

# MERCER COUNTY COMMUNITY COLLEGE

MAT043

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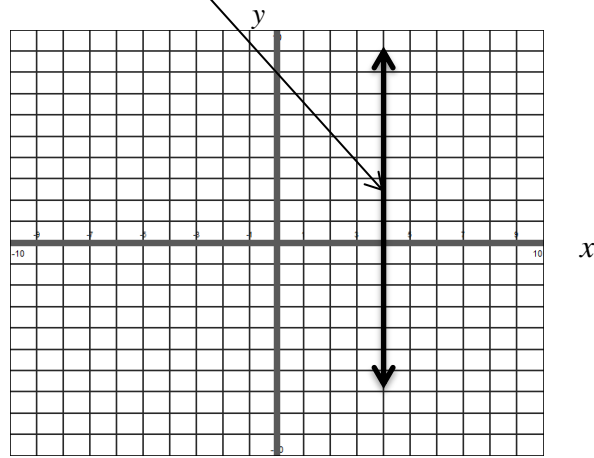
Review for Challenge Test

**Mathematics Department**  
**Fall 2013**

The problems presented within these pages are meant to be representative of the material tested throughout the semester in MAT043. Solutions to these problems may be found at the end of the document.

1. Simplify by removing all possible factors from the radical:  $\sqrt{50}$ .  
A.  $10\sqrt{5}$                       B.  $2\sqrt{5}$                       C.  $5\sqrt{2}$                       D.  $5\sqrt{10}$
2. What is the LCD of  $\frac{3x}{x^2-9}$  and  $\frac{8}{2x-6}$ ?  
A.  $8(x^2-9)+3x(2x-6)$                       C.  $2(x+3)$   
B.  $(x^2-3)(x-3)$                       D.  $2(x+3)(x-3)$
3. For what value(s) of  $t$  is the rational expression undefined:  $\frac{t+3}{t^2-8t+7}$ .  
A.  $t=1, t=7$                       C.  $t=-3, t=1, t=7$   
B.  $t=-3, t=1, t=-7$                       D.  $t=-1, t=-7$
4. Simplify:  $\sqrt{44}$ .  
A. 22                      B.  $4\sqrt{11}$                       C.  $2\sqrt{11}$                       D.  $\sqrt{44}$
5. Solve for  $x$ :  $x^2-x=56$ .  
A.  $\{1,56\}$                       B.  $\{7,8\}$                       C.  $\{-7,-8\}$                       D.  $\{-7,8\}$
6. Find the least common denominator of  $\frac{6}{4a^3-16a^2}$  and  $\frac{9}{a^2-4a}$ .  
A.  $4a^2(a-4)$                       B.  $4a^3(a-4)^2$                       C.  $4a(a-4)$                       D.  $4a^2(a-16)$
7. Simplify:  $\sqrt{425}$ .  
A.  $\sqrt{425}$                       B.  $5\sqrt{17}$                       C. 85                      D.  $25\sqrt{17}$
8. Solve  $(x+9)(x-8)=-16$ .  
A.  $\{-8,7\}$                       B.  $\{-8,9\}$                       C.  $\{-9,8\}$                       D.  $\{7,8\}$
9. Which of the ordered pairs is a solution of the system  $\begin{cases} 6x-2y=-2 \\ 3x+y=-11 \end{cases}$ ?  
A.  $(2,-5)$                       B.  $(-2,-5)$                       C.  $(\frac{20}{3}, -9)$                       D.  $(1,8)$

10. What is the equation of the graph shown below? You may assume that each tick mark represents one unit.



- A.  $y = 4$                       B.  $x = 4$                       C.  $y = 0$                       D.  $x = 0$

11. Solve for  $y$ :  $y^2 + 2y - 24 = 0$ .

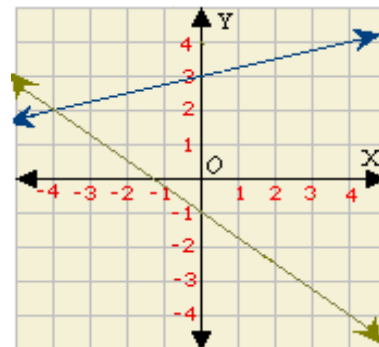
- A.  $\{-6, -4\}$                       B.  $\{-6, 4\}$                       C.  $\{6, 4\}$                       D.  $\{-4, 6\}$

12. Which of the following is an equation of a line containing the point  $(0, -4)$  and parallel to the line  $2x + 5y = 7$ ?

- A.  $2x - 5y = 20$                       C.  $2x + 5y = -20$   
 B.  $5x - 2y = -8$                       D.  $2x - 5y = -20$

13. What is the solution of the system of equations graphed at the right?

- A.  $(4, 2)$                       C.  $(4, -2)$   
 B.  $(-4, 2)$                       D.  $(-4, -2)$



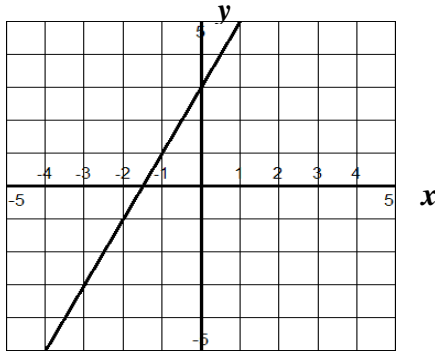
14. Which of the following lines has a slope of zero?

- A.  $x = 5$                       B.  $y = 5$                       C.  $y = 5x$                       D.  $y = -5x$

15. For what value(s) of  $t$  is the rational expression undefined:  $\frac{t+3}{t^2-8t+7}$ .
- A.  $t=1, t=7$                                       C.  $t=-3, t=1, t=-7$   
 B.  $t=3, t=1, t=-7$                               D.  $t=-1, t=-7$
16. Is the line going through the points  $(4,11)$  and  $(-5,8)$  perpendicular to the line going through the points  $(11,-5)$  and  $(8,4)$ ?
- A. The lines are perpendicular.                      B. The lines are not perpendicular.
17. Factor completely:  $k^2 - 10k + 100$ .
- A.  $(k+10)(k-10)$                               C.  $(k+10)^2$   
 B.  $(k-10)^2$                                       D. This is a prime polynomial.
18. Solve for  $r$ :  $\frac{r-5}{4} + \frac{2}{r} = \frac{1}{4}$ .
- A.  $\{4\}$                                       B.  $\{3\}$                                       C.  $\{2,4\}$                                       D.  $\{-4,-2\}$
19. Solve for  $x$ :  $(x-2)(x+3) = 36$ .
- A.  $\{-7,6\}$                                       B.  $\{-6,7\}$                                       C.  $\{-3,2\}$                                       D.  $\{-2,3\}$
20. Multiply:  $(\sqrt{4x} + \sqrt{y})^2$ .
- A.  $16x^2 + 2\sqrt{4xy} + y^2$                       C.  $4x + \sqrt{4xy} + y$   
 B.  $16x^2 + \sqrt{4xy} + y^2$                       D.  $4x + 2\sqrt{4xy} + y$
21. Find the area of a square piece of wood whose length is  $5\sqrt{10}$  inches.
- A.  $25\sqrt{10}$  sq. in.                      B. 2500 sq. in.                      C. 250 sq. in.                      D. 50 sq. in.
22. In 1840 the population of a city was 13,000. By 1880 it had grown to 17,000. If it continued to grow at the same rate, what was the population in 1906? Round to the nearest whole number.
- A. 15,601                                      B. 17,001                                      C. 19,600                                      D. 21,000
23. Divide and simplify:  $\frac{z^2 - 3z - 28}{z^2 - 14z + 49} \div \frac{8 + 2z}{z - 9}$ .
- A.  $\frac{-z-9}{2(z+7)}$                                       B.  $\frac{(z-9)}{2(z-7)}$                                       C.  $\frac{-(z-9)}{2(z+7)}$                                       D.  $\frac{z+9}{2(z-7)}$
24. A small box company estimates that its profits, in dollars, for selling  $x$  boxes of a particular size is given by the expression  $2x^2 - 7x - 4$ . Which of the following is a factor of this expression?
- A.  $(2x+1)$                                       B.  $(2x-1)$                                       C.  $(x+4)$                                       D.  $(x-1)$

25. Multiply and simplify:  $\frac{x^2 - 4x}{x^2 - 4} \cdot \frac{x - 2}{2x - 8}$ .
- A.  $\frac{x}{3}$                       B.  $\frac{2x(x-4)}{x-2}$                       C.  $\frac{x(x-2)}{2x-8}$                       D.  $\frac{x}{2(x+2)}$
26. Solve for  $x$ :  $\frac{3x}{x-3} - \frac{x^2}{x-3} = -8$ .
- A.  $\{-8, -3\}$                       B.  $\{8, 3\}$                       C.  $\{8\}$                       D.  $\{-8\}$
27. Simplify the expression:  $\frac{y^2 - 3y - 54}{y^2 - 2y - 63}$ .
- A.  $\frac{-3y-6}{-2y-7}$                       B.  $\frac{y+6}{y+7}$                       C.  $\frac{-3y-54}{-2y-63}$                       D.  $\frac{y+54}{y+63}$
28. Subtract and simplify:  $\frac{x}{x^2 - 16} - \frac{7}{x^2 + 5x + 4}$ .
- A.  $\frac{x^2 - 6}{(x-4)(x+4)(x+1)}$                       C.  $\frac{x^2 + 6x + 28}{(x-4)(x+4)(x+1)}$
- B.  $\frac{x^2 - 6x + 28}{(x-4)(x+4)(x+1)}$                       D.  $\frac{x^2 - 6x + 28}{(x-4)(x+4)}$
29. Evaluate the expression:  $\sqrt{144 + 25}$ .
- A. 169                      B.  $\sqrt{119}$                       C. 17                      D. 13
30. Solve for  $t$ :  $t^2 - t = 6$ .
- A.  $t = -2, t = 3$                       C.  $t = -2, t = -3$
- B.  $t = 2, t = -3$                       D.  $t = 2, t = 3$
31. Add and simplify:  $\frac{x^2 - 17}{x^2 + 3x - 40} + \frac{5x - 7}{x^2 + 3x - 40}$ .
- A.  $\frac{x+8}{x-5}$                       B.  $\frac{x-3}{x-5}$                       C.  $\frac{x-3}{x^2 + 3x - 40}$                       D.  $\frac{(x+3)(x-8)}{(x-5)(x+8)}$
32. True or false: the line through (1,5) and (0,3) is parallel to the line through (6,8) and (5,6).
- A. True                      B. False

33. What is the slope of the line in the graph below? You may assume that each tick mark represents one unit.

A.  $-2$ B.  $2$ C.  $-\frac{1}{2}$ D.  $\frac{1}{2}$ 

34. Simplify the radical, assuming that the variables represent nonnegative real numbers:  $\sqrt{75x^2}$ .

A.  $75x$ B.  $3x^2\sqrt{5}$ C.  $5x\sqrt{3}$ D.  $5\sqrt{3x}$ 

35. Solve for  $x$ :  $\frac{3}{x} - \frac{6x-2}{4x} = -2$ .

A.  $\{-7\}$ B.  $\left\{\frac{8}{3}\right\}$ C.  $\left\{\frac{7}{2}\right\}$ D.  $\left\{-\frac{5}{2}\right\}$ 

36. What is the  $x$ -coordinate of the solution to the system of equations  $\begin{cases} x - 5y = 23 \\ -2x - 6y = 2 \end{cases}$ ?

A.  $-8$ B.  $-7$ C.  $7$ D.  $8$ 

37. What is the equation of a horizontal line passing through  $(-1, -5)$ ?

A.  $x = -1$ B.  $y = -1$ C.  $x = -5$ D.  $y = -5$ 

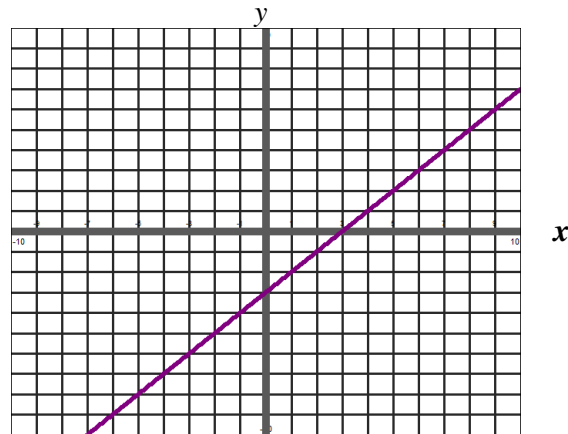
38. Simplify completely:  $7\sqrt{5} + 9\sqrt{125}$ .

A.  $-2\sqrt{5}$ B.  $16\sqrt{5}$ C.  $52\sqrt{5}$ D.  $-52\sqrt{5}$ 

39. A line with an undefined slope passes through the point  $(5, 10)$ . Which of the following points are also on that line?

A.  $(1, 5)$ B.  $(5, 1)$ C.  $(1, 10)$ D.  $(10, 1)$

40. Find the  $x$ - and  $y$ -intercepts of the graph shown below. You may assume that each tick mark represents one unit.



- A.  $x$ -intercept  $(0, 3)$ ;  $y$ -intercept  $(-3, 0)$
- B.  $x$ -intercept  $(3, 0)$ ;  $y$ -intercept  $(0, -3)$
- C.  $x$ -intercept  $(-3, 0)$ ;  $y$ -intercept  $(0, 3)$
- D.  $x$ -intercept  $(0, -3)$ ;  $y$ -intercept  $(3, 0)$

KEY

PROBLEM	ANS.	PROBLEM	ANS.	PROBLEM	ANS.	PROBLEM	ANS.
1	C	11	B	21	C	31	B
2	D	12	C	22	C	32	A
3	A	13	B	23	B	33	B
4	C	14	B	24	A	34	C
5	D	15	A	25	D	35	A
6	A	16	A	26	C	36	D
7	B	17	D	27	B	37	D
8	A	18	C	28	B	38	C
9	B	19	A	29	D	39	B
10	B	20	D	30	A	40	B

Other References:

Systems of equations:

[http://people.hofstra.edu/Stefan\\_Waner/RealWorld/tutorialsf1/frames2\\_1.html](http://people.hofstra.edu/Stefan_Waner/RealWorld/tutorialsf1/frames2_1.html)

<http://www.khanacademy.org/math/algebra/#systems-of-eq-and-ineq>

Graphing: <http://www.khanacademy.org/math/algebra/#linear-equations-and-inequalitie>

Self-quiz on solving quadratic equations:

<http://teachers.henrico.k12.va.us/math/HCPSSAlgebra1/Documents/examviewweb/ev8-6.htm>

Finding LCD (whole numbers)[http://www.youtube.com/watch?v=YbuFd\\_jio28](http://www.youtube.com/watch?v=YbuFd_jio28)

Adding Rational Expressions <http://www.youtube.com/watch?v=omv7Di2o8-Y>

Adding/Subtracting Rational Expressions <http://www.youtube.com/watch?v=FZdt73khrxA>

Radicals: <http://www.algebra.com/algebra/homework/Radicals/Simplifying-Radicals.lesson>

Polynomials and Factoring: <http://www.khanacademy.org/math/algebra/#polynomials>

Quadratic Equations: <http://www.khanacademy.org/math/algebra/#quadratics>

Setting up word equations: <http://www.slideshare.net/ejboggs/translating-algebra>

Graphing: <http://www.khanacademy.org/math/algebra/#linear-equations-and-inequalitie>

Finding LCD (whole numbers)[http://www.youtube.com/watch?v=YbuFd\\_jio28](http://www.youtube.com/watch?v=YbuFd_jio28)

Adding Rational Expressions <http://www.youtube.com/watch?v=omv7Di2o8-Y>

Polynomials and Factoring: <http://www.khanacademy.org/math/algebra/#polynomials>

Solving Equations: <http://www.algebra-class.com/solving-equations.html>

Graphing: <http://www.algebra-class.com/graphing-equations.html>

Exponents: <http://www.algebra-class.com/exponents.html>

Practice Questions: <http://www.algebra-class.com/algebra-practice-test.html>

Writing Equations: <http://www.algebra-class.com/linear-equations.html>

General Algebra Topics: [http://www.wtamu.edu/academic/anns/mps/math/mathlab/beg\\_algebra/](http://www.wtamu.edu/academic/anns/mps/math/mathlab/beg_algebra/)

Polynomials <http://www.coolmath.com/algebra/03-polynomials/index.html>

Exponents: <http://www.coolmath.com/algebra/01-exponents/index.html>

Factoring: <http://www.coolmath.com/algebra/04-factoring/index.html>