

# MERCER COUNTY COMMUNITY COLLEGE

MAT037

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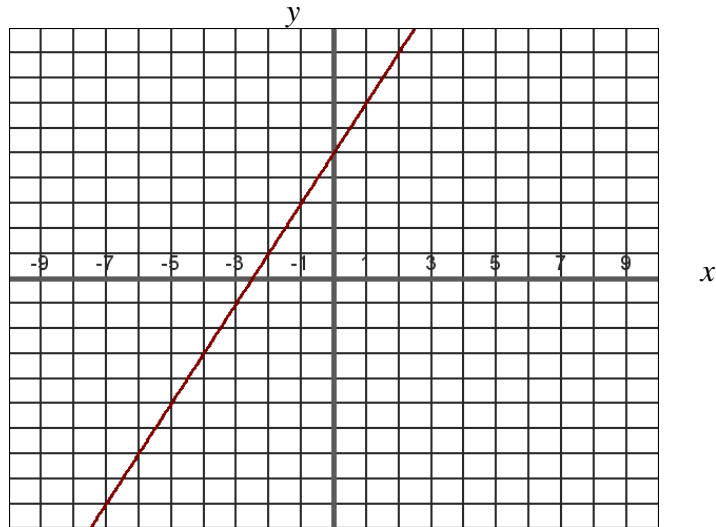
Review for Challenge Test

**Mathematics Department**  
**FALL 2013**

The problems presented within these pages are meant to be representative of the material tested throughout the semester in MAT037. Solutions to these problems may be found at the end of the document.

1. Solve  $2(3x+5) = 5x-11$ .  
A.  $x = -16$       B.  $x = -21$       C.  $x = 2$       D.  $x = -1$
2. If a television costs \$180 after a 20% discount, what was the original cost of the television?  
A. \$150      B. \$200      C. \$216      D. \$225
3. Simplify completely:  $(3x^2 + 2x - 6) - (x^2 - x + 2)$ .  
A.  $2x^4 + 3x^2 - 8$       C.  $2x^2 + 3x - 4$   
B.  $2x^2 + x - 4$       D.  $2x^2 + 3x - 8$
4. Convert to Scientific Notation: 450,000.  
A.  $4.5 \times 10^5$       B.  $4.5 \times 10^4$       C.  $4.5 \times 10^{-5}$       D.  $0.45 \times 10^6$
5. Factor completely:  $12a^2b^2 - 3ab$ .  
A.  $3ab(4ab)$       B.  $3ab(4ab - 1)$       C.  $3ab(4a^2b^2 - ab)$       D.  $ab(12ab - 3)$
6. Evaluate  $2ab - c$  if  $a = -3, b = 2, c = -1$ .  
A. 19      B. 18      C. -11      D. 4
7. Simplify by removing all possible factors from each radical:  $\sqrt{50}$ .  
A.  $10\sqrt{5}$       B.  $2\sqrt{5}$       C.  $5\sqrt{2}$       D.  $5\sqrt{10}$
8. Multiply and simplify:  $(3x+5)(5x+1)$ .  
A.  $15x^2 - 29x + 5$       C.  $15x^2 + 28x + 4$   
B.  $15x^2 + 28x + 5$       D.  $15x^2 - 22x + 4$
9. Solve for y:  $3x + 4y = 12$ .  
A.  $y = 12 - 3x$       B.  $y = \frac{3x-12}{4}$       C.  $y = 3 - 3x$       D.  $y = \frac{12-3x}{4}$
10. The sum of a number and 6 is 8 more than twice the number. Find the equation that could be used to find this number  $x$ .  
A.  $x + 6 = 2x + 8$       C.  $x + 6 = 2(x + 8)$   
B.  $x + 6 = x^2 + 8$       D.  $6x = 2x + 8$
11. Find the y-intercept for  $x + 3y = 7$ .  
A.  $(0, \frac{7}{3})$       B.  $(0, 7)$       C.  $(\frac{7}{3}, 0)$       D.  $(7, 0)$

12. What is the slope of the line shown below? You may assume that each tick mark represents one unit.



- A.  $-2$                       B.  $-3$                       C.  $2$                       D.  $3$
13. Solve the following equation:  $-2(x-6) = 4$ .
- A.  $x = -8$                       B.  $x = -5$                       C.  $x = 4$                       D.  $x = 5$
14. Simplify:  $(a^2b^3)^2$ .
- A.  $a^4b^9$                       B.  $a^2b^9$                       C.  $a^4b^6$                       D.  $a^4b^5$
15. Multiply and simplify:  $(2-3x)^2$ .
- A.  $4-9x^2$                       B.  $4-12x+9x^2$                       C.  $4+9x^2$                       D.  $4-6x+9x^2$
16. 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.  $2(x+3)(x-3)$
17. Find the  $x$ -intercept for  $2x-3y = 6$ .
- A.  $(0,3)$                       B.  $(0,-2)$                       C.  $(3,0)$                       D.  $(-2,0)$

18. Solve:  $\frac{7}{10}x - 1 = 2$ .

A.  $x = \frac{30}{7}$       B.  $x = \frac{10}{7}$       C.  $x = \frac{7}{10}$       D.  $x = \frac{3}{7}$

19. Simplify:  $(a^2b^{-3})^2$ .

A.  $-a^4b^9$       B.  $-\frac{a^2}{b^9}$       C.  $\frac{a^4}{b^6}$       D.  $a^4b^{-5}$

20. If  $y = 3x - 2$ , then a line parallel to this is:

A.  $y = -3x + 2$       C.  $y = 3x + 2$   
B.  $y = \frac{1}{3}x + 2$       D.  $y = -\frac{1}{3}x + 2$

21. Simplify:  $\frac{5x^2y}{x^3}$ .

A.  $5x^5y$       B.  $\frac{5x}{y}$       C.  $5xy$       D.  $\frac{5y}{x}$

22. Solve for  $y$  and express the answer in interval notation:  $6(4 - 2y) < 12$ .

A.  $(-\infty, -1)$       B.  $(-1, \infty)$       C.  $(1, \infty)$       D.  $(-\infty, 1)$

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. Factor completely:  $3p - 3q - px + qx$ .

A.  $3(p - q) - x(p + q)$       C.  $(p - q)(3 - x)$   
B.  $3(p - q) - x(p - q)$       D.  $(p - q)(3 + x)$

25. 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.  $t = -1, t = -7$

26. Solve  $P = 2l + 2w$  for  $w$ .
- A.  $w = P - l$       B.  $w = \frac{P+2}{2}$       C.  $w = P + l$       D.  $w = \frac{P-2l}{2}$
27. A ladder rests against a wall. The foot of the ladder is 8 feet from the wall. The top of the ladder is 21 feet from the ground. What is the slope of the ladder?
- A.  $\frac{21}{8}$       B.  $\frac{8}{21}$       C. 21      D. 8
28. Find the slope of the line through the points  $(2,0)$  and  $(0,6)$ .
- A.  $-\frac{1}{3}$       B.  $\frac{1}{3}$       C. 3      D.  $-3$
29. Solve  $M = bx - 7x$  for  $x$ .
- A.  $x = \frac{M}{b+7}$       B.  $x = M - b + 7$       C.  $x = \frac{M}{b-7}$       D.  $x = M(b-7)$
30. The perimeter of a rectangle is 80 inches. The length is three times the width. Find the length of the rectangle.
- A. 10 in.      B. 15 in.      C. 20 in.      D. 30 in.
31. Is  $x = -6$  a solution of the equation  $-3x - 2 = -16$ ?
- A. It is a solution of the equation.      B. It is not a solution of the equation.
32. Multiply and simplify:  $(x-11)(2x-12)$ .
- A.  $2x^2 - 34x + 132$       C.  $2x^2 + 132x - 34$   
B.  $2x^2 - 36x + 132$       D.  $2x^2 - 34x - 34$
33. Solve for  $s$ :  $-5 = \frac{1}{6}s$ .
- A.  $\{-1\}$       B.  $\{0\}$       C.  $\{-30\}$       D.  $\{1\}$
34. 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.
35. Simplify:  $\sqrt{44}$ .
- A. 22      B.  $4\sqrt{11}$       C.  $2\sqrt{11}$       D.  $\sqrt{44}$

36. 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.
37. Add and simplify:  $\frac{d^2 - 8}{d^2 + 3d - 10} + \frac{3d - 2}{d^2 + 3d - 10}$ .
- A. 1                      B.  $\frac{(d-5)(d+2)}{(d+5)(d-2)}$                       C.  $\frac{d+5}{d-2}$                       D.  $\frac{d-2}{d^2 + 3d - 10}$
38. Solve for  $r$ :  $\frac{r-5}{4} + \frac{2}{r} = \frac{1}{4}$ .
- A. {4}                      B. {3}                      C. {2,4}                      D. {-4,-2}
39. Solve for  $x$ :  $x^2 - x = 56$ .
- A. {1,56}                      B. {7,8}                      C. {-7,-8}                      D. {-7,8}
40. 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.  $4a^2(a-16)$
41. Simplify:  $\sqrt{425}$ .
- A.  $\sqrt{425}$                       B.  $5\sqrt{17}$                       C. 85                      D.  $25\sqrt{17}$
42. Multiply and simplify:  $\frac{x^2 - 7x + 12}{x^2 + x - 12} \cdot \frac{x^2 - 9}{x^2 - x - 12}$ .
- A.  $\frac{x-3}{x-5}$                       B.  $\frac{x-3}{x+4}$                       C.  $\frac{x-4}{x+3}$                       D.  $\frac{x+3}{x-4}$
43. Solve the inequality and give the answer in interval notation:  $13x - 5 \geq 12x - 4$ .
- A.  $(-\infty, 13)$                       B.  $(-\infty, 1]$                       C.  $[1, \infty)$                       D.  $(13, \infty)$
44. Solve  $(x+9)(x-8) = -16$ .
- A.  $\{-8, 7\}$                       B.  $\{-8, 9\}$                       C.  $\{-9, 8\}$                       D.  $\{7, 8\}$

45. Subtract and simplify:  $\frac{x-8}{x-2} - \frac{2x+4}{x-2}$ .

A.  $\frac{x-12}{x-2}$

B.  $-\frac{x-12}{x-2}$

C.  $-\frac{x+12}{x-2}$

D.  $\frac{x+12}{x-2}$

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

A.  $x = -4$

B.  $y = -4$

C.  $-4x = y$

D.  $x = -4y$

47. 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.  $(1, 8)$

48. Solve for  $t$  and write the answer in interval notation:  $-7t > 21$ .

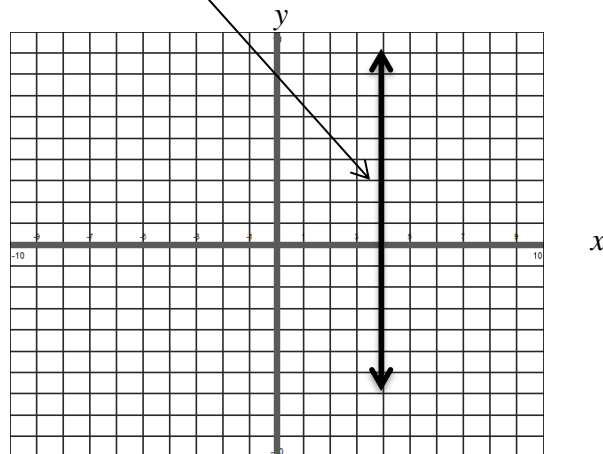
A.  $(3, \infty)$

B.  $(-\infty, 3)$

C.  $(-\infty, -3)$

D.  $(-3, \infty)$

49. 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.  $x = 0$

50. Which equation represents the statement: a number increased by 60 is equal to 410?

A.  $x + 60x = 410$

B.  $x + 60 = 410$

C.  $x - 60 = 410$

D.  $60x = 410$

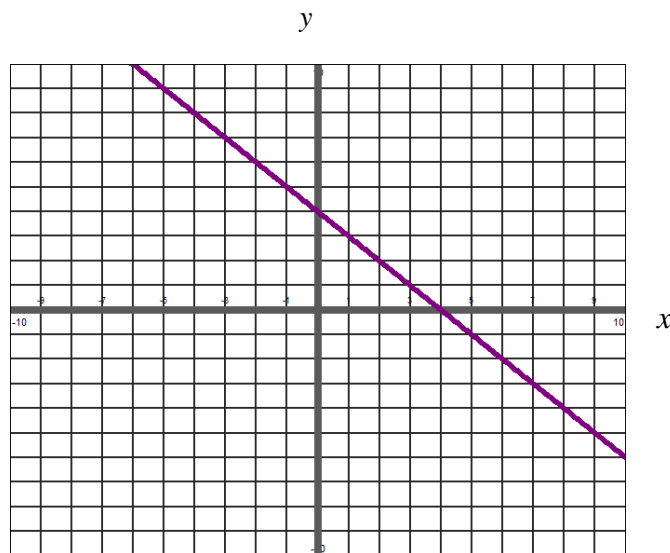
51. An item sells for  $x$  dollars per unit. The formula  $D = \frac{500}{x} + 50$  represents the number of units sold, called the demand,  $D$ . Find the value of  $x$ , the cost per unit, when the demand is for 450 units.

- A. \$0.80                      B. \$1.00                      C. \$1.25                      D. \$1.35

52. Find the slope of the line  $2x - 7y = 8$ .

- A.  $\frac{2}{7}$                               B.  $-\frac{2}{7}$                               C.  $\frac{7}{2}$                               D.  $-\frac{7}{2}$

53. What is **true** of the line shown in the graph below? You may assume that each tick mark represents one unit.



- A. The graph has a positive slope.  
 B. The  $x$ -intercept of the graph is  $(0, 4)$ .  
 C. The  $y$ -intercept of the graph is  $(0, 4)$ .  
 D. The graph goes through the origin.

54. Subtract and simplify:  $(5x^2 - 3x + 5) - (3x^2 - 4x + 2)$ .

- A.  $2x^2 + 7x + 7$                       C.  $2x^2 - 7x + 7$   
 B.  $2x^2 - 7x + 3$                       D.  $2x^2 + x + 3$

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

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



## Key

Problem	Ans	Problem	Ans	Problem	Ans	Problem	Ans
1	B	12	C	23	B	34	A
2	D	13	C	24	C	35	C
3	D	14	C	25	A	36	D
4	A	15	B	26	D	37	A
5	B	16	D	27	A	38	C
6	C	17	C	28	D	39	D
7	C	18	A	29	C	40	A
8	B	19	C	30	D	41	B
9	D	20	C	31	B	42	B
10	A	21	D	32	A	43	C
11	A	22	C	33	C	44	A

Other references:

Solving for a Variable: Although you can't print most of these out without signing up at the site, there are some useful presentations to help with this topic.

<http://www.slideshare.net/craingsberg/solving-literal-equations>

<http://www.scribd.com/doc/6932127/Algebra-1-Notes-YORKCOUNTY-FINAL-Unit-3-Lesson8-Solving-Literal-Equations>

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

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>