1. List the elements from the given set that are rational numbers.

$$\left\{0,\ -2,\ 50,\ \frac{1}{\sqrt{2}},\ 0.521,\ 2\sqrt{2},\ 1.2\overline{3},\ -\frac{1}{6},\ \sqrt[3]{4},\ \sqrt{4}\right\}$$

2. State the property of real numbers being used.

$$(2x+3y)+4z = 2x+(3y+4z)$$

3. Perform the indicated operations.

$$\frac{\frac{1}{12}}{\frac{1}{8}-\frac{1}{12}}$$

4. Evaluate each expression.

(a) $\left(\frac{7}{3}\right)^0 2^{-1}$ (b) $\frac{3^{-3}}{4^0}$ (c) $\left(\frac{1}{5}\right)^{-2}$

5. Evaluate the expression.

$$\sqrt{3}\sqrt{48}$$

6. Find the set $A \cap C$ if $A = \{\, x \mid x < 4 \,\}$ and $C = \{\, x \mid -2 < x \le 6 \,\}$.

7. Simplify the expression and eliminate any negative exponents(s). Assume that all letters denote positive numbers.

$$\sqrt[3]{r^2 s}\sqrt[3]{64 r^4 s^2}$$

8. Simplify the expression.

$$\left(\frac{a^2 b^{5/3}}{a^{1/3} b^{2/3}}\right)^6$$

9. A hummingbird's heart can beat 1260 times per minute. Estimate the number of times its heart will beat in 2 years. State your answer in scientific notation.

10. Factor the expression completely.

$$x^2\left(x^2-1\right)-25\left(x^2-1\right)$$

11. Perform the indicated operation and simplify.

$$\frac{1}{x}+\frac{2}{x-1}+\frac{3}{(x-1)^2}$$

12. Rationalize the denominator.

$$\frac{\sqrt{2}}{\sqrt{6}+\sqrt{2}}$$

13. Find all real solutions of the quadratic equation.

$$z^2 - \frac{8}{5}z + \frac{16}{25} = 0$$

14. Caitlin drove from Greensville to Bluesburg at a speed of 50 mi/h. On the way back, she drove at 75 mi/h. The total trip took $7\frac{1}{2}$ h of driving time. Find the distance between these two cities.

15. Solve the absolute value inequality. Express the answer using interval notation.

$$|8x+5| > 15$$

16. Two points *P* and *Q* are given.

$$P(0,-8), \quad Q(-11,-8)$$

(a) Find the distance from *P* to *Q*.
(b) Find the midpoint of the line segment *PQ*.

17. Find the equation of the circle with center $(-1,7)$ and radius $\sqrt{2}$.

18. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$$x^2 + y^2 + x + 2y + \frac{5}{4} = 3$$

19. Test the equation for symmetry and sketch its graph.

$$y + x^2 = 16$$

20. Find an equation for the line that passes through the point $(5,1)$ and is perpendicular to the line $x - 3y + 16 = 0$.

21. Find the equation of a line that passes through the point $(-7, 7/2)$ and the midpoint of $(-2,4)$ and $(3,4)$.

22. Hooke's Law states that if a weight *w* is attached to a hanging spring, then the stretched length *s* of the spring is linearly related to *w*. For a particular spring we have the equation $s = 0.4w + 3.5$, where *s* is measured in inches and *w* in pounds. How long is the spring when a 5-lb weight is attached?

23. Determine the values of the variable for which the expression is defined as a real number.

$$\left(\frac{1}{x^2 + 2x - 15}\right)^{1/2}$$

24. In a certain city, the property tax collected for a home varies directly to the valuation of the property. The tax collected on a $\$105,000$ home is $\$2,846$ per year. What is the value of a home if the tax collected is $\$1,735$?

25. The resistance of a wire varies directly as its length and inversely as the square of its diameter. A wire 50 m long and 0.01 m in diameter has a resistance of 25 ohms. Find the resistance of a wire made of the same material that is 20 m long and has diameter 0.02 m.

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form A

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1. $0,\ -2,\ 50,\ 0.521,\ 1.2\overline{3},\ -\frac{1}{6},\ \sqrt{4}$

2. Associative Property for addition

3. 2

4. (a) $\left(\frac{7}{3}\right)^0 2^{-1} = \frac{1}{2}$ (b) $\frac{3^{-3}}{4^0} = \frac{1}{27}$ (c) $\left(\frac{1}{5}\right)^{-2} = 25$

5. $\sqrt{3}\sqrt{48} = 12$

6. $\{\, x \mid -2 < x < 4 \,\}$

7. $4r^2s$

8. $a^{10}b^6$

9. 1.32×10^9

10. $x^2\left(x^2-1\right) - 25\left(x^2-1\right) = (x-1)(x+1)(x-5)(x+5)$

11. $\frac{3x^2 - x + 1}{x(x-1)^2}$

12. $\frac{\sqrt{3}-1}{2}$

13. $z = 4/5$

14. 225 mi

15. $(-\infty, -5/2) \cup (5/4, \infty)$

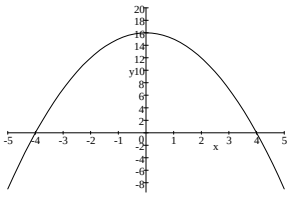
16. (a) 11
(b) $\left(\frac{-11}{2}, -8\right)$

17. $x^2 + 2x + y^2 - 14y + 48 = 0$

18. center $\left(-\frac{1}{2}, -1\right)$, radius $\sqrt{3}$

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form A

19. 

y-axis symmetry

20. $y = 16 - 3x$

21. $30y - 2x - 119 = 0$

22. 5.5 inches

23. $(-\infty, -5) \cup (3, \infty)$

24. $\$64,010$

25. 2.5 ohms

1. List the elements from the given set that are rational numbers.

$$\left\{0,\ -2,\ 25,\ \frac{1}{\sqrt{4}},\ 0.49,\ \sqrt{3},\ -\frac{1}{7},\ \sqrt[3]{16},\ \sqrt{9}\right\}$$

2. State the property of real numbers being used.

$$(2x+3y)+4z = 2x+(3y+4z)$$

3. Perform the indicated operations.

$$\frac{\frac{2}{5}+\frac{1}{2}}{\frac{1}{10}+\frac{3}{5}}$$

4. Evaluate each expression.

(a) $\left(\frac{5}{3}\right)^0 3^{-1}$ (b) $\frac{3^{-3}}{5^0}$ (c) $\left(\frac{1}{3}\right)^{-2}$

5. Evaluate the expression.

$$\sqrt{8}\sqrt{50}$$

6. Find the set $A \cap C$ if $A = \{\, x \mid x < 3 \,\}$ and $C = \{\, x \mid -2 < x \le 10 \,\}$.

7. Simplify the expression and eliminate any negative exponents(s). Assume that all letters denote positive numbers.

$$\sqrt[3]{r^2 s}\sqrt[3]{81 r^4 s^2}$$

8. Perform the division and simplify.

$$\frac{x+4}{9x^2-4} \div \frac{x^2+8x+16}{3x^2+13x-10}$$

9. A hummingbird's heart can beat 1260 times per minute. Estimate the number of times its heart will beat in 2 years. State your answer in scientific notation.

10. Factor the expression completely.

$$x^2\left(x^2-4\right)-16\left(x^2-4\right)$$

11. Perform the indicated operation and simplify.

$$\frac{\frac{1}{x}-\frac{1}{3}}{x-3}$$

12. Rationalize the denominator.

$$\frac{\sqrt{2}}{\sqrt{6}+\sqrt{2}}$$

13. Determine the values of the variable for which the expression is defined as a real number.

$$\left(\frac{1}{x^2+2x-15}\right)^{1/2}$$

14. The approximate distance *d* (in feet) that drivers travel after noticing that they must come to a sudden stop is given by the formula $d = x + \frac{x^2}{20}$, where *x* is the speed of the car in mi/h. If a car travels 120 ft before stopping, what was its speed before the brakes were applied?

15. Solve the inequality.

$$x^2 + x - 20 > 0$$

16. Two points *P* and *Q* are given. Sketch the line determined by *P* and *Q*, and find its equation in slope-intercept form.

$$P(1,-10), \quad Q(-2,-4)$$

17. Find the equation of the circle with center $(-1,5)$ and radius $\sqrt{3}$.

18. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$$x^2 + y^2 + x + 2y + \frac{5}{4} = 3$$

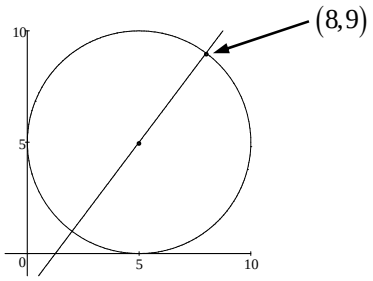
19. Test the equation for symmetry and sketch its graph.

$$9x + y^2 = 0$$

20. Find an equation for the line that passes through the point $(5,1)$ and is perpendicular to the line $x - 3y + 16 = 0$.

21. Find the equation of a line that passes through the point $(-7,1)$ and has slope of $1/2$.

22. Find the equation of the line in the figure.



23. Alyson drove from Bluesville to Greensburg at a speed of 60 mi/h. On the way back, she drove at 45 mi/h. The total trip took $5\frac{3}{5}$ h of driving time. Find the distance between these two cities.

24. In a certain city, the property tax collected for a home varies directly to the valuation of the property. The tax collected on a $\$105,000$ home is $\$2,846$ per year. What is the value of a home if the tax collected is $\$1,735$?

25. The cost for one print run of a book is jointly proportional to the number of pages in the book and the number of books in the print run. Write an equation for the cost of a print run if it costs $\$20,000$ to print 4000 copies of a 100-page book, and calculate the cost to print 400 copies of 293 page book.

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form B

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1. $0,\ -2,\ 25,\ \dfrac{1}{\sqrt{4}},\ 0.49,\ -\dfrac{1}{7},\ \sqrt{9}$

2. Associative Property for addition

3. 9 / 7

4. (a) $\left(\dfrac{5}{3}\right)^0 3^{-1} = \dfrac{1}{3}$ (b) $\dfrac{3^{-3}}{5^0} = \dfrac{1}{27}$ (c) $\left(\dfrac{1}{3}\right)^{-2} = 9$

5. 20

6. $\{\, x \mid -2 < x < 3 \,\}$

7. $3r^2 s\sqrt[3]{3}$

8. $\dfrac{x+4}{9x^2-4} \div \dfrac{x^2+8x+16}{3x^2+13x-10} = \dfrac{(x+5)}{(x+4)(3x+2)}$

9. 1.32×10^9

10. $x^2\left(x^2-4\right)-16\left(x^2-4\right) = (x-2)(x+2)(x-4)(x+4)$

11. $-\dfrac{1}{3x}$

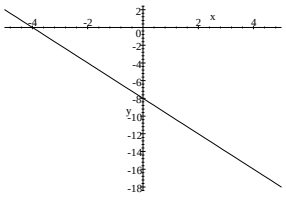
12. $\dfrac{\sqrt{3}-1}{2}$

13. $(-\infty,-5) \cup (3,\infty)$

14. 40 mi/hr

15. $(-\infty,-5) \cup (4,\infty)$

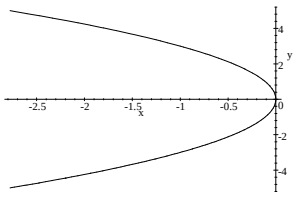
16. $y = -8 - 2x$



17. $x^2 + 2x + y^2 - 10y + 23 = 0$

18. center $\left(-\frac{1}{2}, -1\right)$, radius $\sqrt{3}$

19.



x-axis symmetry

20. $y = 16 - 3x$

21. $y = \frac{x}{2} + \frac{9}{2}$

22. $y = \frac{4}{3}x - \frac{5}{3}$

23. 144 mi

24. $64,010

25. $5860

1. List the elements from the given set that are rational numbers.

$$\left\{0,\ -2,\ 50,\ \frac{1}{\sqrt{2}},\ 0.521,\ 2\sqrt{2},\ 1.2\overline{3},\ -\frac{1}{6},\ \sqrt[3]{4},\ \sqrt{4}\right\}$$

(a) $0,\ -2,\ 50,\ 1.2\overline{3},\ -\frac{1}{6}$

(b) $0,\ \frac{1}{\sqrt{2}},\ 0.521,\ 2\sqrt{2},\ -\frac{1}{6},\ \sqrt{4}$

(c) $0,\ -2,\ 50,\ 0.521,\ 1.2\overline{3},\ -\frac{1}{6},\ \sqrt{4}$

(d) $0,\ \frac{1}{\sqrt{2}},\ 2\sqrt{2},\ \sqrt[3]{4}$

(e) $0,\ -2,\ 50$

2. State the property of real numbers being used.

$3xy = yx3$

(a) Commutative Property for addition
(b) Commutative Property for multiplication
(c) Associative Property for addition
(d) Associative Property for multiplication
(e) Distributive Property

3. Use the properties of real numbers to write the expression without parentheses.

$$2x\left(a - b - 2c + \frac{d}{2}\right)$$

(a) $xa - xb - 2xc + xd$
(b) $2xa - 2xb - xc + 4xd$
(c) $xa - 2xb - 4xc + xd$
(d) $2xa - 2xb - 4xc + xd$
(e) $2xa - xb - 4xc + \frac{xd}{4}$

4. Which inequality is *not* true?

(a) $-\frac{1}{10} < -\frac{1}{100}$
(b) $7 \le 7$
(c) $\sqrt{3} > 1.7$
(d) $-\frac{1}{4} \le -0.25$
(e) all are true

5. Write the statement in terms of an inequality.

The distance from x to 3 *is at most 6.*

(a) $|x-3| \le 6$
(b) $|x-3| \ge 6$
(c) $|x-3| < 6$
(d) $|x-6| \le 3$
(e) $|x-6| \ge 3$

6. Find the set $A \cap C$ if $A = \{ x \mid x < 4 \}$ and $C = \{ x \mid -2 < x \le 6 \}$.

(a) $\{ x \mid -2 < x < 4 \}$
(b) $\{ x \mid -2 < x < 6 \}$
(c) $\{ x \mid 4 < x < 6 \}$
(d) $\{ x \mid -2 < x \le 6 \}$
(e) none

7. Perform the indicated operations.

$$\frac{\frac{1}{10}}{\frac{1}{3}-\frac{1}{5}}$$

(a) 1 (b) $3/2$ (c) $-3/2$ (d) 2 (e) $3/4$

8. Evaluate the expression.

$\sqrt{3}\sqrt{48}$

(a) 36 (b) 24 (c) 12 (d) $2\sqrt{6}$ (e) $4\sqrt{3}$

9. Simplify the expression and eliminate any negative exponents(s). Assume that all letters denote positive numbers.

$\sqrt[3]{r^2 s}\sqrt[3]{64 r^4 s^2}$

(a) $4r^3 s^2$
(b) $64r^6 s^3$
(c) $\sqrt[3]{4r^4 s^2}$
(d) $8r^2 s$
(e) $4r^2 s$

10. Simplify the expression.

$$\left(\frac{3}{2}xy^3\right)\left(\frac{3}{4}x^{-1}y\right)^{-2}$$

(a) $\dfrac{8y^3}{3x^2}$

(b) $\dfrac{8}{3}x^3y$

(c) $\dfrac{3}{4}xy$

(d) $\dfrac{3y}{8x^3}$

(e) $\dfrac{3}{2}xy^3$

11. Perform the division and simplify.

$$\frac{x+2}{9x^2-4} \div \frac{x^2+6x+8}{3x^2+13x-10}$$

(a) $\dfrac{(x+5)}{(x-4)}$

(b) $\dfrac{(x+4)(3x+2)}{(x+5)}$

(c) $\dfrac{(x-5)}{(x+4)(3x-2)}$

(d) $\dfrac{(x+5)}{(x+4)(3x+2)}$

(e) none of these

12. A typical hummingbird's heart can beat 1260 times per minute. Estimate the number of times its heart will beat in 2 years. State your answer in scientific notation.

(a) 1.32×10^9

(b) 6.62×10^8

(c) 6.32×10^9

(d) 1.32×10^{-9}

(e) 6.32×10^{-9}

13. Alyson drove from Greensville to Bluesburg at a speed of 50 mi/h. On the way back, she drove at 75 mi/h. The total trip took $7\frac{1}{2}$ h of driving time. Find the distance between these two cities.

(a) 225 mi (b) 175 mi (c) 185 mi (d) 125 mi (e) 450 mi

14. Factor the expression completely.

$2x^3 + x + 6x^2 + 3$

(a) $(2x+3)(x+1)(x+1)$
(b) $(x+3)(2x^2+1)$
(c) $(2x+3)(x^2+1)$
(d) $(x^2+3)(2x+1)$
(e) none of these

15. Perform the subtraction and simplify.

$$\frac{2}{x+3} - \frac{1}{x^2+5x+6}$$

(a) $\dfrac{2x+11}{x^2+7x+6}$
(b) $\dfrac{1}{x^2+5x+6}$
(c) $\dfrac{2x+1}{x^2+5x+6}$
(d) $\dfrac{2x+3}{x^2+5x+6}$
(e) none of these

16. Rationalize the denominator.

$$\frac{\sqrt{2}}{\sqrt{6}+\sqrt{2}}$$

(a) $\dfrac{\sqrt{3}}{4}$ (b) $\dfrac{\sqrt{2}+1}{2}$ (c) $\dfrac{2\sqrt{3}-1}{4}$ (d) $\dfrac{\sqrt{3}-\sqrt{2}}{2}$ (e) $\dfrac{\sqrt{3}-1}{2}$

17. Find all real solutions of the equation.

$$\frac{x+2}{x-2} = \frac{3x}{3x-6}$$

(a) $\{-2, 2\}$ (b) $\left\{\frac{4}{3}, 3\right\}$ (c) $\left\{-\frac{4}{3}, 2\right\}$ (d) $\{2\}$ (e) no solution

18. Solve the absolute value inequality. Express the answer using interval notation.

$|8x+7|>14$

(a) $(-\infty, 7/8)\cup(7/8, \infty)$
(b) $(7/8, \infty)$
(c) $(-\infty, -21/8)\cup(7/8, \infty)$
(d) $(-\infty, -7/8)\cup(21/8, \infty)$
(e) none of these

19. The approximate distance *d* (in feet) that drivers travel after noticing that they must come to a sudden stop is given by the formula $d = x + \frac{x^2}{20}$, where *x* is the speed of the car in mi/h. If a car travels 175 ft before stopping, what was its speed before the brakes were applied?

(a) 40 mi/hr
(b) 50 mi/hr
(c) 70 mi/hr
(d) 80 mi/hr
(e) 90 mi/hr

20. Find the equation of the circle with center $(-1, 7)$ and radius $\sqrt{2}$.

(a) $x^2+2x+y^2-14y+48=0$
(b) $x^2-2x+y^2-14y+48=0$
(c) $x^2+2x+y^2+14y+48=0$
(d) $x^2+2x+14y+48=0$
(e) $x^2+14x+y^2-2y+48=0$

21. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$x^2+y^2+x+2y+\frac{5}{4}=3$

(a) point
(b) no graph
(c) center $\left(-\frac{1}{2}, -1\right)$, radius $\sqrt{3}$
(d) center $\left(-\frac{1}{2}, 1\right)$, radius 3
(e) center $\left(\frac{1}{2}, 1\right)$, radius 9

22. Find an equation for the line that passes through the point $(5,1)$ and is perpendicular to the line $x-3y+16=0$.

(a) $y=x+5$

(b) $y=\frac{1}{5}x-16$

(c) $y=16-3x$

(d) $y=3x+15$

(e) $y=\frac{1}{3}x-\frac{2}{3}$

23. Find the equation of a line that passes through the point $(-7,7/2)$ and the midpoint of $(-2,4)$ and $(3,4)$.

(a) $30y-2x-119=0$

(b) $2y-30x=0$

(c) $40y-120x-119=0$

(d) $3y-2x-19=0$

(e) $30y-40x-119=0$

24. In a certain city, the property tax collected for a home is directly proportional to the valuation of the property. The tax collected on a $\$105,000$ home is $\$2,846$ per year. What is the value of a home if the tax collected is $\$1,735$?

(a) $\$74,866$

(b) $\$834,289$

(c) $\$175,387$

(d) $\$64,010$

(e) $\$85,259$

25. The resistance of a wire varies directly as its length and inversely as the square of its diameter. A wire 50 m long and 0.01m in diameter has a resistance of 25 ohms. Find the resistance of a wire made of the same material that is 20 m long and has diameter 0.02 m.

(a) 2.5 ohms

(b) 0.02 ohms

(c) 50.54 ohms

(d) 0.25 ohms

(e) 2500 ohms

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form C

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

1. List the elements from the given set that are rational numbers.

$$\left\{-3.13,\ -1,\ 7,\ \frac{1}{\sqrt{9}},\ 0.521,\frac{\sqrt{2}}{2},\ 2.\overline{45},\ -\frac{1}{9},\ \sqrt[3]{8},\ \sqrt{8}\right\}$$

(a) $-3.13,\ -1,\ 7,\ \frac{1}{\sqrt{9}},\ 0.521,\ 2.\overline{45},\ -\frac{1}{9},\ \sqrt[3]{8}$

(b) $\frac{1}{\sqrt{9}},\ \frac{\sqrt{2}}{2},\ 2.\overline{45},\ \sqrt[3]{8},\ \sqrt{8}$

(c) $-1,\ 7,\ 0.521,\ 2.\overline{45},\ -\frac{1}{9}$

(d) only 7

(e) all are rational

2. State the property of real numbers being used.

$$(x+8y)+6z = x+(8y+6z)$$

(a) Commutative Property for addition
(b) Commutative Property for multiplication
(c) Associative Property for addition
(d) Associative Property for multiplication
(e) Distributive Property

3. Use the properties of real numbers to write the expression without parentheses.

$$4x\left(a-\frac{c}{4}+\frac{d}{2}\right)$$

(a) $4xa+xc+2dx$

(b) $4xa-\frac{xc}{2}+dx$

(c) $4xa-xc+2dx$

(d) $4a-c+2d$

(e) $xa-xc+4dx$

4. Which inequality is *not* true?

(a) $-100 < -\frac{1}{100}$

(b) $7 \le 7$

(c) $\sqrt{3} > 1.7$

(d) $-\frac{1}{4} \le -0.25$

(e) all are true

5. Write the statement in terms of an inequality.

The distance from x to 4 *is at most 5.5.*

(a) $|x-4| \le 5.5$
(b) $|x-4| \ge 5.5$
(c) $|x-4| < 5.5$
(d) $|x-1.5| \le 4$
(e) $|x-5.5| \ge 4.5$

6. Find the set $A \cap C$ if $A = \{ x \mid x < 7 \}$ and $C = \{ x \mid -2 < x \le 8 \}$.

(a) $\{ x \mid -2 < x < 8 \}$
(b) $\{ x \mid -7 < x < 8 \}$
(c) $\{ x \mid 7 < x < 8 \}$
(d) $\{ x \mid -2 < x < 7 \}$
(e) none

7. Evaluate the expression.

$2^{-1} - 2^{-2}$

(a) 0 (b) $1/4$ (c) -2 (d) 2 (e) $1/8$

8. Evaluate the expression.

$\sqrt{3}\sqrt{48}$

(a) 36 (b) 24 (c) 12 (d) $2\sqrt{6}$ (e) $4\sqrt{3}$

9. Simplify the expression and eliminate any negative exponents(s). Assume that all letters denote positive numbers.

$\sqrt[3]{r^2 s}\sqrt[3]{81 r^4 s^2}$

(a) $9r^3 s\sqrt{s}$
(b) $9r^2\sqrt{s}$
(c) $9r^2 s$
(d) $4r^2\sqrt[3]{3s}$
(e) $3r^2 s\sqrt[3]{3}$

10. Simplify the expression.

$$\frac{x^2-x-6}{x^2+2x}\cdot\frac{x^2+x}{x^2-2x-3}$$

(a) 1 (b) 2 (c) $\frac{1}{x(x+2)}$ (d) $\frac{(x+1)}{x}$ (e) $\frac{(x+1)}{(x-3)}$

11. Perform the indicated operation and simplify.

$$\frac{\frac{1}{x}-\frac{1}{3}}{x-3}$$

(a) 0 (b) $-\frac{1}{(x-3)}$ (c) $\frac{1}{x(x-3)}$ (d) $-\frac{1}{3x}$ (e) $-3x$

12. Rationalize the denominator.

$$\frac{\sqrt{2}}{\sqrt{6}+\sqrt{2}}$$

a) $-\frac{2}{\sqrt{3}-1}$ (b) $\frac{\sqrt{6}-1}{2}$ (c) $\frac{\sqrt{3}-1}{2}$ (d) $\sqrt{6}-\sqrt{2}$ (e) $\sqrt{6}+\sqrt{2}$

13. Determine the values of the variable for which the expression is defined as a real number.

$$\left(\frac{1}{x^2-5x-24}\right)^{1/2}$$

a) $[3,8]$ (b) $(-\infty,-3)\cup(8,\infty)$ (c) $(0,\infty)$ (d) $(-\infty,-8)\cup(3,\infty)$ (e) none of these

14. The approximate distance d (in feet) that drivers travel after noticing that they must come to a sudden stop is given by the formula $d = x+\frac{x^2}{20}$, where x is the speed of the car in mi/h. If a car travels 175 ft before stopping, what was its speed before the brakes were applied?

(a) 40 mi/hr (b) 50 mi/hr (c) 70 mi/hr (d) 80 mi/hr (e) 90 mi/hr

15. Solve the inequality.

$x^2 + 3x - 18 \le 0$

(a) $(-\infty, -6) \cup (-3, \infty)$
(b) $(-\infty, -6] \cup [3, \infty)$
(c) $(-3, 6)$
(d) $[-6, -3]$
(e) $[-6, 3]$

16. Find all real solutions of the quadratic equation.

$z^2 - \frac{6}{5}z + \frac{9}{25} = 0$

(a) $-\frac{3}{5}, \frac{3}{5}$ (b) $-\frac{5}{3}, \frac{3}{5}$ (c) $\frac{5}{3}$ (d) 1 (e) none of these

17. Two points *P* and *Q* are given.

$P(0, -8)$, $Q(-11, -8)$

Find the distance from *P* to *Q*.

(a) 11 (b) 5 (c) 19 (d) 8 (e) 9

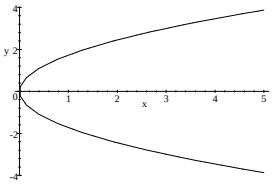
18. Find the equation of the circle with center $(-2, 1)$ and radius $\sqrt{3}$.

(a) $x^2 + 4x + y^2 - 2y + 8 = 0$
(b) $x^2 + 4x + y^2 - 2y + 2 = 0$
(c) $x^2 + 4x + y^2 - y - 8 = 0$
(d) $x^2 + 2x + y^2 - 2y + 8 = 0$
(e) $x^2 - 4x + y^2 + 2y + 2 = 0$

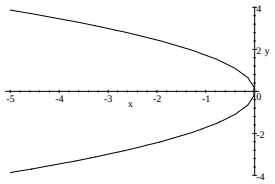
19. Test the equation for symmetry to determine the correct graph.

$y^2 - 3x = 0$

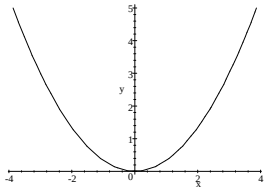
(a) *x-axis symmetry*



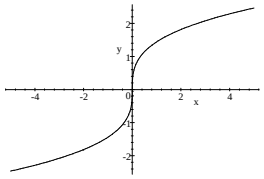
(b) *x-axis symmetry*



(c) *y-axis symmetry*



(d) *origin- symmetry*



(e) none

20. Find an equation for the line that passes through the point $(-1,7)$ and is parallel to the line $x = 2y - 1$.

(a) $y = x + 15$

(b) $y = \frac{x}{2} + \frac{15}{2}$

(c) $y = 15 - x$

(d) $y = 2x + \frac{15}{2}$

(e) $y = x - \frac{1}{2}$

21. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$x^2 + y^2 - 8x + 4y + 18 = 0$

(a) point

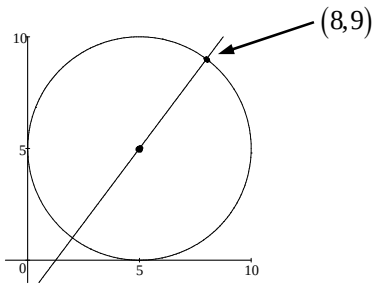
(b) no graph

(c) center $(4,-2)$, radius $\sqrt{2}$

(d) center $\left(-\frac{1}{2}, 4\right)$, radius $\sqrt{2}$

(e) center $(-4,2)$, radius 4

22. Find the equation of the line in the figure.



(a) $4x+3y=3$

(b) $5x+3y=2$

(c) $\frac{4}{9}x+\frac{8}{3}y=0$

(d) $y=\frac{4}{3}x-\frac{5}{3}$

(e) The equation of the line cannot be determined.

23. Taylor drove from Greensville to Bluesburg at a speed of 50 mi/h. On the way back, he drove at 75 mi/h. The total trip took $7\frac{1}{2}$ h of driving time. Find the distance between these two cities.

(a) 225 mi (b) 175 mi (c) 185 mi (d) 125 mi (e) 450 mi

24. The pressure of a sample of gas is directly proportional to the temperature T and inversely proportional to the volume V. Write an equation that expresses this fact if 50 L of gas exerts a pressure of 14 kPa at a temperature of 350° K (absolute temperature measured on the Kelvin scale).

(a) $P=\frac{2T}{V}$

(b) $P=\frac{2V}{T}$

(c) $PV=T$

(d) $P=\frac{50T}{V}$

(e) $P=2TV$

25. The resistance of a wire varies directly as its length and inversely as the square of its diameter. A wire 50 m long and 0.01 m in diameter has a resistance of 25 ohms. Find the resistance of a wire made of the same material that is 20 m long and has diameter 0.02 m.

(a) 2.5 ohms (b) 0.02 ohms (c) 50.54 ohms (d) 0.25 ohms (e) 2500 ohms

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form D

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

1. List the elements from the given set that are rational numbers.

$$\left\{0,\ -2,\ 50,\ \frac{1}{\sqrt{2}},\ 0.521,\ 2\sqrt{2},\ 1.2\overline{3},\ -\frac{1}{6},\ \sqrt[3]{4},\ \sqrt{4}\right\}$$

(a) $0,\ -2,\ 50,\ 1.2\overline{3},\ -\frac{1}{6}$

(b) $0,\ \frac{1}{\sqrt{2}},\ 0.521,\ 2\sqrt{2},\ -\frac{1}{6},\ \sqrt{4}$

(c) $0,\ -2,\ 50,\ 0.521,\ 1.2\overline{3},\ -\frac{1}{6},\ \sqrt{4}$

(d) $0,\ \frac{1}{\sqrt{2}},\ 2\sqrt{2},\ \sqrt[3]{4}$

(e) $0,\ -2,\ 50$

2. State the property of real numbers being used.

$$(2x+3y)+4z=2x+(3y+4z)$$

(a) Commutative Property for addition
(b) Commutative Property for multiplication
(c) Associative Property for addition
(d) Associative Property for multiplication
(e) Distributive Property

3. Perform the indicated operations.

$$\frac{\frac{2}{3}+\frac{1}{2}}{\frac{1}{10}+\frac{3}{5}}$$

4. Which inequality is *not* true?

(a) $-\frac{1}{10}<-\frac{1}{100}$ (b) $7\le 7$ (c) $\sqrt{3}>1.7$ (d) $-\frac{1}{4}\le -0.25$ (e) all are true

5. Evaluate each expression.

(a) $\left(\frac{7}{3}\right)^0 2^{-1}$

(b) $\frac{3^{-3}}{4^0}$

(c) $\left(\frac{1}{5}\right)^{-2}$

6. Find the set $A \cap C$ if $A = \{ x \mid x < 4 \}$ and $C = \{ x \mid -2 < x \le 6 \}$.

(a) $\{ x \mid -2 < x < 4 \}$
(b) $\{ x \mid -2 < x < 6 \}$
(c) $\{ x \mid 4 < x < 6 \}$
(d) $\{ x \mid -2 < x \le 6 \}$
(e) none

7. Evaluate the expression.

$\sqrt{3}\sqrt{48}$

(a) 36 (b) 24 (c) 12 (d) $2\sqrt{6}$ (e) $4\sqrt{3}$

8. Simplify the expression and eliminate any negative exponents(s). Assume that all letters denote positive numbers.

$\sqrt[3]{r^2 s}\sqrt[3]{81 r^4 s^2}$

9. A hummingbird's heart can beat 1260 times per minute. Estimate the number of times its heart will beat in 2 years. State your answer in scientific notation.

10. Simplify the expression.

$$\left(\frac{3}{2}xy^3\right)\left(\frac{3}{4}x^{-1}y\right)^{-2}$$

(a) $\frac{8y^3}{3x^2}$ (b) $\frac{8}{3}x^3 y$ (c) $\frac{3}{4}xy$ (d) $\frac{3y}{8x^3}$ (e) $\frac{3}{2}xy^3$

11. Perform the subtraction and simplify.

$$\frac{2}{x+3} - \frac{1}{x^2+8x+15}$$

12. Rationalize the denominator.

$$\frac{\sqrt{2}}{\sqrt{6}+\sqrt{2}}$$

13. Find all real solutions of the equation.

$$\frac{x+2}{x-2} = \frac{3x}{3x-6}$$

14. Factor the expression completely.

$2x^3 + x + 10x^2 + 5$

(a) $(x+5)(2x+1)^2$

(b) $(x+2)(5x^2+1)$

(c) $(x+1)(x+5)(2x+1)$

(d) $(x-5)(2x^2-1)$

(e) none of these

15. Solve the absolute value inequality. Express the answer using interval notation.

$|8x+5| > 15$

16. Two points *P* and *Q* are given. Sketch the line determined by *P* and *Q*, and find its equation in slope-intercept form.

$P(1,-10)$, $Q(2,-12)$

17. Find the equation of the circle with center $(-1,7)$ and radius $\sqrt{2}$.

18. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$x^2 + y^2 + x + 2y + 5/4 = 3$

19. Test the equation for symmetry and sketch its graph.

$y + x^2 = 16$

20. Find the area of the right triangle with base AB, where the vertices are $A = (-3,0)$, $B = (2,0)$ and $C = (2,4)$.

21. Find the equation of a line that passes through the point $(-7,7/2)$ and the midpoint of $(-2,4)$ and $(3,4)$.

22. Find an equation for the line that passes through the point $(5,1)$ and is perpendicular to the line $x - 3y + 16 = 0$.

(a) $y = x + 5$

(b) $y = \frac{1}{5}x - 16$

(c) $y = 16 - 3x$

(d) $y = 3x + 15$

(e) $y = \frac{1}{3}x - \frac{2}{3}$

23. Caitlin drove from Greensville to Bluesburg at a speed of 50 mi/h. On the way back, she drove at 75 mi/h. The total trip took $7\frac{1}{2}$ h of driving time. Find the distance between these two cities.

24. In a certain city, the property tax collected for a home is directly proportional to the valuation of the property. The tax collected on a $\$105,000$ home is $\$2,846$ per year. What is the value of a home if the tax collected is $\$1,735$?

(a) $\$74,866$
(b) $\$834,289$
(c) $\$175,010$
(d) $\$64,010$
(e) $\$85,259$

25. The resistance of a wire varies directly as its length and inversely as the square of its diameter. A wire 50 m long and 0.01m in diameter has a resistance of 25 ohms. Find the resistance of a wire made of the same material that is 20 m long and has diameter 0.02 m.

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form E

1. c

2. c

3. $5/3$

4. e

5. (a) $\left(\frac{7}{3}\right)^0 2^{-1} = \frac{1}{2}$ (b) $\frac{3^{-3}}{4^0} = \frac{1}{27}$ (c) $\left(\frac{1}{5}\right)^{-2} = 25$

6. a

7. c

8. $3r^2 s\sqrt[3]{3}$

9. 1.32×10^9

10. b

11. $\frac{2}{x+3} - \frac{1}{x^2+8x+15} = \frac{2x+9}{x^2+8x+15}$

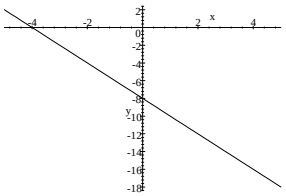
12. $\frac{\sqrt{3}-1}{2}$

13. no solution

14. e

15. $(-\infty, -5/2) \cup (5/4, \infty)$

16. $y = -8 - 2x$



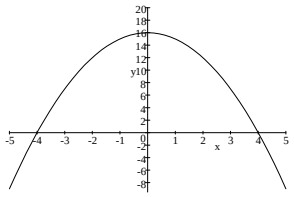
17. $x^2 + 2x + y^2 - 14y + 48 = 0$

18. center $\left(-\frac{1}{2}, -1\right)$, radius $\sqrt{3}$

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form E

19.



y-axis symmetry

20. 10

21. $30y - 2x - 119 = 0$

22. c

23. 225 mi

24. d

25. 2.5 ohms

1. List the elements from the given set that are rational numbers.

$$\left\{0,\ -2,\ 25,\ \frac{1}{\sqrt{4}},\ 0.49,\ \sqrt{3},\ -\frac{1}{7},\ \sqrt[3]{16},\ \sqrt{9}\right\}$$

2. State the property of real numbers being used.

$3xy = yx3$

(a) Commutative Property for addition
(b) Commutative Property for multiplication
(c) Associative Property for addition
(d) Associative Property for multiplication
(e) Distributive Property

3. Perform the indicated operations.

$$\frac{\frac{2}{5}+\frac{1}{2}}{\frac{1}{10}+\frac{3}{5}}$$

4. Evaluate the expression.

$3^{1/2}27^{1/2}$

5. Simplify the expression and eliminate any negative exponents(s). Assume that all letters denote positive numbers.

$\sqrt[3]{x\sqrt{x}}$

6. Find the set $A \cap C$ if $A = \{\, x \mid x < 3 \,\}$ and $C = \{\, x \mid -2 < x \le 10 \,\}$.

7. Evaluate each expression.

(a) $\left(\frac{5}{3}\right)^0 3^{-1}$

(b) $\frac{3^{-3}}{5^0}$

(c) $\left(\frac{1}{3}\right)^{-2}$

8. Simplify the expression.

$$\frac{x^2 - x - 6}{x^2 + 2x} \cdot \frac{x^2 + x}{x^2 - 2x - 3}$$

9. Simplify the expression.

$$\sqrt[3]{\left(27x^3y\right)^2 y^4}$$

(a) $3x^2y$
(b) $27x^3y^2$
(c) $3y$
(d) $\sqrt[3]{9}x^2y^3$
(e) $9x^2y^2$

10. Factor the expression completely.

$$x^2\left(x^2-4\right)-16\left(x^2-4\right)$$

11. Perform the indicated operation and simplify.

$$\frac{\frac{1}{x}-\frac{1}{3}}{x-3}$$

(a) 0 (b) $-\frac{1}{(x-3)}$ (c) $\frac{1}{x(x-3)}$ (d) $-\frac{1}{3x}$ (e) $-3x$

12. Rationalize the denominator.

$$\frac{\sqrt{2}}{\sqrt{6}+\sqrt{2}}$$

13. Determine the values of the variable for which the expression is defined as a real number.

$$\left(\frac{1}{x^2-5x-24}\right)^{1/2}$$

14. The approximate distance d (in feet) that drivers travel after noticing that they must come to a sudden stop is given by the formula $d = x + \frac{x^2}{20}$, where x is the speed of the car in mi/h. If a car travels 175 ft before stopping, what was its speed before the brakes were applied?

15. Solve the absolute value inequality. Express the answer using interval notation.

$$|8x+5| > 15$$

16. Find all real solutions of the quadratic equation.

$$z^2 - \frac{8}{5}z + \frac{16}{25} = 0$$

17. Two points *P* and *Q* are given.

$P(0,-8)$, $Q(-11,-8)$

Find the distance from *P* to *Q*.

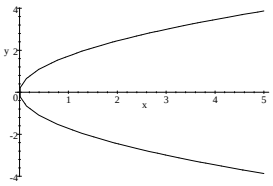
(a) 11 (b) 5 (c) 19 (d) 8 (e) 9

18. If $M(2,1)$ is the midpoint of the line segment *AB*, and if A has coordinates $\left(-\frac{1}{2},6\right)$, find the coordinates of B.

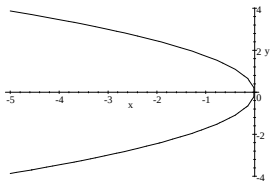
19. Test the equation for symmetry to determine the correct graph.

$y^2 - 3x = 0$

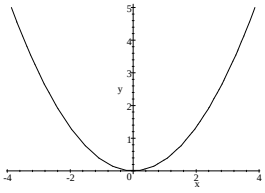
(a) *x-axis symmetry*



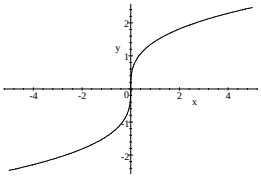
(b) *x-axis symmetry*



(c) *y-axis symmetry*



(d) *origin- symmetry*



(e) none

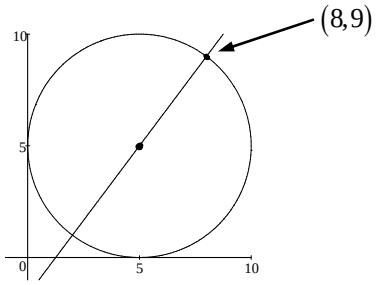
20. Find an equation for the line that passes through the point $(5,1)$ and is perpendicular to the line $x - 3y + 16 = 0$.

21. Determine whether the equation represents a circle, a point, or has no graph. If the equation is that of a circle, find its center and radius.

$x^2 + y^2 - 8x + 4y + 18 = 0$

(a) point
(b) no graph
(c) center $(4,-2)$, radius $\sqrt{2}$
(d) center $\left(-\frac{1}{2},4\right)$, radius $\sqrt{2}$
(e) center $(-4,2)$, radius 4

22. Find the equation of the line in the figure.



23. Taylor drove from Bluesville to Greensburg at a speed of 60 mi/h. On the way back, he drove at 45 mi/h. The total trip took $5\frac{3}{5}$ h of driving time. Find the distance between these two cities.

24. The pressure of a sample of gas is directly proportional to the temperature *T* and inversely proportional to the volume *V*. Write an equation that expresses this fact if 50 L of gas exerts a pressure of 14 kPa at a temperature of 350° K (absolute temperature measured on the Kelvin scale).

(a) $P = \frac{2T}{V}$ (b) $P = \frac{2V}{T}$ (c) $PV = T$ (d) $P = \frac{50T}{V}$ (e) $P = 2TV$

25. The cost for one print run of a book is jointly proportional to the number of pages in the book and the number of books in the print run. Write an equation for the cost of a print run if it costs $\$20,000$ to print 4000 copies of a 100-page book, and calculate the cost to print 400 copies of 293 page book.

ANSWER KEY

Stewart/Redlin/Watson - Precalculus 7e Chapter 1 Form F

1. $0,\ -2,\ 25,\ \dfrac{1}{\sqrt{4}},\ 0.49,\ -\dfrac{1}{7},\ \sqrt{9}$

2. b

3. $9/7$

4. 9

5. $\sqrt[3]{x\sqrt{x}} = \left(x\sqrt{x}\right)^{1/3} = \left(x^{2/2}x^{1/2}\right)^{1/3} = \left(x^{3/2}\right)^{1/3} = x^{1/2} = \sqrt{x}$

6. $\{\, x \mid -2 < x < 3 \,\}$

7. (a) $\left(\dfrac{5}{3}\right)^0 3^{-1} = \dfrac{1}{3}$ (b) $\dfrac{3^{-3}}{5^0} = \dfrac{1}{27}$ (c) $\left(\dfrac{1}{3}\right)^{-2} = 9$

8. 1

9. e

10. $x^2\left(x^2-4\right)-16\left(x^2-4\right) = (x-2)(x+2)(x-4)(x+4)$

11. d

12. $\dfrac{\sqrt{3}-1}{2}$

13. $(-\infty,-3)\cup(8,\infty)$

14. 50 mi/hr

15. $(-\infty,-5/2)\cup(5/4,\infty)$

16. $z = \dfrac{4}{5}$

17. a

18. $(9/2,-4)$

19. a

20. $y = 16 - 3x$

21. c

22. $y = \dfrac{4}{3}x - \dfrac{5}{3}$

23. 144 mi

24. a

25. \$5860