Given Mn, Find The Value Of X.(6x-8)(2x+4)

Given Mn, Find The Value Of X.(6x-8)(2x+4)

Understanding how to find the value of x in algebraic expressions such as (6x-8)(2x+4) is fundamental to mastering algebra. The problem "Given Mn, Find The Value Of X.(6x-8)(2x+4)" involves evaluating the expression and solving for the unknown variable x. This comprehensive guide will walk you through the step-by-step process of solving such problems, exploring relevant algebraic concepts, methods, and tips to enhance your problem-solving skills.

Understanding the Problem Statement

Before diving into solving the expression, it’s crucial to understand what the problem is asking:

- Given Mn: This indicates that there's some known value or condition involving M and n, possibly related to the expression or a previous step. Since the problem statement is somewhat ambiguous, we will interpret it as the task of finding the value of x in the expression (6x - 8)(2x + 4).

- Find the value of x: The main goal is to determine the specific value(s) of x that satisfy the given expression.

- Expression (6x-8)(2x+4): This is a product of two binomials involving x. Our task involves expanding, simplifying, and solving the resulting equation.

Key Algebra Concepts Involved

To effectively solve this problem, you should be familiar with the following algebraic concepts:

1. Binomial Multiplication

- The process of multiplying two binomials using the distributive property, often called FOIL (First, Outer, Inner, Last).

2. Simplification of Algebraic Expressions

- Combining like terms and simplifying expressions to a standard form.

3. Solving Quadratic Equations

- When the multiplication results in a quadratic expression, methods such as factoring, completing the square, or the quadratic formula are used.

4. Setting Expressions Equal to Values

- Often, you set the expression equal to a number (e.g., zero) to find solutions for x.

Step-by-Step Approach to Solving (6x-8)(2x+4)

Let's proceed systematically:

Step 1: Expand the Expression

Apply the distributive property (FOIL):

- First: $6x\ 2x = 12x^2$
- Outer: $6x\ 4 = 24x$
- Inner: $-8\ 2x = -16x$
- Last: $-8\ 4 = -32$

Putting these together:

$(6x-8)(2x+4) = 12x^2 + 24x - 16x - 32$

Step 2: Simplify the Resulting Expression

Combine like terms:

$12x^2 + (24x - 16x) - 32 = 12x^2 + 8x - 32$

Now, the expanded form simplifies to:

$12x^2 + 8x - 32$

Interpreting the 'Given Mn' Part

The phrase "Given Mn" suggests that there might be a specific value or relation involving M and n, possibly from a previous problem or context. Since no explicit value is provided in this problem, common interpretations include:

- The expression equals a known value (e.g., zero or another number).
- The expression is part of a larger equation involving M and n.

Assuming the typical scenario where the expression equals zero (a common approach in algebra problems):

Set the expanded expression equal to zero:

$12x^2 + 8x - 32 = 0$

This transforms the problem into solving a quadratic equation for x.

Solving the Quadratic Equation $12x^2 + 8x - 32 = 0$

Method 1: Factoring

- First, factor out the greatest common factor (GCF):

GCF of 12, 8, and -32 is 4:

$4(3x^2 + 2x - 8) = 0$

- Now, solve the inner quadratic:

$3x^2 + 2x - 8 = 0$

- Look for two numbers that multiply to (3)(-8) = -24 and add to 2.

Possible pairs:

- 6 and -4 (since 6 -4 = -24 and 6 + (-4) = 2)

- Rewrite the middle term:

$3x^2 + 6x - 4x - 8 = 0$

- Factor by grouping:

$3x(x + 2) -4(x + 2) = 0$

- Factor out common binomial:

$(3x - 4)(x + 2) = 0$

- Set each factor equal to zero:

$3x - 4 = 0 \rightarrow x = 4/3$

$x + 2 = 0 \rightarrow x = -2$

- Solutions:

$x = 4/3$ and $x = -2$

Method 2: Quadratic Formula

If factoring is challenging, use the quadratic formula:

$x = [-b \pm \sqrt{(b^2 - 4ac)}] / 2a$

Where $a = 3$, $b = 2$, $c = -8$

Calculate discriminant:

$D = (2)^2 - 4\ 3\ (-8) = 4 + 96 = 100$

Square root of D:

$\sqrt{100} = 10$

Calculate solutions:

$x = [-2 \pm 10] / (2\ 3) = [-2 \pm 10] / 6$

- For the positive:

$x = (8) / 6 = 4/3$

- For the negative:

$x = (-12) / 6 = -2$

Same as the factoring method.

Summary of Solutions

- $x = 4/3$
- $x = -2$

These are the solutions to the quadratic equation derived from setting the original expression equal to zero.

Additional Scenarios and Variations

The above solution assumes the expression equals zero. However, in other contexts, you might be asked to evaluate the expression for a specific value of x or set it equal to a different number.

Scenario 1: Evaluate for a specific x

Suppose $x = 1$, then:

$(6(1) - 8)(2(1) + 4) = (6 - 8)(2 + 4) = (-2)(6) = -12$

Scenario 2: Set the expression equal to a value M, and solve for x

Suppose the expression equals M, then:

$(6x - 8)(2x + 4) = M$

Expanding as before:

$12x^2 + 8x - 32 = M$

Rearranged:

$12x^2 + 8x - (32 + M) = 0$

Then, solve for x using quadratic formula with:

$a = 12$

$b = 8$

$c = - (32 + M)$

This approach allows solving for x given any value of M.

Tips for Solving Algebraic Expressions Like (6x-8)(2x+4)

To enhance your problem-solving skills, consider these practical tips:

- Always expand binomials carefully to avoid errors.
- Look for common factors in the expanded expression to simplify.
- When solving quadratic equations, check the discriminant to determine the nature of roots.
- Use factoring first if the quadratic is factorable; otherwise, resort to the quadratic formula.
- Keep track of units and signs throughout calculations to prevent mistakes.
- Practice with different values and scenarios to build confidence.

Common Mistakes to Avoid

- Incorrect expansion: Forgetting to apply FOIL properly.
- Sign errors: Misplacing negative signs during expansion or factoring.
- Overlooking the GCF: Missing the opportunity to factor out common factors.
- Ignoring the domain: Ensuring solutions are valid within the problem context.
- Forgetting to check solutions: Substituting solutions back into the original expression to verify.

Conclusion

Solving for x in the expression (6x-8)(2x+4) involves understanding algebraic expansion, simplifying the resulting quadratic, and applying appropriate solving methods such as factoring or the quadratic formula. When the expression is set equal to zero, the solutions are x = 4/3 and x = -2. This process exemplifies fundamental algebra concepts and techniques that are essential for tackling a wide range of mathematical problems.

By mastering these steps and tips, you can confidently approach similar problems involving binomials and quadratic equations, enhancing your overall algebraic proficiency.

Keywords for SEO Optimization:
- How to solve (6x-8)(2x+4) for x
- Algebraic expansion of binomials
- Solving quadratic equations
- Factoring quadratic expressions
- Quadratic formula steps
- Algebra practice problems
- Solving expressions involving x
- Step-by-step algebra solutions
- Tips for solving quadratic equations
- Mathematical problem-solving techniques

Frequently Asked Questions

Given Mn, Find the value of x in the expression (6x - 8)(2x + 4).

To find x, you need the value of Mn (the product). Set $(6x - 8)(2x + 4) = Mn$ and solve for x by expanding and solving the quadratic equation.

If (6x - 8)(2x + 4) = 48, what is the value of x?

Expand: $(6x - 8)(2x + 4) = 12x^2 + 24x - 16x - 32 = 12x^2 + 8x - 32$. Set equal to 48: $12x^2 + 8x - 32 = 48$. Simplify: $12x^2 + 8x - 80 = 0$. Divide entire equation by 4: $3x^2 + 2x - 20 = 0$. Then, solve using quadratic formula: $x = [-2 \pm \sqrt{(4 - 43(-20))}]/(23)$. Calculate discriminant: $4 + 240 = 244$. So, $x = [-2 \pm \sqrt{244}]/6$. Simplify $\sqrt{244} \approx 15.62$. Therefore, $x \approx [-2 \pm 15.62]/6$, giving two solutions: $x \approx (13.62)/6 \approx 2.27$ or $x \approx (-17.62)/6 \approx -2.94$.

How do you find the value of x given the product Mn of (6x - 8)(2x + 4)?

Express the product as a quadratic in x: $(6x - 8)(2x + 4) = Mn$. Expand and simplify to quadratic form, then solve for x using factoring or the quadratic formula.

What is the step-by-step method to find x when given (6x - 8)(2x + 4) = Mn?

1. Expand the expression to get a quadratic: $12x^2 + 24x - 16x - 32$. 2. Simplify: $12x^2 + 8x - 32$. 3. Set equal to Mn: $12x^2 + 8x - 32 = Mn$. 4. Rearrange to standard quadratic form: $12x^2 + 8x - (Mn + 32) = 0$. 5. Use quadratic formula to solve for x.

Can the quadratic formula be used to find x in (6x - 8)(2x + 4) = Mn? How?

Yes. First, expand the expression to get a quadratic in x, then set it equal to Mn and rewrite as $12x^2 + 8x - (Mn + 32) = 0$. Apply the quadratic formula $x = [-b \pm \sqrt{(b^2 - 4ac)}]/(2a)$, plugging in $a=12$, $b=8$, $c=-(Mn+32)$.

If Mn is known, how can I determine the possible values of x from (6x - 8)(2x + 4) = Mn?

Expand and form a quadratic equation in x, then substitute Mn into the equation. Use the quadratic formula to find the potential solutions for x.

What are common mistakes to avoid when solving (6x - 8)(2x +

4) = Mn for x?

Common mistakes include incorrect expansion of the expression, forgetting to bring all terms to one side, miscalculating the discriminant in the quadratic formula, or mixing signs during solving. Always double-check each step.

How does the value of Mn affect the solutions for x in the expression (6x - 8)(2x + 4) = Mn?

The value of Mn determines whether the quadratic equation has two real solutions, one real solution, or no real solutions, depending on the discriminant ($b^2 - 4ac$). If discriminant > 0, two solutions; if = 0, one solution; if < 0, no real solutions.

Is there a shortcut to find x without fully expanding (6x - 8)(2x + 4)?

Generally, expanding is necessary to form a quadratic equation and solve for x. However, if Mn is known and factors of Mn correspond to the factors (6x - 8) and (2x + 4), you can set each factor equal to a factor of Mn to find x directly.

Additional Resources

Given Mn, Find The Value Of X.(6x-8)(2x+4)

Mathematics often challenges students with expressions and equations that require a blend of algebraic skills and logical reasoning. The problem "Given Mn, Find The Value Of X.(6x-8)(2x+4)" exemplifies such a challenge, inviting learners to decipher the value of x in an algebraic context. This type of problem not only tests an understanding of algebraic manipulation but also emphasizes the importance of interpreting given conditions correctly. In this article, we will explore the various methods to approach this problem, analyze its components, and provide a comprehensive guide to solving similar expressions efficiently.

Understanding the Problem

Before delving into the solution, it’s crucial to interpret the problem statement accurately. The phrase "Given Mn" likely refers to a specific value, equation, or condition involving the variables or expressions. Since the problem as presented is somewhat abstract, we can interpret it in a few ways:

- Mn as a value or expression: If Mn represents a specific numeric value or an expression involving m and n, then the problem might involve substituting or solving for x based on that value.

- Mn as a notation: Sometimes, Mn could denote the n-th term of a sequence or a particular known value that relates to the expression.

- Contextual assumptions: In many algebra problems, the phrase "Given Mn" might imply that Mn equals the entire expression or a given value, such as Mn = (6x - 8)(2x + 4).

Given the ambiguity, for the purpose of this discussion, we will assume the problem is:

> Given that the value of the expression (6x - 8)(2x + 4) equals Mn (a known value), find x.

Or more simply:

> Find x if (6x - 8)(2x + 4) = M, where M is a known constant.

This assumption allows us to focus on how to solve for x given the expression.

Breaking Down the Expression

The core expression is:

```
(6x - 8)(2x + 4)
```

To solve for x, we first need to expand this expression and then solve the resulting quadratic equation.

Step 1: Expand the Expression

Applying the distributive property (FOIL method):

(6x - 8)(2x + 4) = (6x)(2x) + (6x)(4) - 8(2x) - 8(4)

Calculating each term:

- 6x 2x = 12x2
- 6x 4 = 24x
- -8 2x = -16x
- -8 4 = -32

Combining these:

12x2 + 24x - 16x - 32

Simplify:

12x2 + (24x - 16x) - 32 = 12x2 + 8x - 32

This quadratic expression forms the basis for solving x when set equal to M.

Step 2: Set the Expression Equal to M

Assuming (6x - 8)(2x + 4) = M, then:

12x2 + 8x - 32 = M

Rearranged:

12x2 + 8x - (32 + M) = 0

The quadratic in standard form:

a = 12
b = 8
c = -(32 + M)

Methods to Find X

Once the quadratic is established, the goal is to find the value(s) of x. The most common methods include:

- Factoring (if possible)
- Quadratic formula
- Completing the square

Given the coefficients, the quadratic formula is often the most straightforward approach.

Using the Quadratic Formula

The quadratic formula:

x = [-b ± √(b2 - 4ac)] / (2a)

Plugging in the coefficients:

x = [-8 ± √(82 - 4 12 (-(32 + M)))] / (2 12)

Simplify inside the square root:

82 = 64

4 12 (-(32 + M)) = -4 12 (32 + M) = -48 (32 + M)

Since the term is negative times a negative (because c is negative), the discriminant becomes:

Discriminant $D = 64 - (-48)(32 + M) = 64 + 48(32 + M)$

Calculate $48(32 + M)$:

48 32 = 1536

48 M = 48M

Thus,

$D = 64 + 1536 + 48M = (64 + 1536) + 48M = 1600 + 48M$

Now, the solution for x:

$x = [-8 \pm \sqrt{(1600 + 48M)}] / 24$

Special Cases and Considerations

When solving quadratic equations, it's essential to check for certain conditions:

1. Discriminant Positivity

- If $D > 0$, there are two real solutions.
- If $D = 0$, there is exactly one real solution.
- If $D < 0$, solutions are complex conjugates.

In our case, the discriminant depends on M:

$D = 1600 + 48M$

- For real solutions, $D \geq 0 \rightarrow 48M \geq -1600 \rightarrow M \geq -1600/48 \approx -33.33$

2. Understanding the Value of M

- If M is known, the solutions can be explicitly calculated.
- If M is not specified, the solutions are expressed in terms of M.

3. Domain of x

Given the original expression, certain x values might make the expression undefined (e.g., denominators zero in other contexts). Here, since we have a quadratic, all real x solutions are valid unless restrictions are specified.

Example Calculation

Suppose M = 0 (i.e., the expression equals zero):

12x2 + 8x - 32 = 0

Using the quadratic formula:

D = 1600 + 48 0 = 1600

√D = 40

x = [-8 ± 40] / 24

Calculations:

- x = (-8 + 40) / 24 = 32 / 24 = 4/3 ≈ 1.333
- x = (-8 - 40) / 24 = -48 / 24 = -2

Thus, solutions are x = 4/3 and x = -2.

Conclusion and Final Remarks

The problem "Given Mn, Find The Value Of X.(6x-8)(2x+4)" encapsulates fundamental algebraic techniques, primarily focusing on expansion, setting up quadratic equations, and applying the quadratic formula. When approaching such problems, clarity in interpreting the given conditions is vital, as well as systematic application of algebraic principles.

Key features of solving similar problems include:

- Always expand expressions fully before attempting to solve.
- Recognize the importance of setting the expression equal to a known value (M).
- Use the quadratic formula when factoring isn't straightforward or possible.
- Analyze the discriminant to understand the nature of solutions.
- Substitute specific values of M to get concrete solutions.

Pros of this approach:

- Systematic and reliable method applicable to a wide range of quadratic problems.
- Clear step-by-step process enhances understanding and accuracy.

- Flexibility to handle different values of M.

Cons or challenges:

- Can become cumbersome with complex or large values of M.
- Requires careful algebraic manipulation to avoid errors.
- Might need additional techniques if the quadratic isn't easily solvable via the quadratic formula.

In essence, mastering these algebraic techniques empowers students to confidently tackle expressions like (6x - 8)(2x + 4) and similar problems, laying a strong foundation for advanced mathematical concepts. Whether dealing with specific values or abstract variables, the key is practice, precision, and a thorough understanding of quadratic equations.

Note: If the original problem intends a different interpretation of "Given Mn," such as involving sequences, matrices, or other mathematical objects, the approach would vary accordingly. Clarifying the context or providing additional details would enable more targeted solutions.

Given Mn Find The Value Of X 6x 8 2x 4

Given Mn Find The Value Of X 6x 8 2x 4

Related Articles

- Rename 1/10 And 1/4 Using The Least Common Denominator.
- Importance Of An Income Statement4+ Senteses
- Simplify 15a6bc4/35a2c4 20a3b (3a4b/7) 20a4b 3a3b/7

Back to Home