

Lesson 1

Simplify.

1. $2(x - 3y) + 4(3x - y)$

2. $4(6) - (8 + 1)$

3. $\frac{2}{5} \div \frac{2}{3} \cdot \frac{5}{4}$

4. $-3\frac{1}{2} + 6\frac{1}{5} - 2\frac{1}{2}$

5. $\frac{y-5}{y} - \frac{y}{y+1}$

6. $\frac{x^2-xy}{5y} + \frac{x-y}{y^2}$

7. $(2r^3s^2)^3(-rs^3)^2$

8. $(2t - 3)(2t + 3)$

9. The sum of three consecutive even integers is 138. Write an equation to describe the relationship.

10. If 27 is added to a two-digit number, the digits are reversed. The sum of the digits is 11. Find the original number.

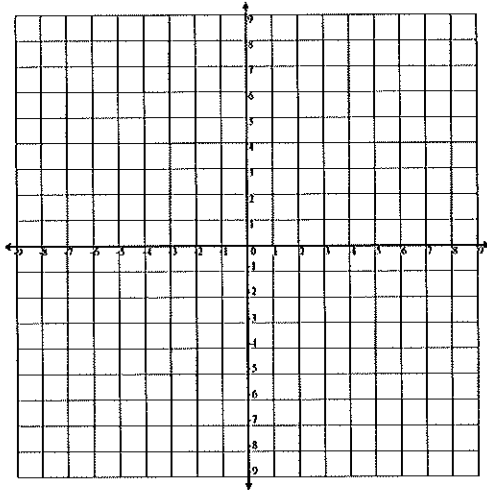
11. A restaurant can prepare 20 patties from 11 kg of ground beef. How much ground beef is needed for 500 patties?

12. Find the slope of the line through $(5, 6)$ and $(2, -3)$.

13. Jack is 8 years older than Anna. Seven years ago, he was twice as old as Anna. How old is each now?

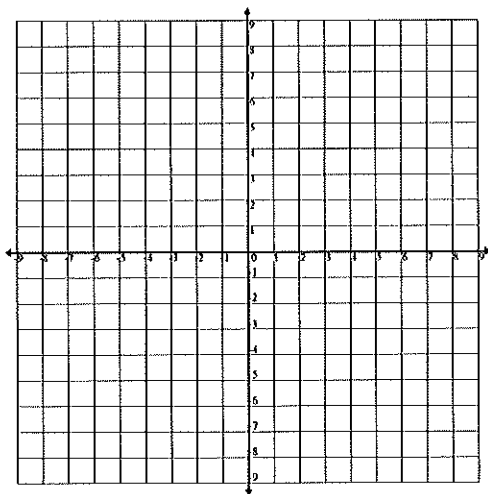
14. Two numbers are in the ratio 3:8. One half of their sum is $16\frac{1}{2}$. Find the numbers.

15. Graph: $2x + y = 5$



16. Solve this system graphically.

$$\begin{cases} 2x - y = 1 \\ x + 2y = 3 \end{cases}$$



Lesson 2

Solve each equation or system.

1. $\frac{y-1}{2} - \frac{y+1}{3} = 3$

2. $\frac{1}{x-2} + \frac{2}{x-1} = \frac{3}{x}$

3. $\frac{3}{t+2} = \frac{t}{3t-2}$

4. $\frac{12}{z-3} = \frac{15}{z+1}$

5. $0.02x - 0.4(5 - x) = 0.1$

6. $5n - 6 = 3n + 8$

7. $y + 5 = 11$

8. $\frac{3x-2}{8} = \frac{2x-1}{8}$

9. $x^2 + 5x = 14$

10. $4x^2 - 12x + 9 = 0$

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$$11. \begin{cases} 5x - 2y = 6 \\ 3x - 5y = 15 \end{cases}$$

$$12. \begin{cases} 3x - 2y = 11 \\ 5x + 2y = 13 \end{cases}$$

Factor completely.

$$13. x^2 - 121$$

$$14. x^2 - 2x - 8$$

$$15. 6n^2 - 5n - 4$$

$$16. 12y^2 - 5y - 2$$

$$17. y^2 + 23y + 132$$

$$18. 9z^4 - 25$$

Lesson 3

1. If y varies directly as x , and $y = 18$ when $x = 3$, find y when $x = 5$.
2. Write an equation in standard form of:
 - a. the line with slope -4 that passes through $(-5, -3)$
 - b. the line through $(-2, -3)$ and $(8, 5)$
3. The sum of the squares of two consecutive positive integers is 113. Find the numbers.
4. One number is 8 more than half another. The sum of the numbers is 38. Find the numbers.
5. Express 0.00038 in a) scientific notation b) expanded notation.
6. What percent of 30 is 24?
7. 16 is 75% of what number?
8. What number is $33\frac{1}{3}\%$ of 186?
9. A radio cost \$44.10 including a 5% sales tax. What was the cost without tax?

10. Find the GCF of 425 and 680.

11. Doug can deliver his papers in 45 minutes. If Meg helps, they can finish in 20 minutes. How long would it take Meg working alone?

12. A dentist can schedule 15 patients in a day if she allows 24 minutes per patient. How many can she schedule if she allows 30 minutes per patient and works the same number of hours?

13. Three numbers are in the ratio 3:4:5 and their sum is 228. Find the numbers.

14. A booster club sold cheese pizzas at \$4.20 and vegetarian pizzas at \$6.50 for a fund raiser. The club members sold 92 pizzas for a total of \$483. How many of each type did they sell?

Lesson 4

1. The sum of two numbers is 52. One number is k . What is the other number?
2. Find three consecutive odd integers whose sum is 3.
3. Translate into symbols: The sum of five and the opposite of two integers is greater than the absolute value of negative two.
4. A rectangle is twice as long as it is wide. If the length and width are both increased by 3 cm , the area is increased by 72 cm^2 . Find the original dimensions.
5. If y is directly proportional to x , and $y = 40$ when $x = 12$, find y when $x = 15$.
6. Given that $f \rightarrow 3x - 2$, find:
 - a) $f(0)$
 - b) $f(-4)$

7. Write $5 + \frac{4}{x-3}$ as a fraction in simplest form.

8. Find the value of x if $(5, 24)$ and $(x, 16)$ are ordered pairs of the same inverse variation.

For 9 and 10, name each set of numbers if possible.

9. Three consecutive multiples of 4 whose sum is 52.

10. Three consecutive multiples of 3 whose sum is 252.

11. Jane Bentley drove 120 km on 8 L of gasoline. How far can she travel on 36 L of gasoline?

12. Two trains leave a station at 2 P.M. traveling in opposite directions. One train is traveling at 100 km/h, the other at 90 km/h. At what time will they be 475 km apart?

Lesson 5

1. A grocer plans to mix two types of cereal: one that costs \$3 per kg and another that costs \$6 per kg. How many kilograms of each type of cereal should be mixed in order to have 115 kg of a cereal worth \$4.80 per kg?

2. Express $(-3y^{-3})^3$ in terms of positive exponents.

3. Find the least value of the function f if $f: x \rightarrow 2x^2 - 4x + 8$.

4. Solve $\frac{3}{x-1} = \frac{5}{2y+1}$ for y in terms of x .

Simplify. Each variable represents a positive real number. No decimal answers.

5. $(3t - 2)(2t^2 + 5t + 4)$

6. $\sqrt{x^2 + 10x + 25}$

7. $(4x^2y)^3(-x^5y)^2$

8. $\sqrt{2601}$

Simplify. Each variable represents a positive real number. No decimal answers.

9. $\frac{b-3}{b+1} - \frac{8}{b}$

10. $\sqrt{\frac{48}{147}}$

11. $\sqrt{180}$

12. $\sqrt{144s^2t^5}$

13. $\sqrt{175}$

14. $\sqrt{\frac{36x^7}{25x}}$

Lesson 6

1. Alice is three times as old as Archie. If Archie's present age is x , represent each person's age 7 years from now.

2. The width of a rectangle is 24 cm less than the length. The perimeter is less than 172 cm. Find the maximum dimensions of the rectangle if each dimension, in centimeters, is an integer.

Factor completely, if possible. If not factorable, write "prime."

3. $3x^2 + x - 2$

4. $y^2 - 5y - 40$

5. $4n^2 + 24n + 9$

6. $x^2 - 18x + 36$

7. $-48y^2 + 29y + 15$

8. $3c^2 - 5cd - 12d^2$

9. If r varies jointly as s and t , and $r = 90$ when $s = 8$ and $t = 15$, find r when $s = 7$ and $t = 12$.

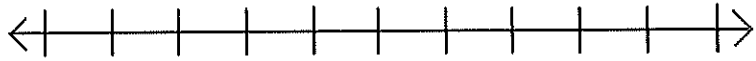
10. At noon, two trains leave stations at opposite ends of the line on parallel tracks. One train is traveling at 90 km/h and the other at 96 km/h. If the stations are 651 km apart, how long will it be before the trains meet?

11. Express $\frac{x-1}{3}$, $\frac{x}{4}$, and $\frac{1}{2}$ with their LCD.

Lesson 7

Solve and graph the solution set.

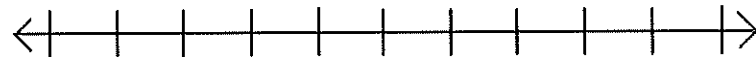
1. $-2x < 6$



2. $-3 \leq x + 1 \leq 1$



3. $3z - 2 > 7$ or $2z + 1 < 5$



4. $|t - 5| < 1$



5. The hypotenuse of a right triangle and one leg have lengths of 12 and 7 respectively. Find the length of the other leg to the nearest tenth.

6. The numerator of a fraction is 10 less than the denominator. If 4 is added to each, the value of the resulting fraction is $\frac{3}{5}$. Find the original fraction.

Solve each equation or inequality.

7. $\frac{4}{x+6} = \frac{8}{3x+5}$

8. $\sqrt{\frac{3x-1}{2}} = 4$

9. $\sqrt{y} = \frac{2}{3}$

10. $\frac{1}{3} < 2 - \frac{3}{4}y$

Lesson 8

Solve each equation or inequality.

1. $5t^2 - 80 = 0$

2. $3t + 2 = 2t - 1$

3. $3t + 2 < 5t - 3$

4. $(x + 3)^2 = 16$

Solve each system.

5.
$$\begin{cases} x + y = 7 \\ 2x + 3y = 4 \end{cases}$$

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6.
$$\begin{cases} 5x - 4y = 9 \\ 3x + 2y = 1 \end{cases}$$

7. Divide $3y^2 - 2y + 1$ by $y + 4$.

8. The sum of two consecutive even integers is less than 84. Find the pair with the greatest sum.

9. $x^2 - 3x + 5 = 0$

10. $4k^2 - 12k + 9 = 0$

Lesson 9

1. When 3 times a number is increased by 7, the square root of the result is 7. Find the number.

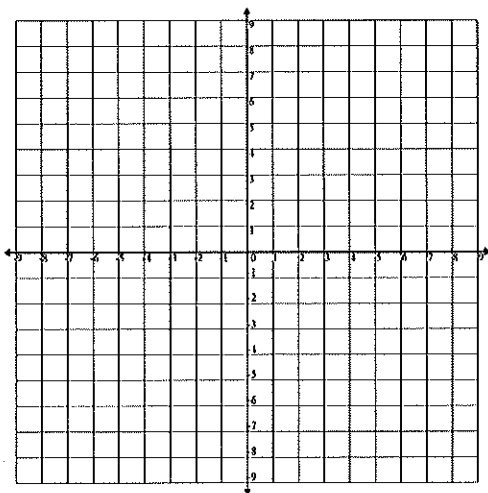
Express each rational number as a terminating or repeating decimal.

2. $\frac{18}{25}$

3. $\frac{13}{15}$

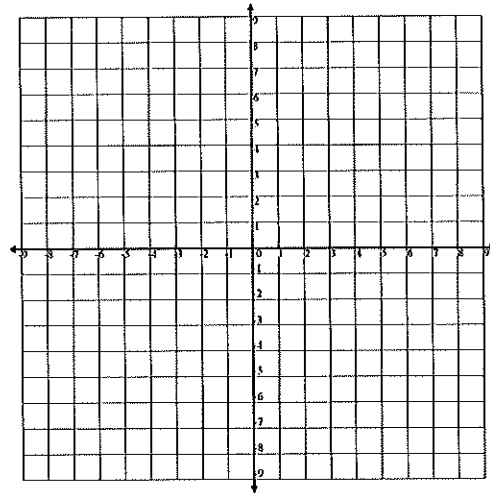
4. $1\frac{4}{9}$

5. Graph: $2x + y < 3$



6. Graph the solution set of this system.

$$\begin{cases} x + y \geq 2 \\ x - y \geq 1 \end{cases}$$



Express in simplest form.

7. $(5\sqrt{7} - 2\sqrt{5})(4\sqrt{7} + 3\sqrt{5})$

8. $3\sqrt{3}(4\sqrt{27} - 5\sqrt{12})$

9. $(2\sqrt{5} - 5\sqrt{2})^2$

10. $\sqrt{\frac{2}{3}} \cdot \sqrt{\frac{8}{12}}$

Lesson 10

Express in simplest form.

1. $6\sqrt{48} - 5\sqrt{18}$

2. $\sqrt{3}\sqrt{15}$

3. Write an equation in standard form for the line with slope -1 that passes through $(-6, 4)$.

Solve using the quadratic formula. Leave irrational answers in simplest radical form.

4. $3t^2 + 5t + 2 = 0$

5. $2z^2 - 7z + 4 = 0$

6. Express $4.\overline{3}$ as a fraction in simplest form.

7. Find the slope of the line through $(-3, 5)$ and $(-4, 7)$.

8. Find the greatest common monomial factor: $18a^3b^4c^2$, $54a^2bc^5$, $27a^7x^2c^3$

9. Evaluate: $\frac{3^{-2} \cdot 3^5}{3^{-3}}$

10. The sum of two numbers is 12 and the sum of their squares is 78. Find the numbers.