M117 Practice Exam 1 Chapter 7 Name_____

Fall 2007

DIRECTIONS. Show all work on a seperate sheet of paper. Check all your answers as you do each problem.

Find every value for the variable that makes the expression undefined.

1) $\frac{d - 7}{9 - d}$ 1) _____

2) $\frac{x^2 - 9}{x^2 - 2x - 35}$ 2) _____

Simplify each rational expression.

3) $\frac{10x^2 - 13x - 3}{2x^2 + 5x - 12}$ 3) _____

4) $\frac{2 - m}{m - 2}$ 4) _____

Simplify each rational expression.

5) $\frac{14x^2 - x - 3}{2x^2 - 7x + 3}$ 5) _____

6) $\frac{(y - 5)^2}{y^2 - 25}$ 6) _____

7) $\frac{5x^2 - 20y^2}{2y - x}$ 7) _____

8) $\frac{x^3 - 27}{x^2 - 6x + 9}$ 8) _____

Solve.

9) In analyzing circuits, electrical engineers often have to simplify rational expressions. Suppose the following rational expression describes an electrical circuit: 9) _____

$$\frac{a^2 - 49}{a^2 + 10a + 21}$$

Simplify the expression to lowest terms.

Multiply or divide if possible.

10) $\frac{a^2 - 36}{10a} \cdot \frac{2a}{a + 6}$ 10) _____

11) $\frac{6t - 6}{2t^2 + t - 1} \cdot \frac{t^2 - 1}{t^2 - 2t + 1}$ 11) _____

12) $\frac{t^2 + 3t - 4}{2} \div \frac{t^2 - 1}{2t + 8}$ 12) _____

13) $\frac{2a^2 + 5a - 3}{a^2} \cdot \frac{5a^3 + 30a^2}{2a^2 + 7a - 4} \div \frac{a^2 + 6a}{a^2 + 7a + 12}$ 13) _____

Add or subtract if possible. Reduce all answers.

14) $\frac{x + 8}{x + 7} + \frac{10 - 4x}{x + 7}$ 14) _____

15) $\frac{5}{8 - y} - \frac{7}{y - 8}$ 15) _____

16) $\frac{3}{3x - 9} + \frac{x - 2}{3 - x}$ 16) _____

17) $\frac{3x - 1}{2x} - \frac{x - 3}{x}$ 17) _____

18) $\frac{2a}{a + 1} - \frac{4a}{1 - a^2}$ 18) _____

19) $\frac{3x}{x+2} - \frac{x}{x-2} + \frac{8}{x^2-4}$ 19) _____

Use the order–of–operations agreement to simplify.

20) $\frac{t-1}{4-t} - \frac{t+5}{t+4} + \frac{t-2}{16-t^2}$ 20) _____

Simplify

21) $\frac{\frac{x^2}{x^2-y^2}}{\frac{-x}{x+y}}$ 21) _____

22) $\frac{2-\frac{3}{x^2}}{2+\frac{3}{x^4}}$ 22) _____

Check the given value to see if it is a solution to the equation.

23) $\frac{30}{x} - \frac{30}{x-6} = \frac{3}{x}$; $x = -54$ 23) _____

Solve.

24) $\frac{3}{y} - \frac{1}{4} = \frac{1}{4}$ 24) _____

25) $\frac{5}{x+3} = \frac{3}{x+2}$ 25) _____

26) $\frac{x}{x^2+x-2} + \frac{x}{x^2-1} = \frac{x}{x^2+3x+2}$ 26) _____

Solve.

27) $\frac{2}{x^2-9} + \frac{5}{x-3} = \frac{3}{x+3}$ 27) _____

28) $\frac{15}{x} - \frac{15}{x-2} = -2$ 28) _____

Solve for the indicated variable.

29) $\frac{1}{t} = \frac{1}{m} - \frac{1}{n}$ for n 29) _____

30) $\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$ for f 30) _____

Simplify.

31) $\dfrac{\frac{4}{x^2 - 36} + \frac{1}{x - 6}}{\frac{7}{x^2 - 36} + \frac{3}{x + 6}}$ 31) _____

Solve for the indicated variable.

32) d = rt + wt for t 32) _____

Set up an equation or a system of equation and use it to solve the following problems.

33) Kopy Kwik has 2 copiers. One can copy a year end report in 20 minutes . The other can copy the same job in 30 minutes. How long would it take both machines, working together to copy the report? 33) _____

34) Jim and Steve's motorboats both travel at the same speed. Jim pilots his boat 60 miles before docking. Steve continues for another 2 hours, traveling a total of 120 miles before docking. How long did it take Jim to navigate the 60 miles? 34) _____

35) A recipe for pizza crust calls for $3\frac{1}{2}$ cups of whole wheat flour and $1\frac{1}{4}$ cups of warm water. If 6 cups of whole wheat flour are used, how much waater should be used? 35) _____

36) One car travels 20 km/h faster than another. In the same time that one goes 225km, the other goes 325km. Find the speed of each car. 36) _____

37) The reciprocal of 1 more than a number is twice the reciprocal of the number itself. What is the number? 37) _____

Solve.

38) A plane flies 460 miles with the wind and 310 miles against the wind in the same length of time. If the speed of the wind is 30 mph, what is the speed of the plane in still air? 38) _____

Set up an equation or a system of equation and use it to solve the following problems.

39) Manley's tractor is just as fast as Caledonia's. It takes Manley 1 hour more than it takes Calkediona to drive to town. If Manley is 20 miles from town and Caledonia is 15 miles from town, how long does it take Caledonia to drive to town? 39) _____

Solve.

40) If m varies directly as p, and $m = 25$ when $p = 5$, find m when p is 9. 40) _____

1) 9
2) –5, 7
3) $\frac{5x + 1}{x + 4}$
4) –1
5) $\frac{7x + 3}{x - 3}$
6) $\frac{y - 5}{Y + 5}$
7) $-5(x + 2y)$
8) $\frac{x^2 + 3x + 9}{x - 3}$
9) $\frac{a - 7}{a + 3}$
10) $\frac{a - 6}{5}$
11) $\frac{6}{2t - 1}$
12) $\frac{(t + 4)^2}{t - + 1}$
13) $\frac{5(a + 3)^2}{a}$
14) $\frac{-3x + 18}{x + 7}$
15) $\frac{12}{8 - y}$
16) -1
17) $\frac{x + 5}{2x}$
18) $\frac{2a}{a - 1}$
19) $\frac{2(x - 2)}{x + 2}$
20) $\frac{2t^2 + 5t - 26}{16 - t^2}$
21) $\frac{-x}{x - y}$

22) $\frac{2x^4 - 3x^2}{2x^4 + 3}$

23) Yes

24) { 6}

25) $\{ -\frac{1}{2} \}$

26) 0 or −4

27) { −13 }

28) { −3 , 5 }

29) $n = \frac{-tm}{m - t}$ or $n = \frac{tm}{t - m}$

30) $f = \frac{pq}{q + p}$

31) $\frac{x + 10}{3x - 11}$

32) $t = \frac{d}{r + w}$

33) 12 minutes

34) 2 hr

35) $2\frac{1}{7}$ cups

36) 45km/h and 65km/h

37) −2

38) 154 mph

39) 3 hours

40) m = 45