

Algebra I
Summer Packet
2018 Summer

Incoming 8th graders,

The following needs to be completed and returned the first day of school:

- The completed attached packet. If you need assistance completing the content please go to Kahn academy <https://www.khanacademy.org/> or Math is Fun <https://www.mathsisfun.com/> or other online resource for help. All work must be shown (no calculators). Please use a pencil!
- The completed Kahn Academy unit (see other page). Students need to complete the “Foundations in Algebra” lessons within the Algebra I course. This is 10 lessons (outlined below) consisting of videos and practice problems – watch the videos and then complete any practice problems given. Students should complete these through the Kahn Academy Login connected to Sr Elise as their teacher so that it is connected to their school account.
- Each student should complete one hour of IXL math work during the months of June, July, and August (each) over their summer break – working on grade level skills. Please use your school account so progress can be recorded and complete the attached IXL sheet.

Have a great summer. I look forward to seeing you in the fall!

Sr. Elise, O.P.

Dear Students and Parents,

For all incoming math students in grades 6-8, students should complete the attached packet as well as complete IXL computer time. Each student should complete one hour of math work during the months of June, July, and August (each) over their summer break – working on grade level skills.

Enjoy the summer!

Sr. Elise, O.P.

Please record your IXL work below:

	Skills I worked on:	What is my Smart Score in these skills?
June		
July		
August		

Kahn Academy

LESSONS for Algebra Foundations – You can search “algebra foundations” on Kahn’s main page.

<https://www.khanacademy.org/math/algebra/introduction-to-algebra>

1. Overview and history of algebra
 - a. Origins of algebra
 - b. Abstract-ness
 - c. The beauty of algebra
 - d. Intro to the coordinate plane
 - e. Why all the letters in algebra?
2. Introduction to variables
 - a. What is a variable?
 - b. Why aren't we using the multiplication sign?
 - c. Evaluating an expression with one variable
 - d. Evaluating expressions with one variable
3. Substitution and evaluating expressions
 - a. Evaluating expressions with two variables
 - b. Evaluating expressions with two variables
 - c. Evaluating expressions with two variables: fractions & decimals
 - d. Evaluating expressions with two variables: fractions & decimals
4. Evaluating expressions word problems
 - a. Evaluating expressions with variables word problems
 - b. Evaluating expressions with variables: temperature
 - c. Evaluating expressions with variables: cubes
 - d. Evaluating expressions with variables: exponents
5. Writing algebraic expressions introduction
 - a. Writing basic expressions with variables
 - b. Writing basic expressions with variables
 - c. Writing expressions with variables
 - d. Writing expressions with variables & parentheses
6. Dependent & independent variables
 - a. Dependent & independent variables
 - b. Dependent & independent variables: graphing
 - c. Dependent & independent variables: equation
7. Combining like terms
 - a. Intro to combining like terms
 - b. Simplifying expressions
 - c. Combining like terms challenge problem
 - d. Simplifying expressions with rational numbers
8. Introduction to equivalent algebraic expressions
 - a. Equivalent expressions
9. Interpreting linear expressions
 - a. Interpreting linear expressions: diamonds
 - b. Interpreting linear expressions: flowers
10. Division by zero
 - a. Why dividing by zero is undefined
 - b. The problem with dividing zero by zero
 - c. Undefined & indeterminate expressions

1-1 Variables and Expressions

See pages
6-9.

Concept Summary

- Variables are used to represent unspecified numbers or values.
- An algebraic expression contains letters and variables with an arithmetic operation.

Examples

- 1 Write an algebraic expression for the sum of twice a number x and fifteen.

$\frac{\text{twice a number } x}{2x} + \frac{\text{sum of}}{+} \frac{\text{fifteen}}{15}$ The algebraic expression is $2x + 15$.

- 2 Write a verbal expression for $4x^2 - 13$.
Four times a number x squared minus thirteen.

Exercises Write an algebraic expression for each verbal expression.

See Examples 1 and 2 on pages 6 and 7.

11. a number x to the fifth power 12. five times a number x squared
13. the sum of a number x and twenty-one 14. the difference of twice a number x and 8

Evaluate each expression. See Example 3 on page 7.

15. 3^3 16. 2^5 17. 5^4

Write a verbal expression for each algebraic expression. See Example 4 on page 7.

18. $2p^2$ 19. $3m^5$ 20. $\frac{1}{2} + 2$

1-2 Order of Operations

See pages
11-15.

Concept Summary

- Expressions must be simplified using the order of operations.
Step 1 Evaluate expressions inside grouping symbols.
Step 2 Evaluate all powers.
Step 3 Do all multiplications and/or divisions from left to right.
Step 4 Do all additions and/or subtractions from left to right.

Example

Evaluate $x^2 - (y + 2)$ if $x = 4$ and $y = 3$.

$$\begin{aligned}x^2 - (y + 2) &= 4^2 - (3 + 2) && \text{Replace } x \text{ with 4 and } y \text{ with 3.} \\ &= 4^2 - 5 && \text{Add 3 and 2.} \\ &= 16 - 5 && \text{Evaluate power.} \\ &= 11 && \text{Subtract 5 from 16.}\end{aligned}$$

Exercises Evaluate each expression. See Examples 1-3 on pages 11 and 12.

21. $3 + 2 \cdot 4$ 22. $\frac{(10 - 6)}{8}$ 23. $18 - 4^2 + 7$
24. $8(2 + 5) - 6$ 25. $4(11 + 7) - 9 \cdot 8$ 26. $288 \div [3(9 + 3)]$
27. $16 \div 2 \cdot 5 \cdot 3 \div 6$ 28. $6(4^3 + 2^2)$ 29. $(3 \cdot 1)^3 - \frac{(4 + 6)}{(5 \cdot 2)}$

Evaluate each expression if $x = 3$, $t = 4$, and $y = 2$. See Example 4 on page 12.

30. $t^2 + 3y$ 31. xy^3 32. $\frac{ty}{x}$
33. $x + t^2 + y^2$ 34. $3ty - x^2$ 35. $8(x - y)^2 + 2t$

1-3 Open Sentences

See pages
16–20.

Concept Summary

- Open sentences are solved by replacing the variables in an equation with numerical values.
- Inequalities like $x + 2 \geq 7$ are solved the same way that equations are solved.

Example

Solve $5^2 - 3 = y$.

$$5^2 - 3 = y \quad \text{Original equation}$$

$$25 - 3 = y \quad \text{Evaluate the power.}$$

$$22 = y \quad \text{Subtract 3 from 25.}$$

The solution is 22.

Exercises Solve each equation. See Example 2 on page 17.

$$36. x = 22 - 13$$

$$37. y = 4 + 3^2$$

$$38. m = \frac{64 + 4}{17}$$

$$39. x = \frac{21 - 3}{12 - 3}$$

$$40. n = \frac{14 + 28}{4 + 3}$$

$$41. n = \frac{96 + 6}{8 + 2}$$

$$42. b = \frac{7(4 \cdot 3)}{18 \div 3}$$

$$43. \frac{6(7) - 2(3)}{4^2 - 6(2)}$$

$$44. y = 5[2(4) - 1^3]$$

Find the solution set for each inequality if the replacement set is {4, 5, 6, 7, 8}.

See Example 3 on page 17.

$$45. x + 2 > 7$$

$$46. 10 - x < 7$$

$$47. 2x + 5 \geq 15$$

1-4 Identity and Equality Properties

See pages
21–25.

Concept Summary

- Adding zero to a quantity or multiplying a quantity by one does not change the quantity.
- Using the Reflexive, Symmetric, Transitive, and Substitution Properties along with the order of operations helps in simplifying expressions.

Example

Evaluate $36 + 7 \cdot 1 + 5(2 - 2)$. Name the property used in each step.

$$36 + 7 \cdot 1 + 5(2 - 2) = 36 + 7 \cdot 1 + 5(0) \quad \text{Substitution}$$

$$= 36 + 7 + 5(0) \quad \text{Multiplicative Identity}$$

$$= 36 + 7 \quad \text{Multiplicative Prop. of Zero}$$

$$= 43 \quad \text{Substitution}$$

Exercises Evaluate each expression. Name the property used in each step.

See Example 2 on page 23.

$$48. 2[3 + (19 - 4^2)]$$

$$49. \frac{1}{2} \cdot 2 + 2[2 \cdot 3 - 1]$$

$$50. 4^2 - 2^2 - (4 - 2)$$

$$51. 1.2 - 0.05 + 2^3$$

$$52. (7 - 2)(5) - 5^2$$

$$53. 3(4 + 4)^2 - \frac{1}{4}(8)$$

1-5 The Distributive Property

See pages
26–31.

Concept Summary

- For any numbers a , b , and c , $a(b + c) = ab + ac$ and $(b + c)a = ba + ca$.
- For any numbers a , b , and c , $a(b - c) = ab - ac$ and $(b - c)a = ba - ca$.

Examples

- 1 Rewrite $5(t + 3)$ using the Distributive Property. Then simplify.

$$\begin{aligned}5(t + 3) &= 5(t) + 5(3) && \text{Distributive Property} \\ &= 5t + 15 && \text{Multiply.}\end{aligned}$$

- 2 Simplify $2x^2 + 4x^2 + 7x$.

$$\begin{aligned}2x^2 + 4x^2 + 7x &= (2 + 4)x^2 + 7x && \text{Distributive Property} \\ &= 6x^2 + 7x && \text{Substitution}\end{aligned}$$

Exercises Rewrite each product using the Distributive Property. Then simplify.

See Examples 1 and 2 on page 27.

54. $2(4 + 7)$

55. $8(15 - 6)$

56. $4(x + 1)$

57. $3\left(\frac{1}{3} - p\right)$

58. $6(a + b)$

59. $8(3x - 7y)$

Simplify each expression. If not possible, write *simplified*. See Example 6 on page 29.

60. $4a + 9a$

61. $4np + 7mp$

62. $3w - w + 4v - 3v$

63. $3m + 5m + 12n - 4n$

64. $2p(1 + 16r)$

65. $9y + 3y - 5x$

1-6 Commutative and Associative Properties

See pages
32–36.

Concept Summary

- For any numbers a and b , $a + b = b + a$ and $a \cdot b = b \cdot a$.
- For any numbers a , b and c , $(a + b) + c = a + (b + c)$ and $(ab)c = a(bc)$.

Example

Simplify $3x + 7xy + 9x$.

$$\begin{aligned}3x + 7xy + 9x &= 3x + 9x + 7xy && \text{Commutative (+)} \\ &= (3 + 9)x + 7xy && \text{Distributive Property} \\ &= 12x + 7xy && \text{Substitution}\end{aligned}$$

Exercises Simplify each expression. See Example 3 on page 33.

66. $3x + 4y + 2x$

67. $7w^2 + w + 2w^2$

68. $3\frac{1}{2}m + \frac{1}{2}m + n$

69. $6a + 5b + 2c + 8b$

70. $3(2 + 3x) + 21x$

71. $6(2n - 4) + 5n$

Write an algebraic expression for each verbal expression. Then simplify, indicating the properties used. See Example 4 on page 34.

72. five times the sum of x and y decreased by $2x$

73. twice the product of p and q increased by the product of p and q

74. six times a plus the sum of eight times b and twice a

75. three times the square of x plus the sum of x squared and seven times x

The following properties are true for any numbers a , b , and c .

Properties	Addition	Multiplication
Commutative	$a + b = b + a$	$ab = ba$
Associative	$(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
Identity	0 is the identity. $a + 0 = 0 + a = a$	1 is the identity. $a \cdot 1 = 1 \cdot a = a$
Zero	—	$a \cdot 0 = 0 \cdot a = 0$
Distributive	$a(b + c) = ab + ac$ and $(b + c)a = ba + ca$	
Substitution	If $a = b$, then a may be substituted for b .	

2-1 Rational Numbers on the Number Line

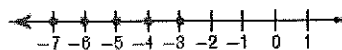
See pages 68-72.

Concept Summary

- A set of numbers can be graphed on a number line by drawing points.
- To evaluate expressions with absolute value, treat the absolute value symbols as grouping symbols.

Example

Graph $\{\dots, -5, -4, -3\}$.



The bold arrow means that the graph continues indefinitely in that direction.

Exercises Graph each set of numbers. See Example 2 on page 69.

9. $\{5, 3, -1, -3\}$

10. $\{-1\frac{1}{2}, -\frac{1}{2}, \frac{1}{2}, 1\frac{1}{2}, \dots\}$

11. $\{\text{integers less than } -4 \text{ and greater than or equal to } 2\}$

Evaluate each expression if $x = -4$, $y = 8$, and $z = -9$. See Example 4 on page 70.

12. $32 - |y - 3|$

13. $3|x| - 7$

14. $4 + |z|$

15. $46 - y|x|$

- To add rational numbers with *different* signs, subtract the lesser absolute value from the greater absolute value. The sum has the same sign as the number with the greater absolute value.
- To subtract a rational number, add its additive inverse.

Examples

1 Find $-4 + (-3)$.

$$-4 + (-3)$$

$$= -(|-4| + |-3|)$$

$$= -(4 + 3)$$

$$= -7$$

Both numbers are negative, so the sum is negative.

2 Find $12 - 18$.

$$12 - 18$$

$$= 12 + (-18)$$

$$= -(|-18| - |12|)$$

$$= -(18 - 12)$$

$$= -6$$

To subtract 18, add its inverse.

The absolute value of 18 is greater, so the result is negative.

Exercises Find each sum or difference. See Examples 1-3 on pages 73-75.

16. $4 + (-4)$

17. $2 + (-7)$

18. $-0.8 + (-1.2)$

19. $-3.9 + 2.5$

20. $-\frac{1}{4} + (-\frac{1}{8})$

21. $\frac{5}{6} + (-\frac{1}{3})$

22. $-2 - 10$

23. $9 - (-7)$

24. $1.25 - 0.18$

25. $-7.7 - (-5.2)$

26. $\frac{9}{2} - (-\frac{1}{2})$

27. $-\frac{1}{8} - (-\frac{2}{3})$

2-3 Multiplying Rational Numbers

See pages
79–83.

Concept Summary

- The product of two numbers having the same sign is positive.
- The product of two numbers having different signs is negative.

Example

Multiply $(-2\frac{1}{7})(3\frac{2}{3})$.

$$\begin{aligned}(-2\frac{1}{7})(3\frac{2}{3}) &= \frac{-15}{7} \cdot \frac{11}{3} && \text{Write as improper fractions.} \\ &= \frac{-55}{7} \text{ or } -7\frac{6}{7} && \text{Simplify.}\end{aligned}$$

Exercises Find each product. See Examples 1 and 3 on pages 79 and 80.

28. $(-11)(9)$

29. $12(-3)$

30. $-8.2(4.5)$

31. $-2.4(-3.6)$

32. $\frac{3}{4} \cdot \frac{7}{12}$

33. $(-\frac{1}{3})(-\frac{9}{10})$

Simplify each expression. See Example 2 on page 80.

34. $8(-3x) + 12x$

35. $-5(-2n) - 9n$

36. $-4(6a) - (-3)(-7a)$

Example

Simplify $\frac{-3(4)}{-2-3}$.

$$\frac{-3(4)}{-2-3} = \frac{-12}{-2-3} \quad \text{Simplify the numerator.}$$

$$= \frac{-12}{-5} \quad \text{Simplify the denominator.}$$

$$= 2\frac{2}{5} \quad \text{same signs} \rightarrow \text{positive quotient}$$

Exercises Find each quotient. See Examples 1–3 on pages 84 and 85.

37. $\frac{-54}{6}$

38. $-\frac{74}{8}$

39. $21.8 \div (-2)$

40. $-7.8 \div (-6)$

41. $-15 \div (\frac{3}{4})$

42. $\frac{21}{24} \div \frac{1}{3}$

Simplify each expression. See Example 5 on page 85.

43. $\frac{14-28x}{-7}$

44. $\frac{-5+25x}{5}$

45. $\frac{-4x+24y}{4}$

Evaluate each expression if $x = -4$, $y = 2.4$, and $z = 3$. See Example 6 on page 85.

46. $xz - 2y$

47. $-2(\frac{2y}{z})$

48. $\frac{2x-z}{4} + 3y$

2-7 Square Roots and Real Numbers

See pages
103–109.

Concept Summary

- A square root is one of two equal factors of a number.
- The symbol $\sqrt{\quad}$ is used to indicate the nonnegative square root of a number.

Example Find $\sqrt{169}$.

$\sqrt{169}$ represents the square root of 169.

$$169 = 13^2 \rightarrow \sqrt{169} = 13$$

Exercises Find each square root. If necessary, round to the nearest hundredth.

See Example 1 on page 103.

60. $\sqrt{196}$ 61. $\pm\sqrt{1.21}$ 62. $-\sqrt{160}$ 63. $\pm\sqrt{\frac{4}{225}}$

Name the set or sets of numbers to which each real number belongs.

See Example 2 on page 104.

64. $\frac{16}{25}$ 65. $\frac{\sqrt{64}}{2}$ 66. $-\sqrt{48.5}$

Replace each \oplus with $<$, $>$, or $=$ to make each sentence true. See Example 4 on page 105.

67. $\frac{1}{8} \oplus \frac{1}{\sqrt{49}}$ 68. $\sqrt{\frac{2}{3}} \oplus \frac{4}{9}$ 69. $\sqrt{\frac{3}{4}} \oplus \sqrt{\frac{1}{3}}$

70. **WEATHER** Meteorologists can use the formula $t = \sqrt{\frac{d^3}{216}}$ to estimate the amount of time t in hours a storm of diameter d will last. Suppose the eye of a hurricane, which causes the greatest amount of destruction, is 9 miles in diameter. To the nearest tenth of an hour, how long will the worst part of the hurricane last?
See Example 1 on pages 103 and 104.

3-1 Writing Equations

See pages
120–126.

Concept Summary

- Variables are used to represent unknowns when writing equations.
- Formulas given in sentence form can be written as algebraic equations.

Example Translate the following sentence into an equation.

The sum of x and y equals 2 plus two times the product of x and y .

$$\underbrace{\text{The sum of}}_{x+y} \underbrace{\text{equals}}_{=} \underbrace{2}_{2} \underbrace{\text{plus}}_{+} \underbrace{\text{two times the product of } x \text{ and } y}_{2xy}$$

The equation is $x + y = 2 + 2xy$.

Exercises Translate each sentence into an equation. See Example 1 on page 120.

11. Three times a number n decreased by 21 is 57.
12. Four minus three times z is equal to z decreased by 2.
13. The sum of the square of a and the cube of b is 16.
14. Translate the equation $16 - 9r = r$ into a verbal sentence. See Example 4 on pages 122 and 123.

3-2 Solving Equations by Using Addition and Subtraction

See pages
128–134.

Concept Summary

- **Addition Property of Equality** For any numbers a , b , and c , if $a = b$, then $a + c = b + c$.
- **Subtraction Property of Equality** For any numbers a , b , and c , if $a = b$, then $a - c = b - c$.

Example

Solve $x - 13 = 45$. Then check your solution.

$$\begin{aligned}x - 13 &= 45 && \text{Original equation} \\x - 13 + 13 &= 45 + 13 && \text{Add 13 to each side.} \\x &= 58 && \text{Simplify.}\end{aligned}$$

CHECK

$$\begin{aligned}x - 13 &= 45 && \text{Original equation} \\58 - 13 &\stackrel{?}{=} 45 && \text{Substitute 58 for } x.\end{aligned}$$

Exercises Solve each equation. Then check your solution.

See Examples 1–3 on pages 135 and 136.

21. $6x = -42$

22. $-7w = -49$

23. $\frac{3}{4}n = 30$

24. $-\frac{3}{5}y = -50$

25. $\frac{5}{2}a = -25$

26. $5 = \frac{r}{2}$

3-3 Solving Equations by Using Multiplication and Division

See pages
135–140.

Concept Summary

- **Multiplication Property of Equality** For any numbers a , b , and c , if $a = b$, then $ac = bc$.
- **Division Property of Equality** For any numbers a , b , and c , with $c \neq 0$, if $a = b$, then $\frac{a}{c} = \frac{b}{c}$.

Example

Solve $\frac{4}{9}t = -72$.

$$\begin{aligned}\frac{4}{9}t &= -72 && \text{Original equation} \\ \frac{9}{4}\left(\frac{4}{9}t\right) &= \frac{9}{4}(-72) && \text{Multiply each side by } \frac{9}{4}. \\ t &= -162 && \text{Simplify.}\end{aligned}$$

CHECK

$$\begin{aligned}\frac{4}{9}t &= -72 && \text{Original equation} \\ \frac{4}{9}(-162) &\stackrel{?}{=} -72 && \text{Substitute } -162 \text{ for } t. \\ -72 &= -72 \checkmark && \text{Simplify.}\end{aligned}$$

The solution is -162 .

Exercises Solve each equation. Then check your solution.

See Examples 1–3 on pages 135 and 136.

21. $6x = -42$

22. $-7w = -49$

23. $\frac{3}{4}n = 30$

24. $-\frac{3}{5}y = -50$

25. $\frac{5}{2}a = -25$

26. $5 = \frac{r}{2}$

3-4 Solving Multi-Step Equations

See pages
142-148.

Concept Summary

- Multi-step equations can be solved by undoing the operations in reverse of the order of operations.

Example

Solve $34 = 8 - 2t$. Then check your solution.

$$\begin{aligned}34 &= 8 - 2t && \text{Original equation} \\34 - 8 &= 8 - 2t - 8 && \text{Subtract 8 from each side.} \\26 &= -2t && \text{Simplify.} \\ \frac{26}{-2} &= \frac{-2t}{-2} && \text{Divide each side by } -2. \\-13 &= t && \text{Simplify.}\end{aligned}$$

CHECK

$$\begin{aligned}34 &= 8 - 2t && \text{Original equation} \\34 &\stackrel{?}{=} 8 - 2(-13) && \text{Substitute } -13 \text{ for } t. \\34 &= 34 \checkmark && \text{The solution is } -13.\end{aligned}$$

Exercises Solve each equation. Then check your solution.

See Examples 2-4 on page 143.

$$\begin{array}{lll}27. 4p - 7 = 5 & 28. 6 = 4v + 2 & 29. \frac{y}{3} + 6 = -45 \\30. \frac{c}{-4} - 8 = -42 & 31. \frac{4d + 5}{7} = 7 & 32. \frac{7n + (-1)}{8} = 8\end{array}$$

3-5

Solving Equations with the Variable on Each Side

See pages
149-154.

Concept Summary

Steps for Solving Equations

- Step 1** Use the Distributive Property to remove the grouping symbols.
- Step 2** Simplify the expressions on each side of the equals sign.
- Step 3** Use the Addition and/or Subtraction Properties of Equality to get the variables on one side of the equals sign and the numbers without variables on the other.

Example

Solve $\frac{3}{4}q - 8 = \frac{1}{4}q + 9$.

$$\begin{aligned}\frac{3}{4}q - 8 &= \frac{1}{4}q + 9 && \text{Original equation} \\ \frac{3}{4}q - 8 - \frac{1}{4}q &= \frac{1}{4}q + 9 - \frac{1}{4}q && \text{Subtract } \frac{1}{4}q \text{ from each side.} \\ \frac{1}{2}q - 8 &= 9 && \text{Simplify.} \\ \frac{1}{2}q - 8 + 8 &= 9 + 8 && \text{Add 8 to each side.} \\ \frac{1}{2}q &= 17 && \text{Simplify.} \\ 2\left(\frac{1}{2}q\right) &= 2(17) && \text{Multiply each side by 2.} \\ q &= 34 && \text{Simplify.}\end{aligned}$$

The solution is 34.

Exercises Solve each equation. Then check your solution.

See Examples 1-4 on pages 149 and 150.

$$\begin{array}{lll}33. n - 2 = 4 - 2n & 34. 3t - 2(t + 3) = t & 35. 3 - \frac{5}{6}y = 2 + \frac{1}{6}y \\36. \frac{x-2}{6} = \frac{x}{2} & 37. 2(b-3) = 3(b-1) & 38. 8.3h - 2.2 = 6.1h - 8.8\end{array}$$

3-6 Ratios and Proportions

See pages
155–159.

Concept Summary

- A ratio is a comparison of two numbers by division.
- A proportion is an equation stating that two ratios are equal.
- A proportion can be solved by finding the cross products.

If $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

Example

Solve the proportion $\frac{8}{7} = \frac{a}{1.75}$.

$$\frac{8}{7} = \frac{a}{1.75} \quad \text{Original equation}$$

$$8(1.75) = 7(a) \quad \text{Find the cross products.}$$

$$14 = 7a \quad \text{Simplify.}$$

$$\frac{14}{7} = \frac{7a}{7} \quad \text{Divide each side by 7.}$$

$$2 = a \quad \text{Simplify.}$$

Exercises Solve each proportion. See Example 3 on page 156.

$$39. \frac{6}{15} = \frac{n}{45}$$

$$40. \frac{x}{11} = \frac{35}{55}$$

$$41. \frac{12}{d} = \frac{20}{15}$$

$$42. \frac{14}{20} = \frac{21}{m}$$

$$43. \frac{2}{3} = \frac{b+5}{9}$$

$$44. \frac{6}{8} = \frac{9}{s-4}$$