x}$

5) $\frac{x + 7}{(x + 9)(x - 6)}$

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

7) $\frac{8y - 5}{y^2 - 81}$

8) $\frac{2y - 8}{y^2 - 64}$

Simplify the rational expression. If the rational expression cannot be simplified, so state.

9) $\frac{y^3 - 125}{y - 5}$

10) $\frac{y^3 - 64}{y - 4}$

11) $\frac{y^3 - 8}{y - 2}$

12) $\frac{y^3 - 27}{y - 3}$

13) $\frac{x^2 + 4x + 16}{x^2 + 7x + 10}$

14) $\frac{x^2 - 6x + 16}{x^2 + 2x - 15}$

Multiply. Simplify if possible.

15) $\frac{k^2 + 10k + 16}{k^2 + 5k + 6} \cdot \frac{k^2 + 7k + 12}{k^2 + 12k + 32}$

16) $\frac{k^2 + 9k + 14}{k^2 + 5k + 6} \cdot \frac{k^2 + 11k + 24}{k^2 + 15k + 56}$

17) $\frac{k^2 + 9k + 18}{k^2 + 6k + 9} \cdot \frac{k^2 + 11k + 24}{k^2 + 14k + 48}$

18) $\frac{5y}{10y + 5} \cdot \frac{14y + 7}{3}$

19) $\frac{3y}{6y+3} \cdot \frac{10y+5}{7}$

Divide. Simplify if possible.

20) $\frac{3x^2}{4} \div \frac{x^3}{24}$

21) $\frac{2x^2}{3} \div \frac{x^3}{12}$

22) $\frac{(y-5)^2}{2} \div \frac{2y-10}{4}$

23) $\frac{(y-3)^2}{5} \div \frac{5y-15}{25}$

Solve.

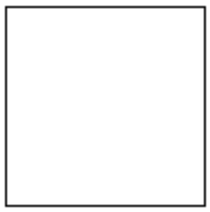
24) Express the perimeter of the rectangle as a fully simplified rational expression.

$\frac{8x+8}{x+2}$ inches

25) Express the perimeter of the rectangle as a fully simplified rational expression.

$\frac{6x+18}{x+4}$ inches

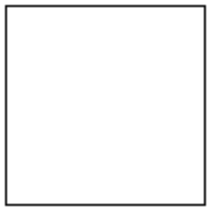
26) A square shaped pasture has a side of length $\frac{11}{x+5}$ meters.



$\frac{11}{x+5}$ meters

Express the perimeter of the pasture as a rational expression.

27) A square shaped pasture has a side of length $\frac{7}{x+10}$ meters.



$\frac{7}{x+10}$ meters

Express the perimeter of the pasture as a rational expression.

Perform the indicated operation(s). Simplify if possible.

28) $\frac{x+7}{x^2+4x-12} + \frac{4x+5}{x^2-7x+10}$

29) $\frac{x+3}{x^2-8x+15} + \frac{3x-5}{x^2-3x-10}$

30) $\frac{x+8}{x^2+8x+7} + \frac{5x+7}{x^2+13x+42}$

Simplify the complex fraction.

31) $\frac{\frac{1}{3}+\frac{1}{4}}{\frac{1}{6}+\frac{1}{7}}$

32) $\frac{\frac{1}{8}+\frac{1}{4}}{\frac{1}{5}+\frac{1}{6}}$

33) $\dfrac{9+\dfrac{3}{x}}{\dfrac{x}{4}+\dfrac{1}{12}}$

34) $\dfrac{4+\dfrac{2}{x}}{\dfrac{x}{3}+\dfrac{1}{6}}$

Solve the rational equation.

35) $\dfrac{x}{4}-\dfrac{x}{5}=9$

36) $\dfrac{x}{8}-\dfrac{x}{9}=7$

37) $\dfrac{x}{3}-\dfrac{x}{8}=7$

38) $\dfrac{9}{y+5}-\dfrac{7}{y-5}=\dfrac{2}{y^2-25}$

39) $\dfrac{7}{y+2}-\dfrac{5}{y-2}=\dfrac{8}{y^2-4}$

40) $6-\dfrac{4}{2x-11}=\dfrac{2}{2x-11}$

41) $9-\dfrac{5}{4x-11}=\dfrac{4}{4x-11}$

42) $7-\dfrac{3}{4x-7}=\dfrac{4}{4x-7}$

Find the square root if it is a real number. If it is not a real number, state so.

43) $-\sqrt{121}$

44) $-\sqrt{25}$

45) $-\sqrt{169}$

46) $\sqrt{\frac{1}{4}}$

47) $-\sqrt{\frac{1}{49}}$

Determine the values of x for which the radical expression is a real number. Express your answer as an inequality or write "all real numbers".

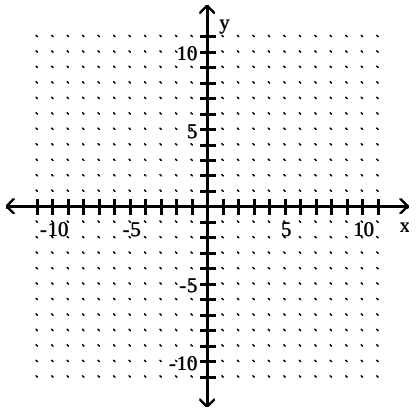
48) $\sqrt{x-3}$

49) $\sqrt{x-5}$

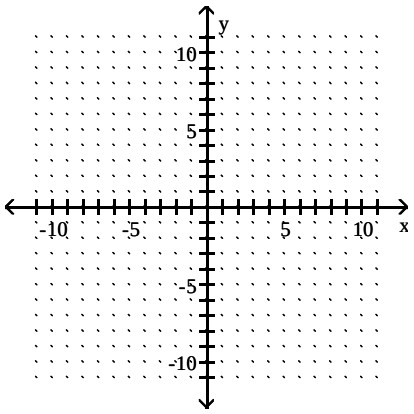
50) $\sqrt{x-3}$

Graph the equation.

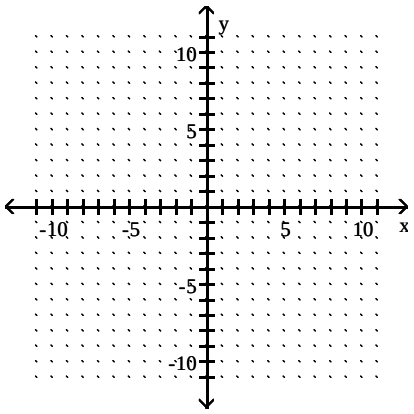
51) $y = \sqrt{x+6}$



52) $y = \sqrt{x + 7}$



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



Use a calculator to approximate the expression to three decimal places. If the expression is not a real number, state this.

54) $\frac{-3 + \sqrt{14}}{4}$

55) $\frac{-2 + \sqrt{5}}{3}$

56) $\frac{-5 + \sqrt{8}}{6}$

Find the cube root.

57) $\sqrt[3]{\frac{1}{27}}$

58) $\sqrt[3]{\frac{1}{64}}$

Simplify.

59) $\frac{\sqrt{45x^3}}{\sqrt{5}x}$

60) $\frac{\sqrt{98x^3}}{\sqrt{2}x}$

61) $\frac{\sqrt{147x^3}}{\sqrt{3}x}$

62) $\frac{\sqrt{32x^3}}{\sqrt{2}x}$

Add or subtract as indicated. If terms are not like radicals and cannot be combined, so state. Assume all variables represent nonnegative real numbers.

63) $\sqrt{45} + \sqrt{320}$

64) $\sqrt{12} + \sqrt{192}$

65) $\sqrt{20} - \sqrt{245}$

Rationalize the denominator. Simplify, if possible.

66) $\sqrt{\frac{27}{x}}$

67) $\sqrt{\frac{125}{x}}$

68) $\sqrt{\frac{8}{x}}$

69) $\frac{\sqrt{2}}{\sqrt{7}+2}$

70) $\frac{\sqrt{2}}{\sqrt{11}+2}$

71) $\frac{\sqrt{6}}{\sqrt{7}+2}$

Solve the equation.

72) $\sqrt{x}+9=8$

73) $\sqrt{x}+8=7$

74) $\sqrt{x}+10=9$

75) $\sqrt{16x^2+9x-45}=4x$

76) $\sqrt{4x^2+10x-40}=2x$

77) $\sqrt{9x^2+8x-32}=3x$

Simplify the given expression.

78) $\left(\frac{64}{121}\right)^{1/2}$

79) $\left(\frac{625}{289}\right)^{1/2}$

80) $\left(\frac{121}{4}\right)^{1/2}$

Simplify the expression. Write the answer with positive exponents only. Assume that all variables represent positive real numbers.

81) $x^{1/8} \cdot x^{5/8}$

82) $x^{5/8} \cdot x^{1/8}$

83) $x^{2/3} \cdot x^{1/2}$

84) $x^{1/4} \cdot x^{3/2}$

85) $\dfrac{x^{6/8}}{x^{1/8}}$

86) $\dfrac{x^{1/7}}{x^{1/11}}$

87) $\left(\dfrac{x^{3/4}}{x^{5/4} \cdot x^{7/4}}\right)^8$

88) $\left(\dfrac{x^{1/5}}{y^{5/4}}\right)^2$

89) $\left(\dfrac{x^{3/4}}{x^{5/4} \cdot x^{7/4}}\right)^8$

Simplify the given expression.

90) $81^{1/4}$

1) $x = -9, x = 8$
2) $z = 4$
3) $z = 2$
4) $x = 0$
5) $x = -9, x = 6$
6) $x = -6, x = 5$
7) $y = 9, y = -9$
8) $y = 8, y = -8$
9) $y^2 + 5y + 25$
10) $y^2 + 4y + 16$
11) $y^2 + 2y + 4$
12) $y^2 + 3y + 9$
13) cannot be simplified
14) cannot be simplified
15) 1
16) 1
17) 1
18) $\frac{7y}{3}$
19) $\frac{5y}{7}$
20) $\frac{18}{x}$
21) $\frac{8}{x}$
22) $y - 5$
23) $y - 3$
24) 16 in.
25) 12 in.
26) $\frac{44}{x + 5}$ m
27) $\frac{28}{x + 10}$ m
28) $\frac{5x^2 + 31x - 5}{(x - 2)(x + 6)(x - 5)}$
29) $\frac{4x^2 - 9x + 21}{(x - 5)(x - 3)(x + 2)}$
30) $\frac{6x^2 + 26x + 55}{(x + 7)(x + 1)(x + 6)}$
31) $\frac{49}{26}$
32) $\frac{45}{44}$
33) $\frac{36}{x}$

34) $\frac{12}{x}$

35) $\{180\}$

36) $\{504\}$

37) $\left\{\frac{168}{5}\right\}$

38) {41}

39) {16}

40) {6}

41) {3}

42) {2}

43) –11

44) –5

45) –13

46) $\frac{1}{2}$

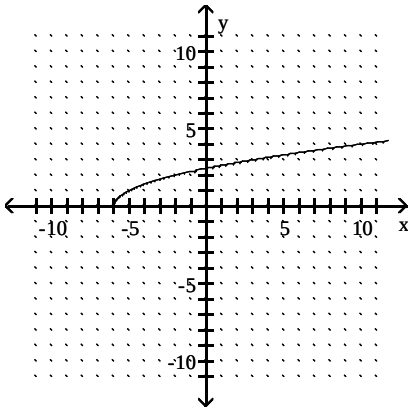
47) $-\frac{1}{7}$

48) $x \geq 3$

49) $x \geq 5$

50) $x \geq 3$

51)



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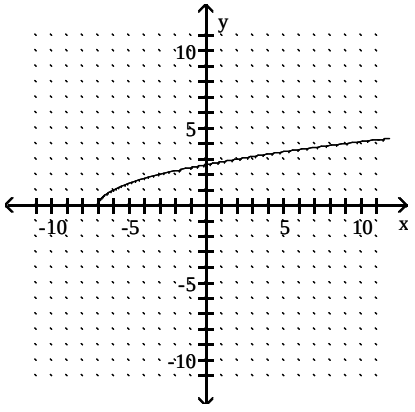

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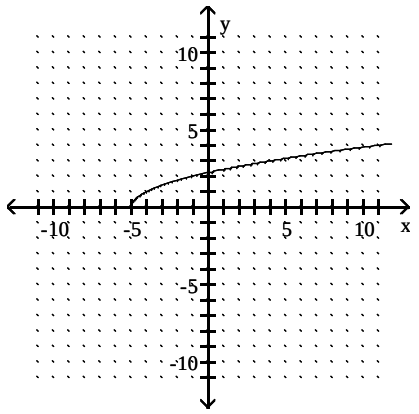

54) 0.185
55) 0.079
56) –0.362
57) $\frac{1}{3}$
58) $\frac{1}{4}$
59) 3x
60) 7x
61) 7x
62) 4x
63) $11\sqrt{5}$
64) $10\sqrt{3}$
65) $-5\sqrt{5}$
66) $\frac{3\sqrt{3x}}{x}$
67) $\frac{5\sqrt{5x}}{x}$
68) $\frac{2\sqrt{2x}}{x}$
69) $\frac{\sqrt{14}-2\sqrt{2}}{3}$
70) $\frac{\sqrt{22}-2\sqrt{2}}{7}$
71) $\frac{\sqrt{42}-2\sqrt{6}}{3}$
72) ∅
73) ∅
74) ∅
75) {5}
76) {4}
77) {4}
78) $\frac{8}{11}$

79) $\frac{25}{17}$

80) $\frac{11}{2}$

81) $x^{3/4}$

82) $x^{3/4}$

83) $x^{7/6}$

84) $x^{7/4}$

85) $x^{5/8}$

86) $x^{4/77}$

87) $\frac{1}{x^{18}}$

88) $\frac{x^{2/5}}{y^{5/2}}$

89) $\frac{1}{x^{18}}$

90) 3