

3. Six Less Than Twice A Number Is 17. Which Equation Could Be Used To Determine The number, N? A. $6-2n$

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Understanding how to translate word problems into algebraic equations is a fundamental skill in mathematics. In this article, we will explore the problem: "Six less than twice a number is 17," and determine the correct algebraic equation to find the number, denoted as (n) . We will analyze this problem step-by-step, interpret the meaning behind the words, and identify the correct mathematical representation to solve for (n) .

Interpreting the Word Problem

Before jumping into equations, it's crucial to understand the problem statement clearly:

> "Six less than twice a number is 17."

Let's break down what this means:

- "Twice a number" refers to multiplying the number (n) by 2, resulting in $(2n)$.
- "Six less than" indicates that we subtract 6 from the previous expression.
- "Is 17" signifies that the resulting expression equals 17.

Putting it together, the phrase "Six less than twice a number" translates into an algebraic expression: $(2n - 6)$.

The statement "is 17" indicates an equality:

```
\[
2n - 6 = 17
\]
```

This is the core equation that models the problem.

Formulating the Correct Equation

Understanding the phrase "Six less than twice a number" is essential to choosing or creating the correct algebraic expression.

Common Misinterpretations

Sometimes, students may confuse the order of operations or incorrectly translate phrases. For example:

- Writing $(6 - 2n)$ instead of $(2n - 6)$ changes the meaning.
- Interpreting "less than" as "more than" or vice versa.

Correct Interpretation

The phrase "six less than twice a number" correctly translates to:

$$2n - 6$$

which means:

> Take twice the number ($2n$), then subtract 6.

The phrase "is 17" translates to:

$$2n - 6 = 17$$

Analyzing the Given Option: A. $6 - 2n$

The problem mentions an option:

- A. $6 - 2n$

Let's analyze whether this expression correctly models the statement.

Does $(6 - 2n)$ match "Six less than twice a number"?

- "Twice a number" is $2n$.
- "Less than" indicates subtraction, but the key is what is being subtracted from what.

In "six less than twice a number," the phrase indicates:

$$\text{(twice a number)} - 6 \implies 2n - 6$$

whereas:

```
\[
6 - 2n
\]
```

would mean:

```
\[
\text{6 minus twice a number}
\]
```

which is a different statement altogether.

Conclusion: The expression $(6 - 2n)$ does not accurately reflect "six less than twice a number." Instead, it corresponds to "six minus twice a number."

Determining the Correct Equation

Based on the analysis:

- The accurate translation of "Six less than twice a number is 17" is:

```
\[
2n - 6 = 17
\]
```

- The expression $(6 - 2n)$ is not suitable because it reverses the order, changing the meaning.

Proper Equation to Find (n)

```
\[
\boxed{
2n - 6 = 17
}
\]
```

This equation can now be solved to find the value of (n) .

Solving the Equation for (n)

Let's go through the steps to solve the equation:

```
\[
2n - 6 = 17
\]
```

Step 1: Add 6 to both sides to isolate the term with (n) :

$$\begin{aligned} & \backslash[\\ & 2n - 6 + 6 = 17 + 6 \\ & \backslash] \\ & \backslash[\\ & 2n = 23 \\ & \backslash] \end{aligned}$$

Step 2: Divide both sides by 2 to solve for (n) :

$$\begin{aligned} & \backslash[\\ & n = \frac{23}{2} \\ & \backslash] \end{aligned}$$

Result:

$$\begin{aligned} & \backslash[\\ & n = 11.5 \\ & \backslash] \end{aligned}$$

The number (n) is 11.5.

Alternative Equations and Common Mistakes

While the correct equation is $(2n - 6 = 17)$, students might consider alternative equations, such as:

- $(6 - 2n = 17)$, which is incorrect for this problem.
- $(2(n - 6) = 17)$, which would mean "twice" applies after subtracting 6, changing the problem statement.

Why these are incorrect:

- $(6 - 2n)$ reverses the order and meaning.
- $(2(n - 6))$ interprets the problem differently: "twice the difference of (n) and 6," which is not what the original statement suggests.

Summary and Key Takeaways

- The phrase "Six less than twice a number" translates to $(2n - 6)$.
- The phrase "is 17" translates to an equality: $(2n - 6 = 17)$.
- The given option $(6 - 2n)$ does not correctly model the problem.
- Solving $(2n - 6 = 17)$ yields $(n = 11.5)$.

Conclusion

Accurately translating word problems into algebraic equations is vital for

solving them correctly. In this case, recognizing that "six less than twice a number" corresponds to the expression $(2n - 6)$ is fundamental. The correct algebraic equation to determine the number (n) is:

```
\[
\boxed{
2n - 6 = 17
}
\]
```

By solving this equation, we find that the value of (n) is 11.5, confirming the importance of precise interpretation and translation of problem statements into mathematical expressions.

Additional Resources

For further practice, consider exploring:

- How to interpret various algebraic phrases into equations.
- Solving linear equations step-by-step.
- Word problem strategies for translating real-world situations into algebra.

Understanding these concepts enhances problem-solving skills and builds confidence in tackling algebraic questions.

Remember: Always carefully analyze the wording, pay attention to key phrases like "less than," "more than," "twice," etc., and double-check your translation before solving.

Frequently Asked Questions

What is the algebraic equation for 'Six less than twice a number is 17'?

The equation is $2n - 6 = 17$.

Which of the following options correctly represents the equation for the problem: 'Six less than twice a number is 17'?

Option B: $2n - 6 = 17$.

Why is the equation $2n - 6 = 17$ the correct choice for this problem?

Because 'twice a number' is $2n$, and 'six less than' means subtracting 6, setting it equal to 17 gives $2n - 6 = 17$.

How do you solve for n in the equation $2n - 6 = 17$?

Add 6 to both sides to get $2n = 23$, then divide both sides by 2 to find $n = 11.5$.

If the options include $6 - 2n$, is that the correct equation for the problem?

No, because $6 - 2n$ does not correctly represent 'six less than twice a number'; the correct form is $2n - 6 = 17$.

What does the phrase 'six less than twice a number' translate to in algebraic form?

It translates to $2n - 6$.

Is the equation $6 - 2n$ suitable for solving this problem?

No, because it reverses the order; the correct form is $2n - 6 = 17$.

What step follows after setting up the correct equation to find the number n ?

First, solve for n by adding 6 to both sides and then dividing by 2.

Can the equation $6 - 2n$ be used to determine the number in this problem?

No, because it does not correctly represent the phrase 'Six less than twice a number'; the correct equation is $2n - 6 = 17$.

Additional Resources

Six Less Than Twice A Number Is 17 is a classic algebraic problem that exemplifies how mathematical expressions can be translated into equations to find unknown values. This phrase, while straightforward in everyday language, encapsulates an essential step in algebra: converting verbal statements into mathematical equations. Understanding how to do this accurately is fundamental for solving a wide range of problems, from basic arithmetic to complex real-world scenarios. In this article, we will explore the problem in detail, analyze the potential equations that represent it, and discuss the reasoning behind selecting the correct mathematical expression to find the number, N .

Understanding the Problem Statement

Breaking Down the Phrase

The phrase "Six less than twice a number is 17" contains key components that

need to be translated into algebraic terms:

- "Six less than" indicates a subtraction operation.
- "Twice a number" suggests multiplying a variable (commonly N) by 2.
- "Is 17" signifies equality to the number 17.

When converting verbal statements into algebraic expressions, it helps to identify these components separately:

- "Twice a number" translates to $2N$.
- "Six less than" this amount indicates $2N$ minus 6.
- The phrase "is 17" points to an equation where the previous expression equals 17.

Constructing the Equation

Based on this breakdown, the algebraic expression should be:

- "Six less than twice a number" $\rightarrow 2N - 6$
- "Is 17" $\rightarrow$ equals 17

Therefore, the equation is:

$2N - 6 = 17$

This is the primary candidate for solving N in this context.

Analyzing the Given Options

The question provides multiple options, with Option A being $6 - 2n$. To determine whether this is the correct equation, we need to analyze each option and understand the logic behind it.

Option A: $6 - 2n$

- Interpretation: This expression reverses the order of subtraction; it suggests "6 minus twice n ."
- Relevance to the problem: It does not align with the phrase "six less than twice a number," which indicates that the subtraction should happen after doubling the number, not before.
- Mathematical correctness: If we interpret "six less than twice a number" as "6 minus $2n$," it changes the meaning, leading to a different equation.
- Conclusion: This option does not accurately represent the problem statement because the order of operations is reversed.

Other potential options (hypothetical)

Suppose the options included:

- B. $2N + 6$
- C. $2N - 6$
- D. $6N$
- E. $N/2 - 6$

Analyzing each:

- B. $2N + 6$: "Six more than twice a number," which does not match the given phrase.
- C. $2N - 6$: "Six less than twice a number," which matches the phrase exactly.
- D. $6N$: "Six times a number," which is unrelated.

- E. $N/2 - 6$: "Half a number minus six," not relevant here.

Hence, the correct algebraic expression from these options would be $2N - 6$.

Why $2N - 6$ Is the Correct Equation

Logical Reasoning

- The phrase "twice a number" clearly translates to $2N$.
- The phrase "six less than" indicates subtracting 6 from this value, resulting in $2N - 6$.
- The phrase "is 17" indicates equality, leading to the equation:
$$2N - 6 = 17$$

This direct translation preserves the original meaning and aligns with standard algebraic conventions.

Solving the Equation

Once the correct equation is identified, solving for N involves:

1. Adding 6 to both sides:
$$2N = 17 + 6$$
$$2N = 23$$
2. Dividing both sides by 2:
$$N = \frac{23}{2}$$
$$N = 11.5$$

Thus, the number N is 11.5.

Implications of the Correct Equation

Features of the Equation

- Linear in form: The equation is a simple linear equation, making it straightforward to solve.
- Reflects the problem accurately: It preserves the semantics of the verbal statement.
- Provides a clear solution pathway: Solving for N involves basic algebraic steps.

Pros of Using the Correct Equation

- Ensures an accurate representation of the problem.
- Facilitates straightforward solution steps.
- Helps reinforce the understanding of translating verbal statements into algebra.

Cons or Potential Pitfalls

- Misinterpreting "less than" or "twice" can lead to incorrect equations.
- Reversing the order of subtraction can cause errors.

- Overlooking the expression's structure may lead to choosing an incorrect option.

Conclusion

The phrase "Six less than twice a number is 17" is best represented by the equation $2N - 6 = 17$. Among the options provided, Option A, $6 - 2n$, does not accurately capture the intended meaning due to the reversed order of subtraction. Correctly translating verbal problems into algebraic equations is crucial for arriving at the right solution, and understanding the language components helps prevent common mistakes. By carefully analyzing each part of the phrase and matching it to the appropriate algebraic operation, students can develop stronger problem-solving skills and confidence in handling similar equations. The process exemplifies the importance of attention to detail in algebra and demonstrates how clear interpretation directly impacts the correctness of the solution.

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