Winter 2013 Math 085
Exam 2 7.1–7.6 and 8.1–8.6 Prep v02
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) $\frac{x + 9}{(x + 7)(x - 3)}$

2) $\frac{z - 4}{8 - z}$

3) $\frac{a - 4}{8 - a}$

4) $\frac{20}{11x}$

5) $\frac{x + 6}{(x + 4)(x - 9)}$

6) $\frac{x + 2}{(x + 7)(x - 3)}$

7) $\frac{3y - 2}{y^2 - 81}$

8) $\frac{5y - 2}{y^2 - 49}$

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

9) $\frac{y^3 - 343}{y - 7}$

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

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

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

13) $\frac{x^2 + 6x + 16}{x^2 + 8x + 15}$

14) $\frac{x^2 + 4x + 9}{x^2 + 7x + 10}$

Multiply. Simplify if possible.

15) $\frac{k^2 + 9k + 20}{k^2 + 10k + 24} \cdot \frac{k^2 + 10k + 24}{k^2 + 9k + 20}$

16) $\frac{k^2 + 12k + 35}{k^2 + 9k + 14} \cdot \frac{k^2 + 11k + 18}{k^2 + 14k + 45}$

17) $\frac{k^2 + 10k + 16}{k^2 + 7k + 10} \cdot \frac{k^2 + 11k + 30}{k^2 + 14k + 48}$

18) $\frac{4y}{8y + 4} \cdot \frac{14y + 7}{3}$

19) $\frac{6y}{12y + 6} \cdot \frac{14y + 7}{3}$

Divide. Simplify if possible.

20) $\frac{4x^2}{5} \div \frac{x^3}{40}$

21) $\frac{3x^2}{5} \div \frac{x^3}{35}$

22) $\frac{(y - 11)^2}{9} \div \frac{9y - 99}{81}$

23) $\frac{(y - 4)^2}{7} \div \frac{7y - 28}{49}$

Solve.

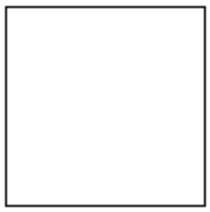
24) Express the perimeter of the rectangle as a fully simplified rational expression.

$\frac{8x + 24}{x + 4}$ inches

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

$\frac{8x + 16}{x + 3}$ inches

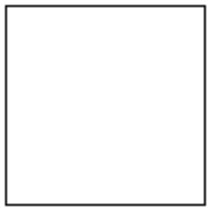
26) A square shaped pasture has a side of length $\frac{5}{x+4}$ meters.



$\frac{5}{x+4}$ meters

Express the perimeter of the pasture as a rational expression.

27) A square shaped pasture has a side of length $\frac{9}{x+2}$ meters.



$\frac{9}{x+2}$ meters

Express the perimeter of the pasture as a rational expression.

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

28) $\frac{x+5}{x^2+8x+7} + \frac{5x-4}{x^2+12x+35}$

29) $\frac{x+3}{x^2-5x+6} + \frac{3x-1}{x^2+2x-8}$

30) $\frac{x-4}{x^2+2x-35} + \frac{3x+7}{x^2-11x+30}$

Simplify the complex fraction.

31) $\frac{\frac{1}{6}+\frac{1}{3}}{\frac{1}{2}+\frac{1}{8}}$

32) $\frac{\frac{1}{6}+\frac{1}{2}}{\frac{1}{4}+\frac{1}{8}}$

33) $\dfrac{4+\dfrac{2}{x}}{\dfrac{x}{4}+\dfrac{1}{8}}$

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

Solve the rational equation.

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

36) $\dfrac{x}{6}-\dfrac{x}{9}=4$

37) $\dfrac{x}{2}-\dfrac{x}{9}=4$

38) $\dfrac{3}{y+3}-\dfrac{6}{y-3}=\dfrac{12}{y^2-9}$

39) $\dfrac{4}{y+4}-\dfrac{6}{y-4}=\dfrac{8}{y^2-16}$

40) $8-\dfrac{3}{4x-7}=\dfrac{5}{4x-7}$

41) $6-\dfrac{1}{4x-11}=\dfrac{5}{4x-11}$

42) $9-\dfrac{5}{2x-7}=\dfrac{4}{2x-7}$

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

43) $-\sqrt{9}$

44) $-\sqrt{225}$

45) $-\sqrt{81}$

46) $\sqrt{\frac{1}{81}}$

47) $-\sqrt{\frac{1}{100}}$

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".

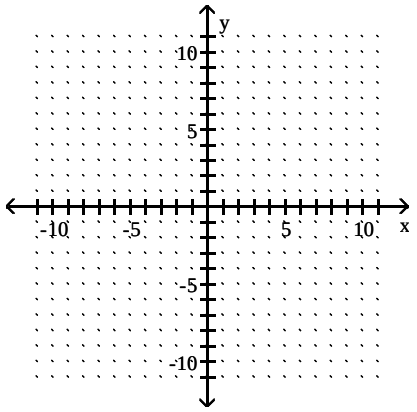
48) $\sqrt{x-8}$

49) $\sqrt{x-6}$

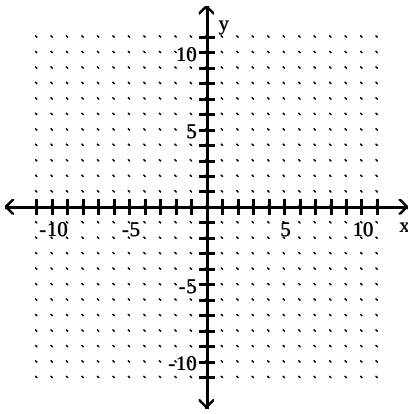
50) $\sqrt{x-10}$

Graph the equation.

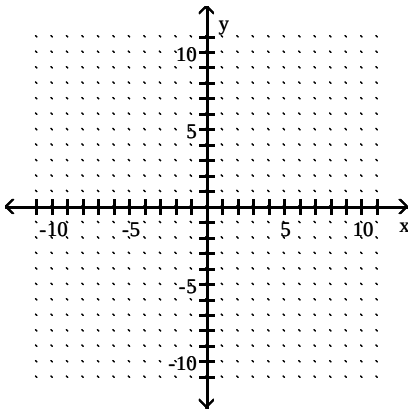
51) $y = \sqrt{x-4}$



52) $y = \sqrt{x - 6}$



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



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

54) $\frac{-4 + \sqrt{8}}{5}$

55) $\frac{-7 + \sqrt{12}}{8}$

56) $\frac{-6 + \sqrt{10}}{7}$

Find the cube root.

57) $\sqrt[3]{\frac{1}{8}}$

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

Simplify.

59) $\frac{\sqrt{245x^3}}{\sqrt{5}x}$

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

61) $\frac{\sqrt{72x^3}}{\sqrt{2}x}$

62) $\frac{\sqrt{48x^3}}{\sqrt{3}x}$

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) $\sqrt{27} + \sqrt{147}$

64) $\sqrt{27} - \sqrt{192}$

65) $\sqrt{12} - \sqrt{192}$

Rationalize the denominator. Simplify, if possible.

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

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

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

69) $\frac{\sqrt{2}}{\sqrt{17}+3}$

70) $\frac{\sqrt{3}}{\sqrt{17}+2}$

71) $\frac{\sqrt{2}}{\sqrt{17}+2}$

Solve the equation.

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

73) $\sqrt{x}+6=5$

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

75) $\sqrt{4x^2+5x-20}=2x$

76) $\sqrt{4x^2+12x-60}=2x$

77) $\sqrt{16x^2+12x-60}=4x$

Simplify the given expression.

78) $\left(\frac{121}{441}\right)^{1/2}$

79) $\left(\frac{49}{361}\right)^{1/2}$

80) $\left(\frac{144}{529}\right)^{1/2}$

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

81) $x^{4/9} \cdot x^{4/9}$

82) $x^{2/9} \cdot x^{4/9}$

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

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

85) $\dfrac{x^{7/8}}{x^{6/8}}$

86) $\dfrac{x^{1/5}}{x^{1/14}}$

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) $16^{1/4}$

1) $x = -7, x = 3$
2) $z = 8$
3) $a = 8$
4) $x = 0$
5) $x = -4, x = 9$
6) $x = -7, x = 3$
7) $y = 9, y = -9$
8) $y = 7, y = -7$
9) $y^2 + 7y + 49$
10) $y^2 + 4y + 16$
11) $y^2 + 5y + 25$
12) $y^2 + 2y + 4$
13) cannot be simplified
14) cannot be simplified
15) 1
16) 1
17) 1
18) $\frac{7y}{3}$
19) $\frac{7y}{3}$
20) $\frac{32}{x}$
21) $\frac{21}{x}$
22) $y - 11$
23) $y - 4$
24) 16 in.
25) 16 in.
26) $\frac{20}{x + 4}$ m
27) $\frac{36}{x + 2}$ m
28) $\frac{6x^2 + 11x + 21}{(x + 7)(x + 1)(x + 5)}$
29) $\frac{4x^2 - 3x + 15}{(x - 2)(x - 3)(x + 4)}$
30) $\frac{4x^2 + 18x + 73}{(x - 5)(x + 7)(x - 6)}$
31) $\frac{4}{5}$
32) $\frac{16}{9}$
33) $\frac{16}{x}$

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

35) $\{168\}$

36) $\{72\}$

37) $\left\{\frac{72}{7}\right\}$

38) {–13}

39) {–24}

40) {2}

41) {3}

42) {4}

43) –3

44) –15

45) –9

46) $\frac{1}{9}$

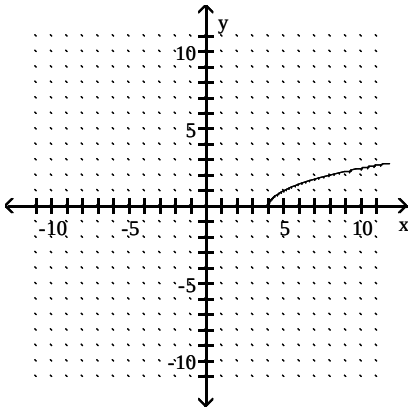
47) $-\frac{1}{10}$

48) $x \geq 8$

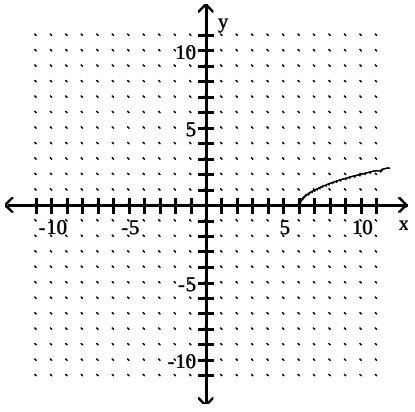
49) $x \geq 6$

50) $x \geq 10$

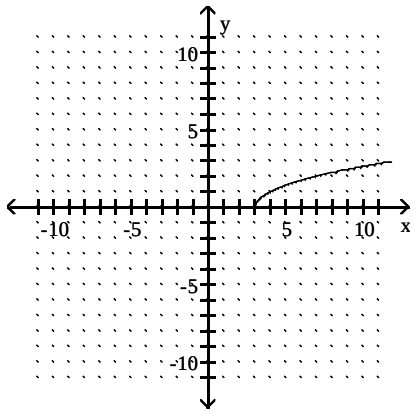
51)



52)



53)



54) −0.234
55) −0.442
56) −0.405
57) $\frac{1}{2}$
58) $\frac{1}{3}$
59) 7x
60) 3x
61) 6x
62) 4x
63) $10\sqrt{3}$
64) $-5\sqrt{3}$
65) $-6\sqrt{3}$
66) $\frac{3\sqrt{3x}}{x}$
67) $\frac{5\sqrt{5x}}{x}$
68) $\frac{2\sqrt{2x}}{x}$
69) $\frac{\sqrt{34}-3\sqrt{2}}{8}$
70) $\frac{\sqrt{51}-2\sqrt{3}}{13}$
71) $\frac{\sqrt{34}-2\sqrt{2}}{13}$
72) ∅
73) ∅
74) ∅
75) {4}
76) {5}
77) {5}
78) $\frac{11}{21}$

79) $\frac{7}{19}$

80) $\frac{12}{23}$

81) $x^{8/9}$

82) $x^{2/3}$

83) $x^{7/4}$

84) $x^{11/6}$

85) $x^{1/8}$

86) $x^{9/70}$

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

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

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

90) 2