

The following set is only to review the Algebra needed for this class. It should be familiar to you from previous class such as M110, M111 or others. Please do your best to refresh these materials if you already had it, or to learn it if you have not. Test 1 will have 15 points from this handout with no partial credits.

### Part A: Simplifying

**Simplify and write your answers with positive exponents:**

1.  $[9(7 - 4) + 19] - [25 - (7 + 3)]$

2.  $4^3 + (20)(10) + 7^2 - 23$

3.  $16 \div (19 - 15)^2 - 7$

4.  $-32 - 8 \div 4 - (-2)$

5.  $[6(x + 4) - 12] - [5(x - 8) + 11]$

6.  $4\{[8(x - 3) + 9] - [4(3x - 7) + 2]\}$

7.  $(6x^{-4}y^3)(-4x^{-8}y^{-2})$

8.  $(6x^5y^{-2})(-3x^2y^3)$

9.  $\frac{14a^4b^{-3}}{-2a^8b^{-5}}$

**Answers, not in order**

31

$\left(\frac{-24y}{x^{12}}\right)$

$(-18x^7y)$

$-16x + 44$

$-32$

$\left(\frac{-7b^2}{a^4}\right)$

$-6$

290

$x + 41$

- Convert to exponential form:

10.  $\sqrt[7]{t}$

11.  $\sqrt[5]{a^3}$

12.  $\sqrt[3]{(x^2 + y)}$

13.  $\sqrt[4]{b^2}$

**Answers, not in order:**  $b^{1/2}$ ;  $(x^2 + y)^{1/3}$ ;  $a^{3/5}$ ;  $t^{1/7}$

- Convert to radical form:

14.  $x^{2/5}$

15.  $x^{-2/3}$

16.  $(x^2 - y)^{-2/3}$

17.  $(x^2 + y)^{2/5}$

**Answers, not in order:**  $\frac{1}{\sqrt[3]{(x^2 - y)^2}}$ ;  $\sqrt[5]{(x^2 + y)^2}$ ;  $\sqrt[5]{x^2}$ ;  $\frac{1}{\sqrt[3]{x^2}}$

## **Part B: Factoring**

### **Factor**

1.  $x^2 + 3x - 54$
2.  $10x + x^2 + 24$
3.  $x + x^2 - 90$
4.  $x^8 - 7x^4 + 10$
5.  $8x^2 - 6x - 9$
6.  $3x^2 - 20x + 32$
7.  $6x^2 - x - 2$
8.  $x^2 - 64$
9.  $x^2 y^2 - 81$
10.  $x^2 - 9$

### **Answers, not in order**

- $(x + 10)(x - 9)$
- $(3x - 2)(2x + 1)$
- $(x^4 - 5)(x^4 - 2)$
- $(4x + 3)(2x - 3)$
- $(x + 9)(x - 6)$
- $(x + 6)(x + 4)$
- $(3x - 8)(x - 4)$
- $(xy + 9)(xy - 9)$
- $(x + 3)(x - 3)$
- $(x + 8)(x - 8)$

## **Part C: Solving Equations:**

### **Solve for x:**

1.  $9(2x + 8) = 20 - (x + 5)$
2.  $6[4(8 - x) - 5(9 + 3x)] - 21 = -7[3(7 + 4x) - 4]$
3.  $\frac{x - 2}{x - 4} = \frac{2}{x - 4}$
4.  $\frac{1}{x - 2} = \frac{2}{x + 4} + \frac{2x - 1}{x^2 + 2x - 8}$
5.  $\frac{3}{x - 2} + \frac{2x}{4 - x^2} = \frac{5}{x + 2}$
6.  $\frac{1}{2x + 10} = \frac{8}{x^2 - 25} - \frac{2}{x - 5}$

### **Answers, not in order**

-3

$\frac{2}{3}$

No Solution

4

3

$\frac{1}{5}$

**Solve by substitution:**

7.  $4x + y = -1$  ; and  $x - 2y = 11$

8.  $-5x + y = -23$  ; and  $6x + 7y = 3$

9.  $x - 2y = 16$  ; and  $y + 3 = 3x$

**Answers, not in order**

$(1, -5)$

$(-2, -9)$

$(4, -3)$

**Solve:**

10.  $R = \frac{2x}{x + 2a}$  for  $x$

11.  $A = P(1 + rt)$  , for  $r$

12.  $A = P(1 + rt)$  , for  $t$

**Answers, not in order**

$t = (A - P) / Pr$

$x = 2Ra / (2 - R)$

$r = (A - P) / Pt$

**Solve for  $x$  (use the quadratic formula):**

13.  $x^2 + 3x = 8$

14.  $x^2 + 4 = 6x$

15.  $7x^2 + 8x = -2$

16.  $3x(x + 1) - 7x(x + 2) = 6$

17.  $3x^2 - 4x - 1 = 0$

**Answers, not in order**

$\frac{2 \pm \sqrt{7}}{3}$

$-2, -3/4$

$3 \pm \sqrt{5}$

$\frac{-3 \pm \sqrt{41}}{2}$

$\frac{-4 \pm \sqrt{2}}{7}$

**Quadratic Formula:**  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  when  $ax^2 + bx + c = 0$

## **Part D: Percentage Applications**

1. What percent of 180 is 36?
2. What percent of 76 is 19?
3. What percent of 125 is 30?
4. What percent of 300 is 57?
5. 45 is 30% of what number?
6. 20.4 is 24% of what number?
7. 0.3 is 12% of what number?
8. 7 is 175% of what number?
9. What number is 65% of 840?
10. What number is 1% of one million?

**Answers, not in order :** (85) , (2.5) , (150) , (19%) , (10,000) , (4) , (20%) , (546) , (25%) , (24%)

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11. What percent of 80 is 100?
12. What percent of 10 is 205?
13. What is 40% of 2?
14. What is 2% of 40?
15. 2 is what percent of 40?
16. 40 is 2% of what number?
17. On a test of 88 items, a student got 76 correct. What percent were correct?
18. One season a basketball player made 36 out of 75 three-point shots. What percent did he make?
19. The sales tax rate in New York City is 8%. How much is charged on a purchase of \$428.86? How much is the total cost of the purchase?
20. Due to inflation, the price of an item increased 12 cents. This was an 8% increase. What was the old price? the new price?

**Answers, not in order :** (86.36%) , (48%) , (2000) , (0.8) , (5%) , (125%) , (2050%) , (0.8) ,  
(34.31, 463.17), (1.5 , 1.62)

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21. After a 40% price reduction, a shirt is on sale at \$19.20. What was the original price (that is, the price before reduction)?
22. A family spent \$224 one month for food. This was 28% of its income. What was its monthly income?
23. After a 34% price reduction, a blouse is on sale at \$29.04. What was the original price?
24. The price of a refrigerator selling at \$600 is to be reduced by 20%. What is the sale price?
25. The price of an automobile selling at \$6800 will be increased by 4%. What is the new price?
26. An \$800 stereo system will be sold at a 25% reduction. What will be the new price?
27. In order to cope with rising costs, an oil producer plans to raise prices by 15%. If a barrel of oil now sells for \$28.00, what will be the new price?
28. A boat that originally sold for \$600 is now on sale for \$540. What is the percentage of discount?

**Answers, not in order :** (44) , (800) , (32) , (6540) , (480) , (7072) , (10%) , (600) , (32.20)

The following sections are part of the course and it should be used as extra examples

**Part E: Slope, Equations of a Line and Inequalities** (section 1.3 in the book)

**Find the slope of the containing the given pair of points:**

1. (-6, -4) and (-7, -9)
2. (4.9, 7) and (4.7, 7.2)
3. (-10, 2) and (2, 11)

**Answers, not in order**

- 5  
3/4  
-1

**Find the slope of the line:**

4.  $5y - 12 = 3x$
5.  $-12 = 4x - 7$
6.  $18 = -3y$
7.  $2y - 3 = 5$
8.  $17y + 4x + 3 = 7 + 4x$
9.  $4 - 5y + 7x = -10$

**Answers, not in order**

- 3/5  
undefined  
0  
0  
0  
7/5

**Find an equation of the line containing the two points:**

10. (-1, -1) and (9, 9)
11. (0, -5) and (3, 0)
12. (-4, -7) and (-2, -1)

**Answers, not in order**

- $y = 5/3x - 5$   
 $y = 3x + 5$   
 $y = x$

General Equation of a straight line:  $y = mx + b$  ;  $m$  is the slope and  $b$  is the  $y$ -intercept

13. In a certain city, the cost for a taxi ride for 20 miles is \$ 13. For 30 miles, the cost is \$ 18. Assuming the number of miles is  $x$ , find the linear equation for the cost.
14. The college bookstore sells a textbook costing \$10 for \$13.50 and a textbook costing \$12 for \$15.90. If the markup policy of the bookstore is linear, write an equation that relates sales price  $S$  and cost  $C$ . What is the cost of a textbook that sells for \$22?
15. The average weekly for durable goods in the United States economy in 1967 was \$25 billion. by 1982 this average had increased to \$70 billion. Use these data to find the linear equation and find the level of average weekly orders in 1987?

**Answers, not in order :**  $(y = 3t + 25 ; 85)$  ,  $(c = 0.5x + 3)$  ,  $(s = 1.20c + 1.5 ; 17.08)$  ,  $(c = 0.3x + 5)$

## Part F: Graphing Review

**(Only Straight Edge, scaled Graphs are Accepted, No Freehands. Otherwise -7p)**

Graph the following linear and non linear equations. After you finish, check your answers by using the program **Graphmatica**. It is very important that you graph them first manually and then use the program to check.

1.  $6x + -2y = 6$

2.  $2x + 6y = 12$

3.  $2x - y = 4$  ; and  $2x + 3y = -4$

4.  $3x + y = 5$  ; and  $x - 2y = 4$

5.  $y = x^2 - 2x - 3$

6.  $y = 5 - x^2$

**Find the x-intercept for (Make  $y = 0$ ):**

7.  $y = x^2 + 2x + 12$

8.  $y = -x^2 + 5x + 24$

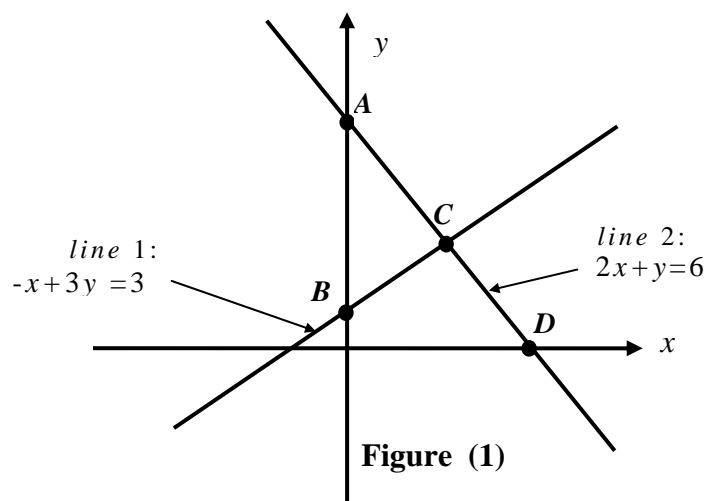
9.  $y = -x^2 + x + 20$

**Answers, not in order**

$(-4, 0)$  and  $(5, 0)$

None

$(-3, 0)$  and  $(8, 0)$



10. Using the above figure, and without scaling the graph, the coordinates of points A, B, C, and D:

**Answers, not in order:**  $(1, 0)$  ,  $(6, 0)$  ,  $(0, 6)$  ,  $(3, 0)$  ,  $(15/7, 12/7)$ ,

11. Match the graphs with the equations:

a)  $y = -2x + 4$  is best represented by graph: .....

b)  $y = -2x - 4$  is best represented by graph: .....

c)  $y = 2x + 4$  is best represented by graph: .....

d)  $y = 2x - 4$  is best represented by graph: .....

