

Explore



Part 1

- Write an algebraic expression for these statements:
Think of a number.
Multiply it by 3.
Add 4.
- The answer is 13. What is the original number?

Part 2

- Each of you writes your own number riddle.
Trade riddles with your partner.
- Write an algebraic expression for your partner's statements.
Find your partner's original number.

Reflect & Share

Compare your answer to *Part 1* with that of another pair of classmates.
If you found different values for the original number, who is correct?
Can both of you be correct? How can you check?

Connect

Zena bought 3 CDs.
Each CD costs the same amount.
The total cost was \$36.
What was the cost of 1 CD?

$$(\$?) + (\$?) + (\$?) = \$36$$

We can write an equation for this situation.
Let p dollars represent the cost of 1 CD.
Then, the cost of 3 CDs is $3p$. This is equal to \$36.
We can write an equation to represent this situation:
 $3p = 36$



When we write one quantity equal to another quantity, we have an *equation*.

Each quantity may be a number or an algebraic expression.

For example, $3x + 2$ is an algebraic expression; 11 is a number.

When we write $3x + 2 = 11$, we have an equation.

An equation is a statement that two quantities are equal.

Each side of the equation has the same value.

In an equation, the variable represents a specific unknown number.

When we find the value of the unknown number, we *solve* the equation.

Example

Write an equation for each sentence.

- | | |
|---|----------------------------------|
| a) Three more than a number is 15. | b) Five less than a number is 7. |
| c) A number subtracted from 5 is 1. | d) A number divided by 3 is 10. |
| e) Eight added to 3 times a number is 26. | |

A Solution

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|--|--|
| a) Three more than a number is 15.
Let x represent the number.
Three more than x : $x + 3$
The equation is: $x + 3 = 15$ | b) Five less than a number is 7.
Let z represent the number.
Five less than z : $z - 5$
The equation is: $z - 5 = 7$ |
| c) A number subtracted from 5 is 1.
Let g represent the number.
g subtracted from 5: $5 - g$
The equation is: $5 - g = 1$ | d) A number divided by 3 is 10.
Let j represent the number.
j divided by 3: $\frac{j}{3}$
The equation is: $\frac{j}{3} = 10$ |
| e) Eight added to 3 times a number is 26.
Let h represent the number.
3 times h : $3h$
8 added to $3h$: $3h + 8$
The equation is: $3h + 8 = 26$ | |

Practice

- Write an equation for each sentence.

a) Eight more than a number is 12.	b) Eight less than a number is 12.
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- Write a sentence for each equation.

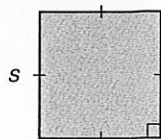
a) $12 + n = 19$	b) $3n = 18$	c) $12 - n = 5$	d) $\frac{n}{2} = 6$
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3. Write an equation for each sentence.

- a) Six times the number of people in the room is 258.
- b) One-half the number of students in the band is 21.
- c) The area of a rectangle with base 6 cm and height h centimetres is 36 cm^2 .

4. The perimeter of a square is 156 cm.

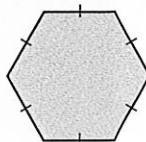
Write an equation you could use to find the side length of the square.



Recall that perimeter is the distance around a shape.

5. The side length of a regular hexagon is 9 cm.

Write an equation you could use to find the perimeter of the hexagon.



6. Match each equation with the correct sentence.

- | | |
|-----------------|---|
| a) $n + 4 = 8$ | A. Four less than a number is 8. |
| b) $4n = 8$ | B. Four more than four times a number is 8. |
| c) $n - 4 = 8$ | C. The sum of four and a number is 8. |
| d) $4 + 4n = 8$ | D. The product of four and a number is 8. |

7. Alonso thinks of a number.

He divides the number by 4, then adds 10.

The answer is 14.

Write an equation for the problem.

8. Assessment Focus

a) Write an equation for each sentence.

- i) Five times the number of students is 295.
- ii) The area of a rectangle with base 7 cm and height h centimetres is 28 cm^2 .
- iii) The cost of 2 tickets at x dollars each and 5 tickets at \$4 each is \$44.
- iv) Bhavin's age 7 years from now will be 20 years old.

b) Which equation was the most difficult to write? Why?

c) Write your own sentence, then write it as an equation.



Reflect

Give an example of an algebraic expression and of an equation.

How are they similar? How are they different?