CHAPTER R, FORM D
COLLEGE ALGEBRA

NAME_____
DATE_____

1. Let $A = \left\{\sqrt{5}, -17.8, -3.\overline{6}, 0, -\frac{10}{2}, \sqrt{49}, 3\pi, \frac{5}{3}, 8\right\}$.

   List the elements of A that belong to the given set.

   a. Natural numbers

   b. Rational numbers

   c. Integers

1. a. _____
   b. _____
   c. _____

2. Evaluate the expression if $x = -3$, $y = -4$, and $z = 1$:

$$\frac{|2x + 5z|}{(2|x| - y)^3}$$

2. _____

3. Identify the property illustrated. Let a, b and c represent any real numbers.

   a. $a(b+c) = (b+c)a$

   b. $\left(\frac{2}{7} \cdot \frac{1}{5}\right)b = \frac{2}{7} \cdot \left(\frac{1}{5}b\right)$

   c. $\frac{3}{5} \cdot 1 = \frac{3}{5}$

   d. $4[a + (-a)] = 4a + 4(-a)$

3. a. _____
   b. _____
   c. _____
   d. _____

Perform the indicated operations.

4. $(4x^2 + 3x - 6) - (7x^3 - 2x^2 + 5) - 3x(2x^2 + 1)$

5. $(8y - 3)(y^2 + 2y - 2)$

6. $[(2x - 3y) - 2]^2$

7. $[(r + 2s) - 4][(r + 2s) + 4]$

8. $(6x - y)^3$

9. $\frac{2y^4 - 2y^3 - 11y^2 + 6y}{y^2 - 3}$

4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Factor completely.

11. $18x^2 - 27x + 4$

12. $x^4 - 10x^2 + 9$

13. $12ab^3 - 3abc^2$

14. $r^4 - 8rs^3 - 2r^3s + 16s^4$

11. _____
12. _____
13. _____
14. _____

Perform the indicated operations.

15. $\dfrac{x^2+13x+40}{7x^2-x} \div \dfrac{x^2-64}{7x^2+34x-5}$ 15. _____

16. $\dfrac{x-4}{x^2-10x+16} - \dfrac{x+1}{x^2+5x-14}$ 16. _____

17. $\dfrac{x+3}{x^2-4} + \dfrac{2x+5}{4-x^2}$ 17. _____

18. $\dfrac{\frac{2}{x}-y}{\frac{2}{y}+\frac{1}{x}}$ 18. _____

19. Evaluate $\left(-\dfrac{27}{125}\right)^{-2/3}$. 19. _____

20. Simplify $\left(\dfrac{a^{2/5}b^{-3/4}c^{-4/5}}{a^{1/2}c^{1/4}}\right)^{10}$ so that there are no negative exponents. Assume that all variables represent positive real numbers. 20. _____

Simplify. Assume that all variables represent positive real numbers.

21. $\sqrt{84a^{14}b^{18}c^5}$ 21. _____

22. $2x\sqrt[3]{54y^2} + 5\sqrt[3]{2x^3y^2}$ 22. _____

23. $\left(\sqrt{10}+2\sqrt{6}\right)\left(\sqrt{10}-\sqrt{6}\right)$ 23. _____

24. Rationalize the denominator of $\dfrac{8}{\sqrt{7}-\sqrt{5}}$ and simplify. 24. _____

NAME_____
DATE_____

1. Let $B = \left\{\sqrt{10}, -1.\overline{55}, 12, \frac{15}{5}, -\pi, \sqrt{64}, 0, \frac{5}{14}\right\}$.

List the elements of B that belong to the given set.

A. Irrational numbers

1. A. _____

a. $\sqrt{10}, -1.\overline{55}, 12, \frac{15}{5}, -\pi, \sqrt{64}, 0, \frac{5}{14}$ b. $\sqrt{10}, -1.\overline{55}, -\pi, \sqrt{64}, 0$

c. $\sqrt{10}, -\pi, 0$ d. $\sqrt{10}, -\pi$

B. Natural numbers

B. _____

a. $12, \frac{15}{5}, \sqrt{64}, 0$ b. $12, \frac{15}{5}, \sqrt{64}$

c. $12, \frac{15}{5}, 0, -1.\overline{55}, \sqrt{64}$ d. $12, \frac{15}{5}$

C. Integers

C. _____

a. $12, \frac{15}{5}, \sqrt{64}$ b. $12, \frac{15}{5}, \sqrt{64}, 0$

c. $12, \frac{15}{5}$ d. $12, \frac{15}{5}, 0, -1.\overline{55}, \sqrt{64}, \frac{5}{14}$

2. Evaluate the expression if $x = -2$, $y = 1$, and $z = -1$:

2. _____

$$\frac{|3x + y|}{|z| - 2x^2}$$

a. $\frac{5}{7}$ b. $-\frac{1}{3}$ c. $-\frac{5}{7}$ d. $\frac{1}{3}$

3. Identify the property illustrated. Let a and b represent any real numbers.

A. $1 \cdot \sqrt{3} = \sqrt{3}$

3. A. _____

a. Associative b. Inverse
c. Distributive d. Identity

B. $(a + b) + 0 = a + (b + 0)$

B. _____

a. Identity b. Commutative
c. Associative d. Distributive

C. $\frac{\pi}{3} \cdot \frac{3}{\pi} = 1$

C. _____

a. Commutative b. Inverse
c. Identity d. Distributive

D. $5(a + b) = 5(b + a)$

D. _____

a. Associative b. Distributive
c. Commutative d. Inverse

Perform the indicated operations.

4. $\left(-2x^2+5x+8\right)-\left(x^3-7x-2\right)+4x\left(x^2-3\right)$

a. $3x^3-2x^2-14x+6$
b. $-5x^3-2x^2-14x+6$
c. $5x^3-2x^2-14x+6$
d. $3x^3-2x^2+10$

4. _____

5. $(3y+5)\left(2y^2-y-3\right)$

a. $6y^3+7y^2-4y+15$
b. $6y^3+7y^2-14y-15$
c. $6y^3+13y^2-14y-15$
d. $6y^3+7y^2+4y+15$

5. _____

6. $\left[(3a+2b)-2\right]^2$

a. $9a^2+4b^2-4$
b. $9a^2+12ab+4b^2-12a-8b+4$
c. $9a^2+12ab+4b^2-6a-4b+4$
d. $9a^2+4b^2+4$

6. _____

7. $\left[(r-2)+3s\right]\left[(r-2)-3s\right]$

a. r^2+4-9s^2
b. r^2-4-9s^2
c. $r^2-4r-4-9s^2$
d. $r^2-4r+4-9s^2$

7. _____

8. $(x+3)^4$

a. $x^4+6x^3+18x^2+54x+81$
b. $x^4+6x^3+36x^2+54x+81$
c. x^4+81
d. $x^4+12x^3+54x^2+108x+81$

8. _____

9. $\dfrac{3x^3+5x-8}{x-2}$

a. $3x^2+11x+22+\dfrac{36}{x-2}$
b. $3x^2+11x+\dfrac{14}{x-2}$
c. $3x^2-6x+17-\dfrac{42}{x-2}$
d. $3x^2+6x+17+\dfrac{26}{x-2}$

9. _____

Factor completely.

11. $12t^2+40t-7$

a. $(2t+7)(6t-1)$
b. $(3t+7)(2t-1)$
c. $(3t-7)(2t+1)$
d. $(2t-7)(6t+1)$

11. _____

12. $125x^3+216y^3$

a. $(5x-6y)\left(25x^2+30xy+36y^2\right)$
b. $(5x+6y)\left(25x^2-30xy+36y^2\right)$
c. $(5x+6y)\left(25x^2-60xy+36y^2\right)$
d. $(5x-6y)\left(25x^2+60xy+36y^2\right)$

12. _____

13. $100a^2-16$

a. $(10a-4)(10a+4)$
b. $4(5a-2)(5a+2)$
c. $2(5a-2)^2$
d. $4(5a-2)^2$

13. _____

14. $r^3s^2+4r^3-8s^2-32$

a. $(r-2)(r+2)^2(s-2)(s+2)$
b. $(r-2)\left(r^2+2r+4\right)\left(s^2+4\right)$
c. $(r-2)\left(r^2+2r+4\right)(s-2)(s+2)$
d. $(r-2)\left(r^2-2r+4\right)(s-2)(s+2)$

14. _____

Perform the indicated operations.

15. $\dfrac{x^2+5x-14}{x^2-4} \div \dfrac{x^2+12x+35}{x^2+12x+20}$ 15. _____

a. $\dfrac{x+10}{x+5}$ b. $\dfrac{x+5}{x+10}$

c. $\dfrac{x+1}{x+2}$ d. $\dfrac{x+2}{x+1}$

16. $\dfrac{3a+7}{a^2+5a+6} - \dfrac{a-5}{a^2+2a-3}$ 16. _____

a. $\dfrac{2a^2-3a-17}{(a+2)(a+3)(a-1)}$ b. $\dfrac{2a+1}{(a-1)(a+2)}$

c. $\dfrac{2(a+6)}{3(a+3)}$ d. $\dfrac{4a^2+a-17}{(a+2)(a+3)(a-1)}$

17. $\dfrac{8s+t}{5s-t} - \dfrac{2t+7s}{t-5s}$ 17. _____

a. $\dfrac{s-t}{5s-t}$ b. $\dfrac{t-s}{5s-t}$ c. $\dfrac{15s+3t}{5s-t}$ d. 3

18. $\dfrac{\dfrac{1}{x+3}-\dfrac{2}{3}}{\dfrac{2}{x+3}-\dfrac{1}{3}}$ 18. _____

a. $\dfrac{3+2x}{x-3}$ b. -1 c. $\dfrac{-3-2x}{1+x}$ d. $\dfrac{6}{x+3}$

19. Evaluate $\left(\dfrac{125}{8}\right)^{-4/3}$ 19. _____

a. $\dfrac{625}{16}$ b. $-\dfrac{16}{625}$ c. $\dfrac{16}{625}$ d. $-\dfrac{625}{16}$

20. Simplify $\left(\dfrac{x^{5/3}y^{-3/2}}{x^{3/6}y^{5/3}z^{-3/6}}\right)^{18}$ so that there are no negative exponents. 20. _____

Assume that all variables represent positive real numbers.

a. $\dfrac{x^{27}y^{57}}{z^{15}}$ b. $\dfrac{x^{27}z^{15}}{y^{57}}$ c. $\dfrac{x^{33}y^{3}}{z^{15}}$ d. $\dfrac{z^{15}}{x^{33}y^{3}}$

Simplify. Assume that all variables represent positive real numbers. 21. _____

21. $\sqrt{75a^{12}b^3c^5}$

a. $5a^6bc^2\sqrt{3abc}$ b. $3a^6bc^2\sqrt{5abc}$

c. $5a^6bc^2\sqrt{3bc}$ d. $3a^6bc^2\sqrt{5bc}$

22. $\sqrt[3]{81x^4y^2} + 4x\sqrt[3]{3xy^2}$ 22. _____

a. $7x\sqrt[3]{3xy^2}$ b. $12x^2\sqrt[3]{3xy^2}$

c. $7xy\sqrt[3]{3x}$ d. $12x^2y\sqrt[3]{9x^2y}$

23. $\left(2\sqrt{15}+5\sqrt{3}\right)\left(-3+\sqrt{5}\right)$ 23. _____

a. $-\sqrt{15}-5\sqrt{3}$
b. $-11\sqrt{15}-5\sqrt{3}$
c. $-11\sqrt{15}-3\sqrt{5}$
d. $-\sqrt{15}-3\sqrt{5}$

24. Rationalize the denominator of $\frac{9}{\sqrt{17}+3\sqrt{2}}$. 24. _____

a. $9\left(\sqrt{17}+3\sqrt{2}\right)$
b. $-9\left(\sqrt{17}-3\sqrt{2}\right)$
c. $-9\left(\sqrt{17}+3\sqrt{2}\right)$
d. $9\left(\sqrt{17}-3\sqrt{2}\right)$

CHAPTER 1, FORM D
COLLEGE ALGEBRA

NAME_____
DATE_____

Solve each equation.

1. $4x - 2(x + 4) = 6(2 - x) + 6$ 1. _____

2. $\frac{5}{6}(x+8) - \frac{2}{3}(x+6) = 2x + 10$ 2. _____

3. $16x(5 - x) = 128$ 3. _____

4. $(5x - 3)^2 = -49$ 4. _____

5. $\frac{2}{x^2 - 9} + \frac{1}{x+3} = \frac{2}{x-3}$ 5. _____

6. $\sqrt{x} - 1 = \sqrt{x - 5}$ 6. _____

7. $\sqrt[3]{x^2 + 15} = \sqrt[3]{2x^2 + x + 9}$ 7. _____

8. $x^4 - x^2 - 56 = 0$ 8. _____

9. $(x^2 - 4x)^2 - 36 = 9(x^2 - 4x)$ 9. _____

10. $|7x - 5| = 12$ 10. _____

11. $|5x - 1| = |3x|$ 11. _____

12. The formula for the surface area of an open topped rectangular box is $S = LW + 2LH + 2WH$ where S, H, W, and L represent surface area, height, width, and length, respectively. Solve this formula for L. 12. _____

Perform each operation. Give the answer in standard form.

13. $(5 + 3i) + (2 - 4i) - (3 - 8i)$ 13. _____

14. $(2 + 3i)(5 + 7i)$ 14. _____

15. $\frac{30 - i}{1 - 4i}$ 15. _____

16. Simplify the following power of i: i^{-50} 16. _____

Solve each problem.

17. What weight of an alloy containing 10% silver must be melted with an alloy containing 60% silver to obtain 10 lb of an alloy containing 40% silver? 17. _____

19. An arrow is shot upward from a platform 40 ft high with an initial velocity of 224 ft per sec. Its height h in feet after t seconds is given by the equation $h = -16t^2 + 224t + 40$. At what times will the arrow be 424 ft above the ground?

19. _____

Solve each inequality. Give the answer using interval notation.

21. $4(x + 3) \geq 3(4 - 5x)$

21. _____

22. $2x^2 - x \leq 6$

22. _____

23. $\frac{4}{x+1} < 1$

23. _____

24. $|3x - 9| < 10$

24. _____

25. $|2 - x| \geq 3$

25. _____

CHAPTER 1, FORM F
COLLEGE ALGEBRA

NAME_____
DATE_____

Choose the best answer.

Solve each equation.

1. $2(5x+4)-3(2x-1)=5-2(2x+3)$ 1. _____

a. $\left\{\frac{5}{4}\right\}$ b. $\left\{-\frac{3}{2}\right\}$ c. $\left\{-\frac{3}{4}\right\}$ d. $\varnothing$

2. $\frac{2}{3}(2x+7)+\frac{3}{4}x=\frac{1}{2}x+\frac{3}{2}$ 2. _____

a. $\{1\}$ b. $\{-2\}$ c. $\left\{\frac{5}{4}\right\}$ d. $\varnothing$

3. $3x(x-4)=2x-9$ 3. _____

a. $\left\{\frac{5\pm 2\sqrt{2}}{3}\right\}$ b. $\left\{\frac{5}{3}\pm\frac{2}{3}i\sqrt{2}\right\}$

c. $\left\{\frac{7\pm\sqrt{22}}{3}\right\}$ d. $\left\{\frac{7}{3}\pm\frac{1}{3}i\sqrt{22}\right\}$

4. $(3x-5)^2=81$ 4. _____

a. $\left\{\frac{14}{3}\pm\frac{4}{3}i\right\}$ b. $\left\{\frac{86}{3},\frac{76}{3}\right\}$

c. $\left\{\frac{14\pm\sqrt{86}}{3}\right\}$ d. $\left\{\frac{14}{3},-\frac{4}{3}\right\}$

5. $\frac{2}{x^2-36}-\frac{1}{x-6}=\frac{1}{x+6}$ 5. _____

a. $\{1\}$ b. $\{3\}$ c. $\varnothing$ d. $\left\{\frac{5}{2}\right\}$

6. $\sqrt{2x+7}-\sqrt{x+3}=1$ 6. _____

a. $\{-3, 1\}$ b. $\{-3, -1\}$ c. $\{3, -1\}$ d. $\{3, 1\}$

7. $\sqrt[3]{4x^2+3}=\sqrt[3]{x^2+10x}$ 7. _____

a. $\{0, -10\}$ b. $\left\{-\frac{1}{3}, -3\right\}$ c. $\left\{\pm\frac{1}{2}i\sqrt{3}\right\}$ d. $\left\{\frac{1}{3}, 3\right\}$

8. $x^4+4=5x^2$ 8. _____

a. $\{\pm 1, \pm 2\}$ b. $\left\{\pm 1, \pm\sqrt{2}\right\}$

c. $\{\pm i, \pm 2i\}$ d. $\{\pm 1, \pm 2i\}$

9. $(3x-1)^2+(3x-1)=72$

a. $\{9,-8\}$ b. $\{-9,8\}$ c. $\left\{-\frac{7}{3},\frac{10}{3}\right\}$ d. $\left\{-\frac{8}{3},3\right\}$

9. _____

10. $|3x+9|=0$

a. $\{-3,3\}$ b. $\varnothing$ c. $\{-3\}$ d. $\{3\}$

10. _____

11. $|x+3|=|5x+3|$

a. $\varnothing$ b. $\{0\}$ c. $\{0,-1\}$ d. $\{0,-3\}$

11. _____

Perform each operation. Give the answer in standard form.

13. $(5+3i)-(2-4i)-(3-8i)$

a. $9i$ b. $6+7i$ c. $15i$ d. $6+15i$

13. _____

14. $(4-3i)^2$

a. 7 b. $25-24i$ c. $7+24i$ d. $7-24i$

14. _____

15. $\frac{2+i}{7-5i}$

a. $\frac{19}{74}+\frac{17}{74}i$ b. $\frac{19}{24}+\frac{19}{24}i$ c. $\frac{9}{74}+\frac{17}{74}i$ d. $\frac{9}{24}+\frac{17}{24}i$

15. _____

16. Simplify the following power of i: i^{63}

a. i b. -1 c. $-i$ d. 1

16. _____

Solve each problem.

17. Two runners, Alan and Ed, leave home at the same time and jog in different directions. Alan travels east at a uniform rate that is 2 mph faster than Ed, who is traveling west. After 2 hr, they are 28 mi apart. Find Alan's rate.

a. 4 mph b. 10 mph c. 6 mph d. 8 mph

17. _____

18. Mona can process 100 requests in 4 hr, and Jane can process 100 requests in twice the time. How long will it take both Mona and Jane, working together, to process 200 requests?

a. $2\frac{2}{3}$ hr b. 6 hr c. $3\frac{2}{3}$ hr d. $5\frac{1}{3}$ hr

18. _____

20. The height in feet of an object thrown upward is given by the equation $h = 48t - 16t^2$, where h is the height of the object after t seconds. After how many seconds will the object reach a height of 36 feet? 20. _____

a. $1\frac{1}{2}$ sec b. $2\frac{1}{2}$ sec c. 2 sec d. 5 sec

Solve each inequality. Give the answer using interval notation.

21. $\frac{2x}{4} - 3 \le \frac{4-2x}{3}$ 21. _____

a. $\left[-\frac{26}{7}, \frac{26}{7}\right]$ b. $\left(-\infty, \frac{26}{7}\right]$ c. $\left(-\infty, \frac{26}{7}\right)$ d. $\left[\frac{26}{7}, \infty\right)$

22. $4x^2 < 20 + 11x$ 22. _____

a. $\left(-\infty, -\frac{5}{4}\right) \cup (4, \infty)$ b. $\left(-\frac{5}{4}, 4\right)$

c. $\left(-4, \frac{5}{4}\right)$ d. $(-\infty, -4) \cup \left(\frac{5}{4}, \infty\right)$

23. $\frac{3x+4}{2x-1} \le 0$ 23. _____

a. $\left(-\infty, -\frac{4}{3}\right] \cup \left(\frac{1}{2}, \infty\right)$ b. $\left[-\frac{4}{3}, \frac{1}{2}\right)$

c. $\left(-\frac{4}{3}, \frac{1}{2}\right)$ d. $\left[-\frac{4}{3}, \frac{1}{2}\right]$

24. $|2x - 1| \ge 12$ 24. _____

a. $\left[-\frac{13}{2}, \frac{11}{2}\right]$ b. $\left(-\infty, -\frac{13}{2}\right] \cup \left[\frac{11}{2}, \infty\right)$

c. $\left[-\frac{11}{2}, \frac{13}{2}\right]$ d. $\left(-\infty, -\frac{11}{2}\right] \cup \left[\frac{13}{2}, \infty\right)$

25. $|3 - 2x| \le 19$ 25. _____

a. $[-8, 11]$ b. $(-8, 11)$ c. $(-\infty, -8)$ d. $(11, \infty)$

CHAPTER R, FORM D

1. a. $\sqrt{49}, 8$

   b. $-17.8, -3.\overline{6}, 0, -\frac{10}{2}, \sqrt{49}, \frac{5}{3}, 8$

   c. $0, -\frac{10}{2}, \sqrt{49}, 8$

2. $\frac{1}{100}$

3. a. commutative

   b. associative

   c. identity

   d. distributive

4. $-13x^3+6x^2-11$

5. $8y^3+13y^2-22y+6$

6. $4x^2-12xy+9y^2-8x+12y+4$

7. $r^2+4rs+4s^2-16$

8. $216x^3-108x^2y+18xy^2-y^3$

9. $2y^2-2y-5-\frac{15}{y^2-3}$

10. approximately 3

11. $(6x-1)(3x-4)$

12. $(x-1)(x+1)(x-3)(x+3)$

13. $3ah(2h-c)(2h+c)$

14. $(r-2s)^2(r^2+2rs+4s^2)$

15. $\frac{(x+5)^2}{x(x-8)}$

16. $\frac{10}{(x-8)(x+7)}$

17. $-\frac{1}{x-2}$ or $\frac{1}{2-x}$

18. $\frac{2y-xy^2}{2x+y}$

19. $\frac{25}{9}$

20. $\frac{1}{ab^{15/2}c^{9/2}}$

21. $2a^7b^9c^2\sqrt{21c}$

22. $11x\sqrt[3]{2y^2}$

23. $-2+2\sqrt{15}$

24. $4\sqrt{7}+4\sqrt{5}$

25. approximately 27.1 m

CHAPTER R, FORM F

1. A. d B. b C. b
2. c
3. A. d B. c C. b D. c
4. d
5. b
6. b
7. d
8. d
9. d
10. b
11. a
12. b
13. b
14. b
15. a
16. b
17. c
18. a
19. c
20. b
21. c
22. a
23. a
24. b
25. a

CHAPTER 1, FORM D

1. $\left\{\frac{13}{4}\right\}$
2. $\{-4\}$
3. $\left\{\frac{5}{2} \pm \frac{1}{2}i\sqrt{7}\right\}$
4. $\left\{\frac{3}{5} \pm \frac{7}{5}i\right\}$
5. $\{-7\}$
6. $\{9\}$
7. $\{-3, 2\}$
8. $\left\{\pm 2\sqrt{2}, \pm i\sqrt{7}\right\}$
9. $\{-2, 1, 3, 6\}$
10. $\left\{\frac{17}{7}, -1\right\}$
11. $\left\{\frac{1}{2}, \frac{1}{8}\right\}$
12. $L = \frac{S - 2WH}{W + 2H}$
13. $4 + 7i$
14. $-11 + 29i$
15. $2 + 7i$
16. -1
17. 4 lb
18. \$4500 at 6%; \$9000 at 8%
19. 2 sec and 12 sec
20. 1987
21. $[0, \infty)$
22. $\left[-\frac{3}{2}, 2\right]$
23. $(-\infty, -1) \cup (3, \infty)$
24. $\left(-\frac{1}{3}, \frac{19}{3}\right)$
25. $(-\infty, -1] \cup [5, \infty)$

CHAPTER 1, FORM F

1. b
2. b
3. c
4. d
5. a
6. a
7. d
8. a
9. d
10. c
11. c
12. d
13. c
14. d
15. c
16. c
17. d
18. d
19. a
20. a
21. b
22. b
23. b
24. d
25. a