

TOC 49 Translating Algebraic Equations

Words	Algebraic Equation
four plus a number equals 20	$4 + x = 20$
three times (the quantity) of three plus a number is 15	$3(3 + x) = 15$
seven less than four times a number is 35	$-7 + 4x = 35$ or $4x - 7 = 35$
twice the difference between a number and seven is 40. Find the number.	$2(x - 7) = 40$ $2x - 14 = 40$ $\downarrow +14 +14$ $\hline 2x = 54$ $\downarrow \div 2 \div 2$ $x = 27$

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* A car rental agency charges \$150 per week plus \$0.20 per mile to rent a car. How many miles can you travel in one week for \$190?

$$\begin{array}{r}
 150 + 0.20m = 190 \\
 -150 \quad \downarrow \quad -150 \\
 \hline
 0.20m = 40 \\
 \hline
 0.2 \quad 0.2 \\
 \hline
 m = 200
 \end{array}$$

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Example 1 (page 50): Four subtracted from six times a number is 68. Find the number

$$x = 12$$

$$6x - 4 = 68$$

$$+4 \quad +4$$

$$6x = 72$$

$$\div 6 \quad \div 6$$



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Example 2 (page): Rent-a-Heap agency charges \$125 per week plus \$0.20 per mile to rent a small car. How many miles can you travel for \$335?

$$125 + 0.20m = 335$$

$$-125 \quad -125$$

$$\frac{0.2m}{0.2} = \frac{210}{0.2} \quad m = 1,050$$



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Example 3 (page 56)

The cost for two different kinds of heating systems for a 3-bedroom home are given below.

System	Cost to Install	Operating Cost/Year
Solar	\$29,700	\$150
Electric	\$5,000	\$1100

After how many years will the total costs for solar heating and electric heating be the same? What will be the cost at that time?



$$\begin{aligned} 29,700 + 150y &= 5,000 + 1100y \\ 29,700 - 5,000 &= 1100y - 150y \\ 24,700 &= 950y \\ \frac{24,700}{950} &= \frac{950y}{950} \\ 26 &= y \end{aligned}$$

$$29,700 + 150(26)$$

$$29,700 + 3900$$

$$\boxed{33,600}$$

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2) A number increased by 13

$$X + 13$$

4) 13 less than a number

$$X - 13$$



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6) 14 less than the product of 6 and a number

$$6m - 14$$

8) The quotient of a number and 15

$$x \div 15$$



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10) Twice the sum of a number and 20

$$2(x + 20)$$

12) The quotient of 12 and a number, decreased by 3 times the number

$$12 \div x - 3x \quad \text{or} \quad \frac{12}{x} - 3x$$



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14) Five times the difference of a number and 6

$$5(x-6)$$

16) The sum of a number and 29 is 54. Find the number.

$$\begin{array}{r} x + 29 = 54 \\ - 29 \quad - 29 \\ \hline \end{array}$$

$$x = 25..$$

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18) The difference between a number and 14 is 28.
Find the number.

$$\begin{array}{r} x - 14 = 28 \\ + 14 \quad + 14 \\ \hline 42 \end{array}$$

20) The product of 8 and a number is 184. Find the number.

$$\frac{8x}{8} = \frac{184}{8} = 23$$

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22) The quotient of a number and 13 is 9. Find the number.

$$13 \cdot \frac{x}{13} = 9 \cdot 13 = 117$$

24) The sum of five and three times a number is 29. Find the number.

$$5 + 3x = 29 \quad \boxed{x = 8}$$

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26) Eight subtracted from six times a number is 184. Find the number.

$$\begin{array}{r} 6x - 8 = 184 \\ + 8 \quad + 8 \\ \hline 6x = 192 \\ \frac{6x}{6} = \frac{192}{6} = \boxed{x = 32} \end{array}$$

28) A number increased by 12 is four times the number. Find the number.

$$x + 12 = 4x$$
$$\boxed{x = 4}$$

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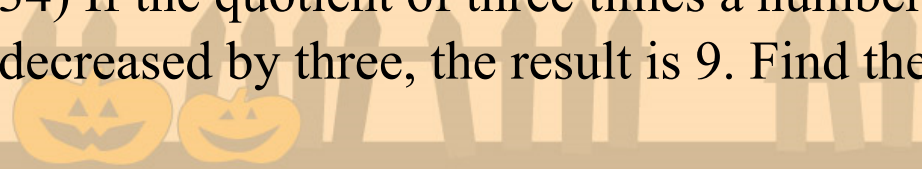
30) Three times the sum of five and a number is 48. Find the number.

$$3(x+5) = 48$$

32) Five more than four times a number is that number increased by 35. Find the number.

$$5 + 4x = 35$$

34) If the quotient of three times a number and 4 is decreased by three, the result is 9. Find the number.



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40) In 2001, the most populous countries in the world were China and India. In that year, China's population exceeded India's by 260 million. Combined, the two countries had a population of 2310 million. Determine the 2001 population for China and India.



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43) An automobile repair shop charged a customer \$448, listing \$63 for parts and the remainder for labor. If the cost of labor is \$35 per hour, how many hours of labor did it take to repair the car?

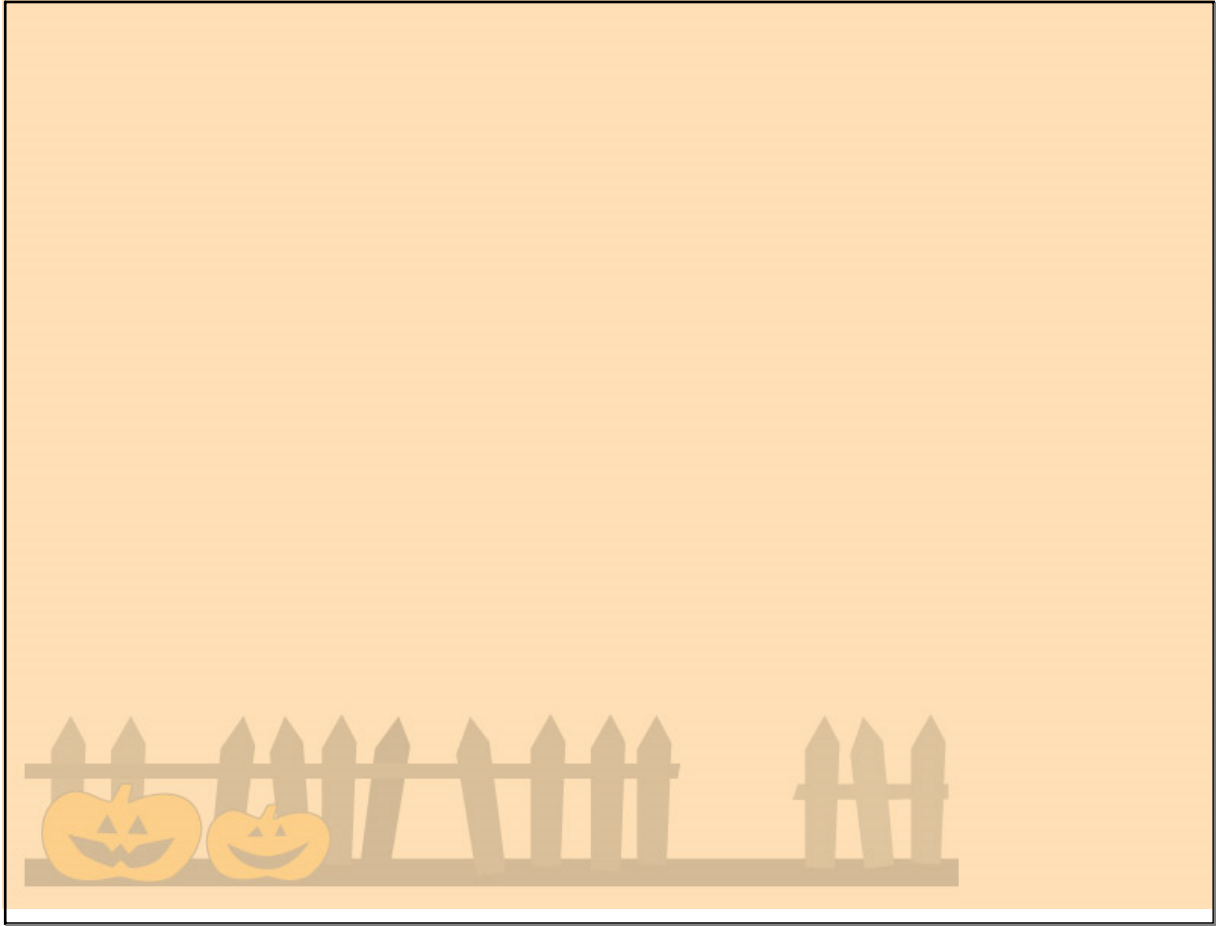


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45) You are choosing between two long-distance telephone plans. Plan A has a monthly fee of \$15 with a charge of \$0.08 per minute for all long-distance calls. Plan B has a monthly fee of \$3 with a charge of \$0.12 per minute for all long-distance calls. For how many minutes of long-distance calls will the costs for the two plans be the same?



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