

Section 6.4

Applications of Linear Equations in One Variable



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Translating Words to Expressions

Phrase	Mathematical Expression
Ten more than a number	$x + 10$
A number increased by 5	$x + 5$
Four less than a number	$x - 4$
A number decreased by 8	$x - 8$
Twice a number	$2x$



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Translating Words to Expressions

Phrase	Mathematical Expression
Four times a number	$4x$
2 decreased by a number	$2 - x$
The difference between a number and 6	$x - 6$
Five less than 7 times a number	$7x - 5$



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Translating Words to Expressions

Phrase	Mathematical Expression
Eleven more than twice a number	$2x + 11$
The sum of 6 times a number and 4	$6x + 4$
Nine times a number, decreased by 5	$9x - 5$



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Translating Words to Expressions

Phrase	Mathematical Equation
Seven more than a number is 12	$x + 7 = 12$
Three less than a number is 4	$x - 3 = 4$
Twice a number, decreased by 3 is 8.	$2x - 3 = 8$
A number decreased by 15 is 9 times the number	$x - 15 = 9x$



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To Solve a Word Problem

- Read the problem carefully at least twice to be sure that you understand it.
- If possible, draw a sketch to help visualize the problem.
- Determine which quantity you are being asked to find. Choose a letter to represent this unknown quantity. Write down exactly what this letter represents.
- Write the word problem as an equation.
- Solve the equation for the unknown quantity.
- Answer the question or questions asked.
- Check the solution.



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Example

The bill (parts and labor) for the repairs of a car was \$496.50. The cost of the parts was \$339. The cost of the labor was \$45 per hour. How many hours were billed?

Let h = the number of hours billed

Cost of parts + labor = total amount

$$339 + 45h = 496.50$$



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Example (continued)

$$\begin{aligned}339 + 45h &= 496.50 \\339 - 339 + 45h &= 496.50 - 339 \\45h &= 157.50 \\ \frac{45h}{45} &= \frac{157.50}{45} \\ h &= 3.5\end{aligned}$$

The car was worked on for 3.5 hours.



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Example

- Sandra Cone wants to fence in a rectangular region in her backyard for her lambs. She only has 184 feet of fencing to use for the perimeter of the region. What should the dimensions of the region be if she wants the length to be 8 feet greater than the width?

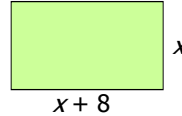


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Example (continued)

- 184 feet of fencing, length 8 feet longer than width
- Let x = width of region
- Then $x + 8$ = length
- $P = 2l + 2w$



$$184 = 2(x) + 2(x + 8)$$

$$184 = 2x + 2x + 16$$

$$184 = 4x + 16$$

$$168 = 4x$$

$$42 = x$$

The width of the region is 42 feet and the length is 50 feet.



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