

**Math 51 Exam #3 Review – Winter 2016**

**Please Note:** The exam will cover sections 8.3-8.7, Chapter 4, Chapter 5, and 9.1-9.5. The review sheet is designed for you to have a guide as to what to study. The problems on the exam are not limited to the type of problems on this sheet. Any types of problem from the assigned homework problems are possible exam questions. As a reminder, all word problems will need to be solved using an equation. No credit will be given to a problem solved without the use of an equation. Please attempt other practice problems other than those presented on this sheet in order to be completely prepared for the exam.

1. Perform the indicated operation.

a.  $\frac{4}{p+2} + \frac{1}{3p+6}$

b.  $\frac{x+1}{3-x} + \frac{x^2}{x-3}$

c.  $\frac{2}{x^2-4x} - \frac{3}{x^2-16}$

d.  $\frac{4m}{m^2+3m+2} + \frac{2m-1}{m^2+6m+5}$

e.  $\frac{\frac{1}{x^2} - \frac{1}{y^2}}{\frac{1}{x} - \frac{1}{y}}$

f.  $\frac{\frac{1}{m^3p} + \frac{2}{mp^2}}{\frac{4}{mp} + \frac{1}{m^2p}}$

2. Solve for  $x$ . Remember to determine the restricted values.

a.  $\frac{x+2}{3} = \frac{2x-1}{5}$

b.  $\frac{x}{x-2} + \frac{3}{x+2} = \frac{8}{x^2-4}$

$$c. \frac{2}{x-1} - \frac{2}{3} = \frac{-1}{x+1}$$

$$d. \frac{3x}{x^2+5x+6} = \frac{5x}{x^2+2x-3} - \frac{2}{x^2+x-2}$$

3. Find the slope of the line passing through the following pairs of points.

a.  $(3,4)$  and  $(7,-2)$

b.  $(-1,-4)$  and  $(5,3)$

c.  $(4,7)$  and  $(8,7)$

d.  $(2,4)$  and  $(2,6)$

4. Find the slope,  $x$ -intercept and  $y$ -intercept of the following linear equations. Then, graph the equation.

a.  $5x - 4y = 20$

b.  $2x + y = 6$

c.  $y = -3x + 4$

d.  $\frac{1}{3}x + y = 2$

e.  $x + 2y = 4$

f.  $3x + 2y = 6$

g.  $x = 5$

h.  $y = 3$

5. Graph the following inequalities.

a.  $2x - 3y \geq 6$

b.  $3x + 5y \leq 10$

c.  $2x - y \leq 4$

d.  $3x + 2y > -6$

6. Find an equation of the following lines based on the given information. Write your answer in *slope-intercept form*.

a. Find the equation of a line passing through the points  $(3,4)$  and  $(6,2)$ .

b. Find the equation of a line with a slope of  $2/3$  and passing through the point  $(1,5)$ .

c. Find the equation of a vertical line that passes through the point  $(3,2)$ .

d. Find the equation of a horizontal line that passes through the point  $(-2,5)$ .

7. Solve the following system of equations. Remember that you will need to know how to use the graphing, substitution, and elimination methods.

$$a. \begin{cases} x - 2y = 16 \\ y + 3 = 3x \end{cases}$$

$$b. \begin{cases} x - 3y = -6 \\ 3x - 9y = 9 \end{cases}$$

$$c. \begin{cases} 2x + 6y = 8 \\ 3x + 9y = 12 \end{cases}$$

$$d. \begin{cases} 3x - 5y = 11 \\ 2x - 6y = 2 \end{cases}$$

11. Simplify the following radicals.

$$a. \sqrt{56}$$

$$b. \sqrt{45}$$

$$c. \sqrt{80}$$

$$d. \sqrt{72x^5y^8z^2}$$

$$e. \sqrt[3]{48x^5y^7}$$

12. Perform the indicated operations.

$$a. 5\sqrt{12} + 16\sqrt{27}$$

$$b. \sqrt{5a} + 2\sqrt{45a^3}$$

$$c. \sqrt{10} \cdot \sqrt{5}$$

$$d. \sqrt{5a^7} \cdot \sqrt{15a^3}$$

$$e. \frac{\sqrt{40xy^3}}{\sqrt{8x}}$$

$$f. (2\sqrt{5} - \sqrt{7})(3\sqrt{5} + 4\sqrt{7})$$

$$g. \sqrt{18} - \sqrt{50} + \sqrt{12} - \sqrt{75}$$

13. Rationalize the denominator.

$$a. \frac{4\sqrt{5}}{3\sqrt{2}}$$

$$b. \frac{12}{\sqrt{72}}$$

$$c. \frac{\sqrt{12}}{\sqrt{3}-1}$$

$$d. \frac{5}{\sqrt[3]{9}}$$

$$e. \frac{7}{\sqrt[3]{8}}$$

14. How many gallons of 50% antifreeze must be mixed with 80 gallons of 20% antifreeze to get a mixture that is 40% antifreeze?
15. Luevenia can row 4 miles per hour in still water. It takes as long to row 8 miles upstream as 24 miles downstream. How fast is the current?
16. Deep Thought Granola is 25% nuts and dried fruit. Oat Dream Granola is 10% nuts and dried fruit. How much of Deep Thought and how much of Oat Dream should be mixed to form a 20-lb. batch of granola that is 19% nuts and dried fruit.
17. Trip goes to a bank and gets change for a \$50 bill consisting of all \$5 bills and \$1 bills. There are 22 bills in all. How many of each kind are there?
18. Hoshi paddled for 4 hours with a 6-km/h current to reach a campsite. The return trip against the same current took 10 hours. Find the speed of Hoshi's canoe in still water.
19. Doug's copier can do a printing job in 7 hours. Scott's copier can do the same job in 12 hours. How long would it take to do the job using both copiers?
20. A boat can go 20 miles against a current in the same time that it can go 60 miles with the current. The current is 4 miles per hour. Find the speed of the boat in still water.
21. How many gallons of a 12% indicator solution must be mixed with a 20% indicator solution to get 10 gallons of a 14% solution?
22. A coin collector has \$1.70 in dimes and nickels. She has 2 more dimes than nickels. How many nickels does she have?
23. Casella's Catering is planning a wedding reception. The bride and groom would like to serve a nut mixture containing 25% peanuts. Casella has available mixtures that are either 40% or 10% peanuts. How much of each type should be mixed to get a 10-lb mixture that is 25% peanuts?
24. Working alone, Jorge can paint a room in 8 hours. Caterina can paint the same room working alone in 6 hours. How long will it take them if they work together?
25. An experienced employee can enter tax data into a computer twice as fast as a new employee. Working together, it takes the employees 2 hours. How long would it take the experience employee working alone?
26. One roofer can put a new roof on a house three times faster than another. Working together they can roof a house in 4 days. How long would it take the faster roofer working alone?