

For the exam, you will need to show all work and justify answers with work when appropriate. No justification may cause answer to receive no credit.

1. (2.1) Write the expression in simpler form.

a.  $(2x + 1) + (5x + 8) = 7x + 9$

b.  $(x + 1) + (x + 2) + (x + 3) = 3x + 6$

c.  $5x^2 + 5x + 3x^2 = 8x^2 + 5x$

d.  $(2x)(3y) + 4x + 5y + (6x)(3y) = 24xy + 4x + 5y$

2. (2.2) Simplify each expression:

a.  $2(x + 5)x = 2x^2 + 10x$

b.  $-7v(2w + 8y) = -14vw - 56vy$

c.  $5(3x - 6)x = 15x^2 - 30x$

d.  $x(y - 3) - 4(xy + 3) = -3xy - 3x - 12$

3. (2.3) Expand and combine like terms

a.  $(z - 5)(z - 6) = z^2 - 11z + 30$

b.  $(3b + c)(b + 2c) = 3b^2 + 7bc + 2c^2$

c.  $3(x - 4)^2 + 8x - 48 = 3x^2 - 16x$

d.  $(x - 11)^2 = x^2 - 22x + 121$

4. (2.3) Factor the expressions:

a.  $x^2 - 5x + 6 = (x - 2)(x - 3)$

b.  $x^2 + 11xy + 24y^2 = (x + 3y)(x + 8y)$

c.  $3w^2 + 12w - 36 = 3(w - 2)(w + 6)$

d.  $y^2 - 169 = (y + 13)(y - 13)$

5. (2.4) Write the following as a single fraction:

a.  $\frac{1}{x-2} - \frac{1}{x-3} = \frac{-1}{(x-2)(x-3)}$

b.  $\frac{1}{a-b} + \frac{1}{a+b} = \frac{2a}{(a-b)(a+b)}$

c.  $\frac{x+1}{2} - \frac{3x}{x-3} = \frac{x^2 - 8x - 3}{2(x-3)}$

d.  $\frac{2ab}{5b} * \frac{10a^2b^2}{6b} = \frac{2a^3b}{3}$

e.  $\frac{2r+3s}{4s} * \frac{16r}{6r+9s} = \frac{4r}{3s}$

6. (3.1) Solve the equations:

a.  $.5x - 3 = 11$   $x = 28$

b.  $\frac{5}{3}(y + 4) = \frac{1}{2} - y$   $y = -27/16$

c.  $\frac{3}{g-2} = \frac{2}{g-3}$   $g = 5$

d.  $\frac{17}{3n-4} = \frac{7}{n}$   $n = 7$

7. (3.2) Solve the inequalities:

a.  $-5t < 17.5$   $t > -3.5$

b.  $\frac{-3p}{7} < \frac{6}{14}$   $p > -1$

c.  $-3(f - 2) \geq -15$   $f \leq 7$

d.  $8 - 4b \geq 22b$   $4/13 \geq b$

8. (3.3) Solve the absolute value equation by writing it as two separate equations.

a.  $|x - 3| = 10$   $x = 13$   $x = -7$

b.  $|x + 7| = -3$  No Solution

c.  $|5 + x| < 0$  Not Possible

9. (3.3) Solve the absolute value inequality by writing it as two separate equations.

a.  $|5 + 2w| < 7$   $w < 1$  and  $w > -6$

b.  $|\frac{x}{3} + 7| \geq 2$   $x \geq -15$  or  $x \leq -27$

c.  $|\frac{3p+7}{4}| + 2 = 5$   $p = 5/3$   $p = -19/3$

10. Solve each absolute value inequality by writing it as two separate inequalities. Be sure to include AND or OR to indicate the correct solution set. Drawing a number line and testing values to check your work may be helpful, but is not required.

a.  $|12 - 2x| < 6$   $x > 3$  and  $x < 9$

b.  $|\frac{y}{6} + 2| > 4$   $y > 12$  or  $y < -36$

c.  $|6 + 3x| \leq 9$   $x \leq 1$  and  $x \geq -5$

11.

12. (4.1) Write the relationship using function notation  $y$  is a function of  $x$  is written  $y = f(x)$

a. The number,  $N$ , of napkins used in a restaurant is  $N = f(C) = 2C$ , where  $C$  is the number of customers.

i. What is the dependent variable? Napkins

ii. What is the independent variable? Customers

13. (4.1) Let  $f(x) = 2x^2 + 7x + 5$ . Evaluate

- a.  $f(3) = 44$
- b.  $f(a) = 2a^2 + 7a + 5$
- c.  $f(a+4) = 2a^2 + 23a + 65$
- d.  $f(-2) = -1$
- e.  $f(a) + 4 = 2a^2 + 7a + 9$

14. (4.2) Are the two functions the same function?

- a.  $f(x) = 2(x+1)(x-3)$  and  $g(x) = x^2 - 2x - 3$  NO  $2x^2 - 4x - 6 \neq x^2 - 2x - 3$
- b.  $r(x) = 5(x-2) + 3$  and  $s(x) = 5x + 7$  NO  $5x - 7 \neq 5x + 7$

15. (4.3) For accounting purposes, the value of a machine,  $t$  years after it is purchased, is given in dollars by  $V(t) = 100,000 - 10,000t$ .

- a. Write an equation whose solution is the number of years it takes for machine's value to reach \$70,000.  $70,000 = 100,000 - 10,000t$

16. (4.4) Find the average rate of change of  $f(x) = x^3 - x^2$  on the following intervals.

- a. Between 2 and 4  $= 22$
- b. Between -2 and 4  $= 10$
- c. Between -4 and -2  $= 34$

17. (5.2) Find a possible formula for the linear function  $h(x)$  if  $H(-30) = 80$  and  $H(40) = -60$

18. (5.2) For working  $n$  hours a week, where  $n \geq 40$ , a personal trainer is paid in dollars  $P(n) = 500 + 18.75(n - 40)$ .

- a. What is the practical meaning of the 500 and the 18.75?  
\$500 made after 40hrs 18.75 pay per hour

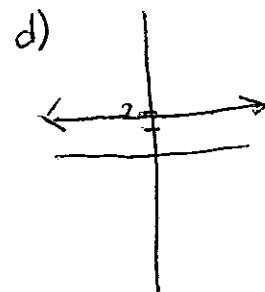
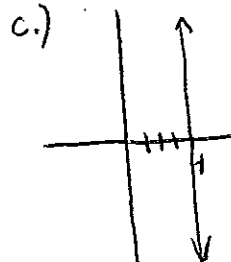
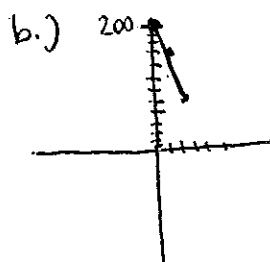
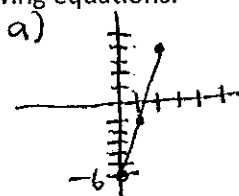
19. (5.3) Solve the following linear equations. Explain your results.

- a.  $3x + 5 = 3(x + 5)$  No
- b.  $4x + 3 = 4(x + 1) - 1$  Infinite
- c.  $2x - 6 = 5x + 2$  One solution  $x = -8/3$

e.

20. (5.4) Graph the following equations:

- a.  $y = 5x - 6$
- b.  $y = 200 - 4x$
- c.  $4 = x$
- d.  $2 = y$
- e.  $33x - 2y = 24$



21. (5.4) Write an equation in point-slope form for the line.

- a. Through (2,3) with a slope of  $m = 5$   $y = 3 + 5(x - 2)$   
 b. Through (4,7) and (1,1)  $y = 7 + 2(x - 4)$  or  $y = 1 + 2(x - 1)$   
 c. Through (-1,-8) and parallel to  $y = 5x - 2$   $y = -8 + 5(x + 1)$   
 d. Through (12,20) and perpendicular to  $y = -4x - 3$   $y = 20 + \frac{1}{4}(x - 12)$

22. (5.5) Could the table represent the values of a linear function? Give a formula if it could.

X	0	2	10	20
Y	50	58	90	130

$y = 4x + 50$  or  $y = 50 + 4(x - 0)$  or  $y = 90 + 4(x - 10)$   
 or  $y = 58 + 4(x - 2)$  or  $y = 130 + 4(x - 20)$

23. Solve the systems of equations using substitution or elimination. Show all work.

a.  $\begin{cases} 3x - 2y = 10 \\ 2x - 2y = 15 \end{cases} \quad (-5, -12.5)$

b.  $\begin{cases} 3x + 2y = 4 \\ 4x + 5y = -11 \end{cases} \quad (6, -7)$

a.