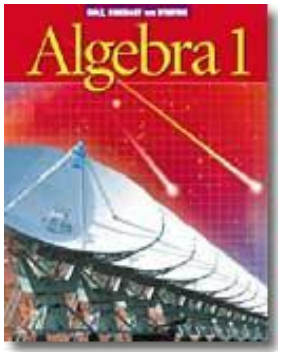


Algebra 1
Final Exam
REVIEW
June 2015

Name: _____ **Date:** _____

Teacher: _____ **Period:** ____

Your final examination will consist of 65 multiple-choice questions which will be completed on a Scantron form. The exam will include material from Chapters 7, 8, 9, 10, and 12 of your text.

NOTE: School policy mandates a penalty for cheating on an exam to be a grade of ZERO for that exam. The term cheating includes "intent to cheat." NO CELL PHONES. All cell phones must be kept out of sight. If a cell phone is seen during an exam, you will receive a grade of ZERO.

All calculators may be checked for inclusion of extraneous material. No papers should be placed in calculators. No information should be written on the front/back of calculators. The program portion of the graphing calculator will be checked. Any information entered there can be considered intent of cheating.

Before the examination, clear your calculator of any formulas, notes or any such items, which could be perceived as "useful" or providing unfair advantage. The best solution is to RESET and clear the memory completely.

The following pages provide a comprehensive review of the materials to be studied for this exam. We will take a few days of class time to review for this exam. Please feel free to stop in on your own time for further assistance. Good Luck!

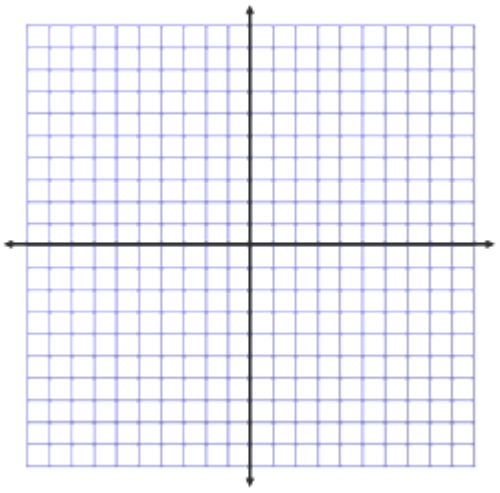
Mr. Brill, Ms. Buonomo-Gramata, Ms. Keeble, Ms. Marchegiano, Mr. Peklo, Ms. Prigge, Ms. Simpson, Mr. Waddon, and Ms. Winter

CHAPTER 7

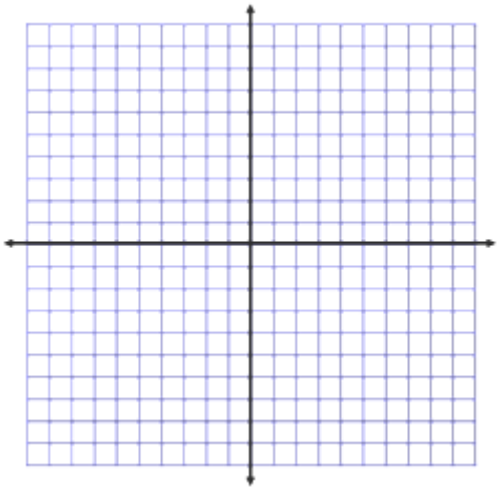
TOPICS –
GRAPHING – Inequalities, and Systems of Inequalities

PROBLEMS –

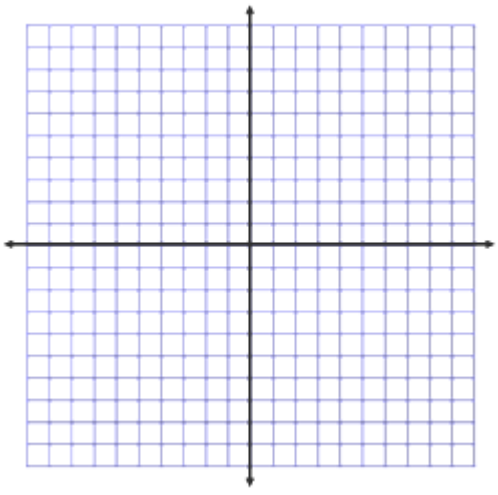
1. Graph the following: $y < x + 3$



2. Graph the following system: $\begin{cases} y - 2x \geq 2 \\ 2y - x < -2 \end{cases}$

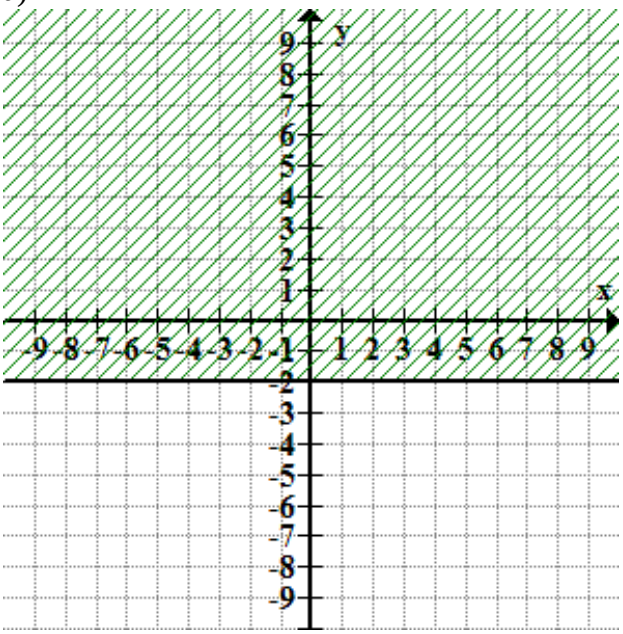


3. Graph the following system: $\begin{cases} 4x - y \leq 3 \\ 2x + y < 1 \end{cases}$



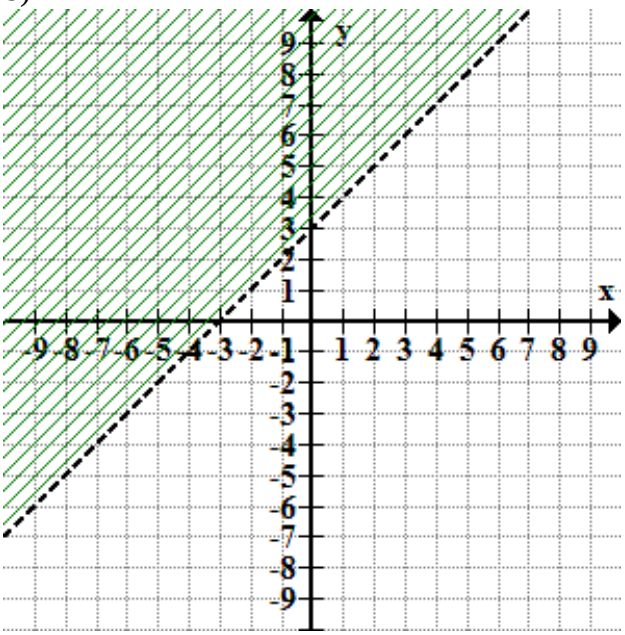
4. Choose the correct inequality or system of inequalities for each graph.

a)



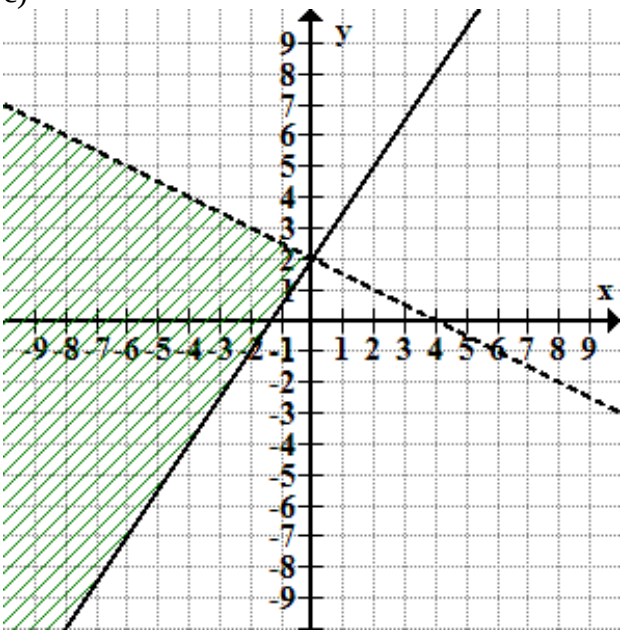
A. $x > -2$
B. $x \geq -2$
C. $y > -2$
D. $y \geq -2$

b)



A. $y = x + 3$
B. $y > x + 3$
C. $y < x + 3$
D. $y > -x + 3$
E. $y \leq x + 3$

c)



A. $\begin{cases} y < \frac{-3}{2}x + 3 \\ y \geq \frac{1}{2}x + 2 \end{cases}$

B. $\begin{cases} y \leq \frac{-3}{2}x + 3 \\ y > \frac{1}{2}x + 2 \end{cases}$

C. $\begin{cases} y \geq \frac{3}{2}x + 2 \\ y < \frac{-1}{2}x + 2 \end{cases}$

D. $\begin{cases} y < \frac{3}{2}x + 3 \\ y > \frac{-1}{2}x + 2 \end{cases}$

CHAPTER 8

TOPICS– LAWS OF EXPONENTS, EXPONENTIAL FUNCTIONS

$b^x b^y = b^{x+y}$; $(b^x)^y = b^{xy}$; $(abc)^x = a^x b^x c^x$; $b^0 = 1$; $b^{-x} = \frac{1}{b^x}$

$\frac{b^x}{b^y} = b^{x-y}$ if $x > y$ $\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$

PROBLEMS –

1. In simplified form, $(-5x^2y^3)(-xy^2)$ is

   a. $5x^3y^6$ b. $5x^4y^5$ c. $-5x^3y^5$ d. $5x^3y^5$

---

2. In simplified form, $\frac{-3a^2b^5}{-18a^5b^2}$ is

   a. $\frac{b^3}{6a^3}$ b. $6a^3b^4$ c. $-\frac{b^3}{6a^3}$ d. $.\frac{b^4}{6a^3}$

---

3. In simplified form, $(3c^2d^5)(2c^3d^0)^2$ is

   a. $6c^5d^5$ b. $12c^7d^5$ c. $12c^8d^5$ d. $6c^{12}d$

---

4. In simplified form, $(v^{-3}w^3)(v^{-3}w^2)$ is

   a. w b. $\frac{w^5}{v^6}$ c. v^6w^5 d. $\frac{w}{v}$

---

5. Find the value of:

a) $\left(\frac{2}{3}\right)^2 =$ b) $\frac{10^3 \times 10^8}{10^5} =$ c) $\frac{3^3+3^3}{5^2} =$

---

6. Simplify: $(-3a^3b^2)(-7a^5b)$

7. Simplify: $\frac{(5p^4)(6p^7)}{2p^2}$

8. Simplify: $(2cd^2)^3$

9. Simplify: $(-3x^4y^5)^2$

10. Simplify: $\frac{r^6}{r^9}$

11. Simplify: $\frac{-15v^5w^8z^4}{25v^7w^5z^4}$

12. Simplify: $\frac{14ab^{-2}}{7a^{-1}b^3}$

13. Simplify: $\frac{-51m^{-3}n^{-4}q^{0}}{-17m^{-5}n^{6}p^{-2}}$

14. Simplify: $\left(\frac{6a^{3}c^{5}d^{-2}}{2ab^{2}c^{5}}\right)^{-3}$

15. Simplify: $\left(\frac{x^{2}y^{-3}z^{10}}{4x^{-5}y^{-4}z^{0}}\right)^{2}$

CHAPTER 9

TOPICS – POLYNOMIALS –degree of, standard form, monomial, binomial, trinomial
NAME BY DEGREE- constant, linear, quadratic, cubic, quartic
ADDING, SUBTRACTING, MULTIPLYING, and DIVIDING
FACTORING – Solving equations by factoring

PROBLEMS –

1. The polynomial $3x^{2}-2x+1$ is a

   a. monomial b. binomial c. trinomial

2. In standard form $a^4 + 7a^2 - 2a^3 - 8$ is

   a. $-8 + 7a^2 - 2a^3 + a^4$
   b. $a^4 - 2a^3 + 7a^2 - 8$
   c. $7a^2 - 2a^3 + a^4 - 8$

---

3. By degree, the polynomial $9x^3 + 1$ is classified as

   a. constant b. quadratic c. cubic d. quartic e. linear

---

4. By degree, the polynomial $x^2 - 8x + 2$ is classified as

   a. constant b. quadratic c. cubic d. quartic e. linear

---

5. Simplify: $(3r^4 - 7r^2 + r - 9) + (r^4 + 5r^3 - 2r^2 + 1)$

   a. $4r^4 - 12r^2 + 3r - 10$
   b. $4r^4 - 2r^2 - r - 8$
   c. $4r^4 + 5r^3 - 5r^2 + r - 8$
   d. $4r^4 + 5r^3 - 9r^2 + r - 8$

---

6. Simplify: $(x^5 - 2x^3 + 3x^2 - 3) - (x^3 - 5x^2 + 7)$

   a. $x^5 - x^3 - 3x^2 + 4$
   b. $x^5 - 3x^3 + 8x^2 - 10$
   c. $-x^5 + x^3 - 8x^2 + 10$
   d. $x^5 - x^3 - 2x^2 + 4$

7. Multiply/Simplify: $6y^2(3y^2 - 1)$

   a. $18y^4 - 6y^2$
   b. $9y^4 - 6y$
   c. $18y^4 - 1$
   d. $18y^3 - 6y^2$

8. Multiply/Simplify: $(4p-3)^2$

   a. $16p^2-6p+9$
   b. $16p^2-12p+9$
   c. $16p^2-24p+9$
   d. $16p^2-9$

9. Multiply/Simplify: $(5x-3)(2x+2)$

   a. $10x^2-16x-6$
   b. $10x^2-x-6$
   c. $10x^2+4x-6$
   d. $15x^2+4x+4$

10. Multiply/Simplify: $(3x-2)(3x+2)$

    a. $9x^2-4$
    b. $3x^2-6x-4$
    c. $9x^2+4$
    d. $9x^2-2x-4$

11. What is the GCF of $3a^4b^2c$ and a^2b^3c

    a. $3a^2b^3c$
    b. a^2b^2c
    c. $3a^4b^3c$
    d. a^2b^3c

12. Factor: $2a^2b^3+8a^3b^2-6a^2b$

    a. $2a^2b(b^2+4ab-3)$
    b. $2ab(ab^2+4ab-3a)$
    c. $2a^2b^3(8a^3b^2-6a^2b)$
    d. $2a^2b^2(b+4a-3)$

13. What are the solutions to the equation: $x^2 - 5x + 6 = 0$?

a. – 2 and 3

b. 2 and – 3

c. – 2 and – 3

d. 2 and 3

14. Factor completely: $9x^2 - 36x + 36$

a. $9(x + 2)(x - 2)$

b. $3(x + 3)(3x + 4)$

c. $9(x - 4)(x + 1)$

d. $9(x - 2)^2$

15. Factor completely: $25a^2 - 9b^4$

a. $16(a + b^2)(a - b^2)$

b. $25a^2(1 - 3b^2)(1 + 3b^2)$

c. $(5a - 3b^2)(5a + 3b^2)$

d. $(5a - 3b^2)^2$

16. Simplify: $(3x^2y - 5x^2y^2 + x^3y^4) + (2x^2y + 7x^3y^4 + 2x^2y^2) - (3x^3y^4 - 3x^2y^2)$

17. Simplify: $\frac{2m^3 - 18m^2 + 10m}{6m^2}$

18. Simplify: $\frac{28m^6-32m^2}{4m}$

19. Simplify: $\frac{42r^2s^5-49r^2s^7+14rs^3}{7rs^3}$

20. Find the degree of the monomial $6x^{10}y^2z^{15}$

21. Find the degree of the monomial $-3l^0mn$

22. Factor completely: $81x^2+25y^2$

23. Factor completely: $26a^2-25b^4$

24. Factor completely: $6x^2 + x - 12$

a. $2(3x + 2)(x - 3)$

b. $(3x - 4)(2x + 3)$

c. $(3x + 4)(2x - 3)$

d. $6(x + 1)(x - 2)$

---

25. Find each product:

a) $3w(5w^2 - 6w + 1)$

b) $(4a - 2b^2)(4a + 2b^2)$

c) $(2x - 3)^2$

d) $(3x - 8)(2x + 3)$

e) $(x - 5)(x - 12)$

f) $(x - 3)(2x^2 - 4x + 8)$

---

26. Factor each completely:

a) $9r^2 - 4$

b) $z^2 - 7z - 18$

c) $m^2 - 10m + 25$

d) $7a^3 + 28a^2 - 35a$

e) $y^2 - 11y + 24$

f) $18a^5b^3 - 9a^2b + 27a^4b^2$

g) $-100x + 25x^3$

h) $3x^2 - 8x - 16$

27. Solve each equation:

a) $x^2 - 4x + 3 = 0$

b) $x^2 - 25 = 0$

c) $x^2 - 8x = -15$

d) $x^2 - 8x = 20$

---

28. Find the missing value if: $(x + 8)(x + \_\_) = x^2 + 14x + 48$

---

29. Use the quadratic formula to solve for x:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

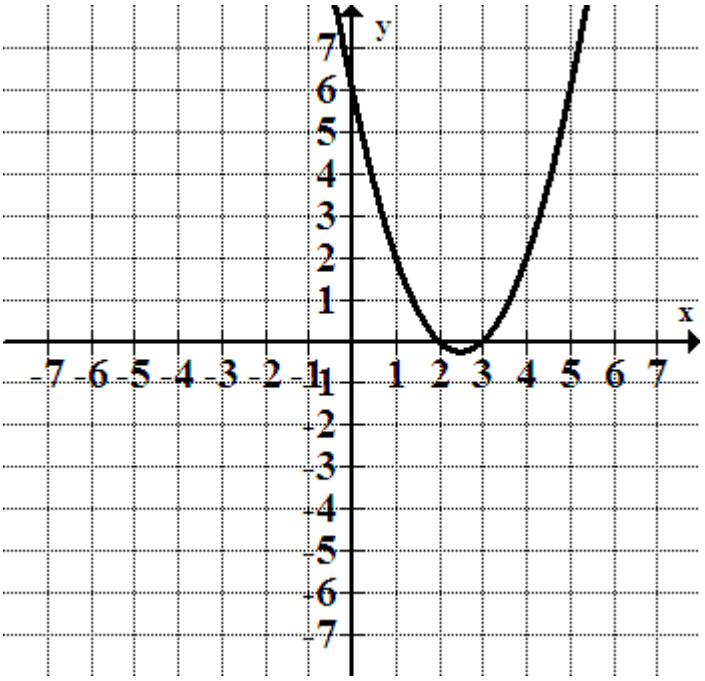
a) $3x^2 + 2x - 4 = 0$

b) $2m^2 - 9m + 7 = 0$

c) $x^2 + 11x = 10$

d) $3a^2 - 2a + 3 = -2a + 20 - 2a^2$

30. Determine the point symmetrical to the y −intercept:



31. Find each of the following for the given functions:

a) $f(x) = -2x^2 + 12x + 15$	b) $f(x) = (x + 6)(x - 8)$
Axis of Symmetry: _____	Axis of Symmetry: _____
Vertex: _____	Vertex: _____
y-intercept: _____	y-intercept: _____
Min/Max Value: _____	Min/Max Value: _____
Domain: _____	Domain: _____
Range: _____	Range: _____
Increasing: _____	Increasing: _____
Decreasing: _____	Decreasing: _____

RADICALS

1. Simplify each radical expression:

a) $\sqrt{75}$

b) $\sqrt{245}$

c) $\sqrt{3}+5\sqrt{3}$

d) $\sqrt{24}-\sqrt{54}$

e) $\sqrt{6}\cdot\sqrt{12}$

f) $\sqrt{8}+5\sqrt{2}$

g) $\frac{7}{\sqrt{3}}$

h) $\frac{8}{\sqrt{6}}$

i) $(3\sqrt{2})(4\sqrt{18})$

j) $\sqrt{5}\cdot\sqrt{10}\cdot\sqrt{12}$

k) $\frac{2\sqrt{8}}{\sqrt{22}}$

l) $\sqrt{18}-5\sqrt{5}+7\sqrt{2}-\sqrt{20}$

COMPOUND INEQUALITIES, ABSOLUTE VALUE EQUATIONS AND INEQUALITIES

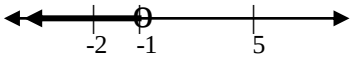
1. Solve and graph each of the following inequalities:

(a) $\|x\| + 5 \leq 7$	(b) $\|2x + 1\| > 7$
(c) $-3\|x + 3\| \geq 27$	(d) $5 + 2\left\|\frac{x}{3}\right\| \geq 15$

2. Write an inequality describing each graph below:

(a)

(b)



3. Graph each solution.

(a) $-1 < x < 4$ (b) $x < 3$ or $x > 4$ (c) $0 \leq y < 7.5$ (d) $k < 12$ or $k \geq 3.5$

4. Solve and graph the following compound inequalities.

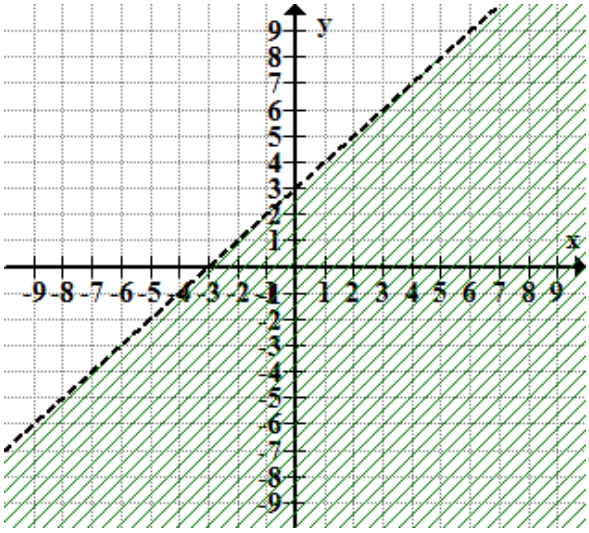
(a) $-5 \leq x + 2 < 0$	(b) $10y > -2$ *or* $2 + y \leq -15$
(c) $-4x < 8$ *or* $-3x \geq 9$	(d) $x + 4 > 2$ and $-2x + 6 \geq 4$

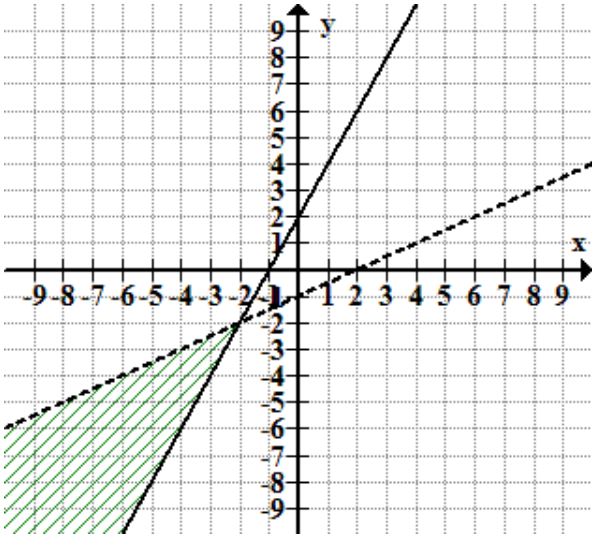
5. Solve the following absolute value equations.

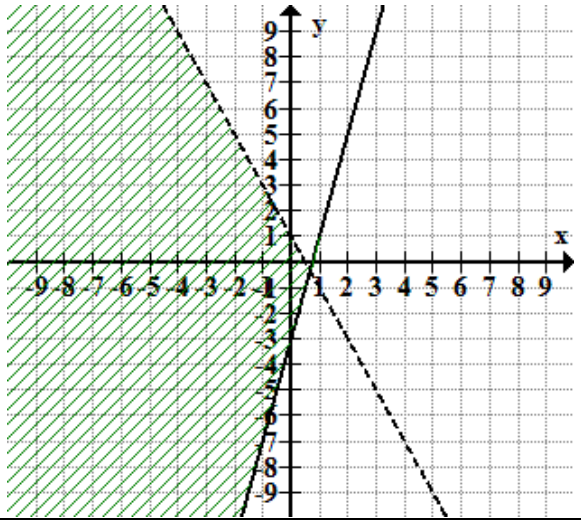
(a) $-7 = \|3x + 1\| + 8$	(b) $6 - 2\|4 - x\| = -8$	(c) $-\left\|\frac{x}{2}\right\| + 5 = -2$

ANSWERS

CHAPTER 7:

1. 

2. 

3. 

4. a) D b) B c) C

CHAPTER 8:

1. d
2. a
3. c
4. b
5. a) $\frac{4}{9}$ b) $10^6 = 1{,}000{,}000$ c) $\frac{54}{25}$
6. $21a^8b^3$
7. $15p^9$
8. $8c^3d^6$
9. $9x^8y^{10}$
10. $\frac{1}{r^3}$
11. $\frac{-3w^3}{5v^2}$
12. $\frac{2a^2}{b^5}$
13. $\frac{3m^2p^2}{n^{10}}$
14. $\frac{b^6d^6}{27a^6}$
15. $\frac{x^{14}y^2z^{20}}{16}$

CHAPTER 9:

1. c
2. b
3. c
4. b
5. d
6. b
7. a
8. c
9. c
10. a
11. b
12. a
13. d
14. d
15. c
16. $5x^3y^4 + 5x^2y$
17. $\frac{m}{3} - 3 + \frac{5}{3m}$ or $\frac{m^2-9m+5}{3m}$
18. $7m^5 - 8m$
19. $-7rs^4 + 6rs^2 + 2$
20. 27
21. 2
22. prime
23. prime
24. b
25. a) $15w^3 - 18w^2 + 3w$
    b) $-4b^4 + 16a^2$
    c) $4x^2 - 12x + 9$
    d) $6x^2 - 7x - 24$
    e) $x^2 - 17x + 60$
    f) $2x^3 - 10x^2 + 20x - 24$
26. a) $(3r + 2)(3r - 2)$
    b) $(z - 9)(z + 2)$
    c) $(m - 5)^2$
    d) $7a(a + 5)(a - 1)$
    e) $(y - 8)(y - 3)$
    f) $9a^2b(2a^3b^2 + 3a^2b - 1)$
    g) $25x(x - 2)(x + 2)$
    h) $(x - 4)(3x + 4)$
27. a) $1, 3$ b) ± 5 c) $3, 5$ d) $-2, 10$
28. 6
29. a) $x = -1.535, 0.869$ b) $x = 1, 3.5$
    c) $x = -11.844, 0.844$
    d) $x = -1.844, 1.844$
30. $(5, 6)$

31.

a) Axis of Symmetry: $x = 3$
Vertex: $(3, 33)$
y −intercept: $(0, 15)$
Max Value: 33
Domain: $-\infty < x < \infty$
Range: $-\infty < y \leq 33$
Increasing: $-\infty < x < 3$
Decreasing: $3 < x < \infty$

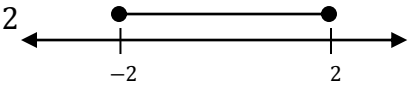
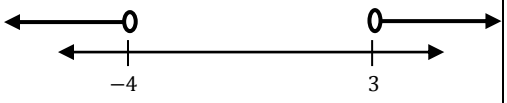
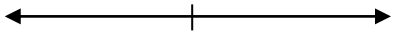
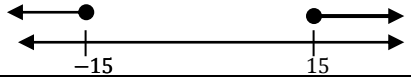
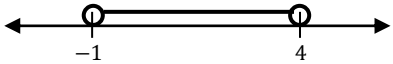
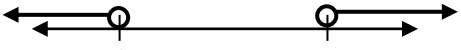
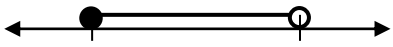
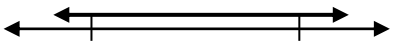
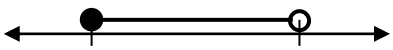
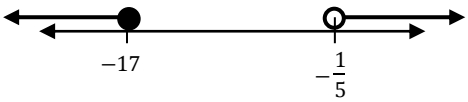
31.

b) Axis of Symmetry: $x = 1$
Vertex: $(1, -49)$
y −intercept: $(0, -48)$
Min Value: -49
Domain: $-\infty < x < \infty$
Range: $-49 \leq y < \infty$
Increasing: $1 < x < \infty$
Decreasing: $-\infty < x < 1$

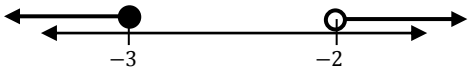
RADICALS:

a) $5\sqrt{3}$
b) $7\sqrt{5}$
c) $6\sqrt{3}$
d) $-\sqrt{6}$
e) $6\sqrt{2}$
f) $7\sqrt{2}$
g) $\frac{7\sqrt{3}}{3}$
h) $\frac{4\sqrt{6}}{3}$
i) 72
j) $10\sqrt{6}$
k) $\frac{4\sqrt{11}}{11}$
l) $10\sqrt{2}-7\sqrt{5}$

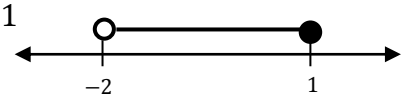
COMPOUND INEQUALITIES, ABSOLUTE VALUE EQUATIONS AND INEQUALITIES

1. (a) $-2 \le x \le 2$ 	(b) $x > 3$ *or* $x < -4$ 
(c) $\emptyset$ 	(d) $x \ge 15$ *or* $x \le -15$ 
2. (a) $x \ge -2$	(b) $x < -1$
3. (a) 	(b) 
(c) 	(d) All Reals 
4. (a) $-7 \le x < 2$ 	(b) $y > -\frac{1}{5}$ or $y \le -17$ 

(c) $x > -2$ or $x \leq -3$



(d) $x > -2$ and $x \leq 1$



5.
(a) $\emptyset$
(b) $\{-3,11\}$
(c) $\{-14,14\}$