# Given The Function C(n) = N(n+5)(n - 7) Its C-intercept Is Its N-intercepts Are

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Understanding the intercepts of a function is fundamental in graphing and analyzing its behavior. When dealing with polynomial functions like C(n) = N(n+5)(n - 7), identifying the x-intercepts (or N-intercepts) and y-intercepts (or C-intercepts) provides crucial insights into the function's roots and how it crosses the axes. This article explores how to determine these intercepts, their significance, and the methods involved in calculating them for the given function.

## Understanding the Function C(n) = N(n+5)(n - 7)

Before diving into intercepts, it’s essential to comprehend the structure of the given function:

- The function is expressed as C(n) = N(n+5)(n - 7), where N is a constant multiplier, and n is the variable.
- The factors (n+5) and (n-7) indicate potential roots or x-intercepts.
- The constant N influences the shape and the magnitude of the function but does not affect the intercepts' positions.

Note: The notation in the function suggests N is a constant coefficient, which could be a specific value depending on context. For general purposes, we'll treat N as a constant parameter.

## What Are Intercepts in a Function?

Intercepts are points where a graph crosses the axes:

- N-intercepts (x-intercepts): The points where the graph crosses the x-axis. At these points, the function's output (C(n)) is zero.
- C-intercept (y-intercept): The point where the graph crosses the y-axis. At this point, the input (n) is zero, and the output (C(n)) is the value of the function when n=0.

Understanding how to find these points helps in sketching the graph accurately and analyzing the function's behavior.

# Finding the N-Interceptors (x-intercepts)

The N-intercepts are the values of n where C(n) = 0. To find these, set the function equal to zero:

$$ C(n) = N(n+5)(n - 7) = 0 $$

Since N is a constant (not zero), the product equals zero when any factor is zero:

$$ N \neq 0 \Rightarrow (n+5)(n - 7) = 0 $$

Thus,

$$ n + 5 = 0 \quad \Rightarrow \quad n = -5 $$
$$ n - 7 = 0 \quad \Rightarrow \quad n = 7 $$

Therefore, the N-intercepts are:

- n = -5
- n = 7

These are the points where the graph crosses the x-axis, meaning the function equals zero at these points.

Summary of N-intercepts:

| N-intercept (x-intercept) | Value of n | Corresponding C(n) |
|---|---|---|
| 1 | -5 | 0 |
| 2 | 7 | 0 |

Visual Interpretation:

- The graph touches or crosses the x-axis at n = -5 and n = 7.
- The multiplicity of these roots (which is 1 here) indicates the nature of the crossing. Since both are simple roots, the graph crosses the x-axis at these points.

# Finding the C-Intercept (y-intercept)

The C-intercept is the point where the graph crosses the y-axis. To find it:

1. Set n = 0 in the function.
2. Calculate C(0).

Applying this to the function:

$$ C(0) = N(0+5)(0-7) $$

Simplify:

$$ C(0) = N \times 5 \times (-7) $$
$$ C(0) = -35N $$

Therefore, the y-intercept is at:

- (0, -35N)

Where N is the constant coefficient.

Significance:

- The y-intercept depends directly on N.
- For N > 0, the y-intercept is negative.
- For N < 0, the y-intercept is positive.

Example:

If N = 1,

$$ C(0) = -35 \times 1 = -35 $$

The y-intercept is at (0, -35).

If N = 2,

$$ C(0) = -35 \times 2 = -70 $$

The y-intercept is at (0, -70).

Visual Representation:

- The graph crosses the y-axis at (0, -35N).
- The position of this point shifts depending on the value of N.

# Summary of Intercepts for the Function C(n) = N(n+5)(n - 7)

| Intercept Type | Calculation | Coordinates | Explanation |
|---|---|---|---|
| N-intercepts (x-intercepts) | Set C(n) = 0 and solve for n | n = -5, n = 7 | Roots of the quadratic factors |
| C-intercept (y-intercept) | Evaluate C(0) | (0, -35N) | Function value at n=0 |

# Additional Insights into the Function's Behavior

Understanding the intercepts is just the first step. To fully analyze the function, consider:

- The shape of the graph: Since C(n) is quadratic in n, it opens upwards or downwards depending on N.
- The leading coefficient: N influences whether the parabola opens upward (N > 0) or downward (N < 0).
- Vertex of the parabola: The axis of symmetry can be found at the midpoint of the roots, which is at n = (–5 + 7)/2 = 1.

Calculating the Vertex:

$$ n_{vertex} = \frac{-5 + 7}{2} = 1 $$

Substitute n=1 into C(n):

$$ C(1) = N(1+5)(1-7) = N \times 6 \times (-6) = -36N $$

- The vertex occurs at (1, -36N).
- The nature of the vertex (minimum or maximum) depends on the sign of N.

# Graphing the Function Based on Intercepts

Knowing the intercepts allows for an accurate sketch of the graph:

1. Plot the N-intercepts at n = -5 and n = 7.
2. Plot the y-intercept at (0, -35N).
3. Mark the vertex at (1, -36N).
4. Sketch the parabola passing through these points, considering whether it opens upward or downward based on N.

# Conclusion

Understanding the intercepts of the function C(n) = N(n+5)(n - 7) is vital for graphing and analyzing its behavior. The N-intercepts are at n = -5 and n = 7, where the function crosses the x-axis. The C-intercept is at (0, -35N), which depends on the constant N. Recognizing how these points relate to the overall shape of the graph enhances comprehension and helps in various applications, including solving equations, graphing, and understanding the function's properties.

In summary:

- The N-intercepts are at n = -5 and n = 7.
- The C-intercept is at (0, -35N).

By mastering the process of locating these intercepts, students and mathematicians can better analyze quadratic functions and their graphs, leading to more effective problem-solving and mathematical modeling.

# Frequently Asked Questions

## What are the N-intercepts of the function C(n) = N(n+5)(n - 7)?

The N-intercepts are the values of n where C(n) = 0. Setting C(n) = 0 gives N(n+5)(n - 7) = 0, so N = 0 or n+5 = 0 or n - 7 = 0. Therefore, the N-intercepts are at N=0, n=-5, and n=7.

## What is the C-intercept of the function C(n) = N(n+5)(n - 7)?

The C-intercept occurs when n=0. Substituting n=0, C(0) = N(0+5)(0-7) = N(5)(-7) = -35N. The C-intercept depends on N; if N is fixed, then at n=0, C(0) = -35N.

## How can we interpret the N-intercepts and C-intercept in the context of the function C(n) = N(n+5)(n - 7)?

The N-intercepts represent the values of n where the function crosses the N-axis (C(n)=0), i.e., when the function value is zero. The C-intercept at n=0 indicates the value of C(n) at that specific point, which depends on N. It shows how the function's output varies with N at n=0.

## If N=2, what are the N-intercepts and the C-intercept of the function C(n) = N(n+5)(n - 7)?

With N=2, the N-intercepts are at n=-5 and n=7 (since these do not depend on N). The C-intercept at n=0 is C(0) = -35 2 = -70.

## Are the N-intercepts or the C-intercept dependent on the parameter N in the function C(n) = N(n+5)(n - 7)?

The N-intercepts (the roots of the equation) are independent of N; they are always at n=-5 and n=7. However, the C-intercept at n=0 depends on N, since

C(0) = -35N, making it parameter-dependent.

## Additional Resources

Understanding the Function C(n) = N(n+5)(n-7): A Deep Dive into Its Intercepts

When exploring the fascinating world of algebraic functions, one of the most fundamental aspects to analyze is their intercepts — the points where the graph crosses the axes. These intercepts reveal critical information about the function's behavior and are often the starting point for graphing and understanding its nature. Today, we will dissect the function:

$$ C(n) = N(n+5)(n-7) $$

and explore its C-intercept and N-intercepts in detail, providing an expert-level breakdown suited for students, educators, or enthusiasts keen on mastering the intricacies of algebraic functions.

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## Deciphering the Function: C(n) = N(n+5)(n-7)

Before diving into intercepts, let's clarify the structure of this function. The notation suggests a relationship between two variables, N and n, which can sometimes cause confusion. Typically, in algebra, functions are expressed as $y = f(x)$, but here, the notation $C(n) = N(n+5)(n-7)$ implies that C is a function of n, and N appears as a parameter or variable in the expression.

Key assumptions:

- N is a constant parameter: In many contexts, N could be a fixed constant, which influences the shape and position of the graph.
- n is the independent variable: The variable upon which the function depends.

For the purpose of this analysis, we will assume that N is a constant parameter, and our focus is on how the intercepts depend on N.

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## Understanding Intercepts: What Are They?

Intercepts are the points where the graph of a function crosses the axes:

- N-intercept (or y-intercept in a typical Cartesian setting): The point where the graph crosses the N-axis (or y-axis if N is the output variable).
- C-intercept: The point where the graph crosses the C-axis, which may refer to the value of n where the function equals zero or another specific condition.

In this context, since the function is expressed as $C(n)$, the C-intercept refers to the value of n where $C(n) = 0$. Similarly, the N-intercept involves understanding the value of N where certain conditions are met, or vice versa.

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# Locating the C-Intercept: The Function’s Zeroes

The C-intercept generally refers to the zeroes of the function — the points where the function evaluates to zero. To find this, we set:

$$
C(n) = N(n+5)(n-7) = 0
$$

Given that N is a constant parameter, this equation can be zero in two scenarios:

Scenario 1: When N = 0

If $N = 0$, then:

$$
C(n) = 0 \times (n+5)(n-7) = 0
$$

which implies every value of n yields $C(n) = 0$. In this special case, the entire graph collapses to the zero function, and every point along the n-axis is a C-intercept.

Scenario 2: When N ≠ 0

In the more typical scenario where $N \neq 0$, the only way for $C(n)$ to be zero is:

$$
(n+5)(n-7) = 0
$$

which yields:

$$
\[

$$
n + 5 = 0 \quad \Rightarrow \quad n = -5
$$
$$
n - 7 = 0 \quad \Rightarrow \quad n = 7
$$

Thus, the C-intercepts are at:

$$
\boxed{
n = -5 \quad \text{and} \quad n = 7
}
$$

Interpreting the C-intercept:

- These are the x-values where the function crosses the n-axis.
- The corresponding C-values at these points depend on N:

$$
C(-5) = N(-5 + 5)(-5 - 7) = N(0)(-12) = 0
$$

$$
C(7) = N(7 + 5)(7 - 7) = N(12)(0) = 0
$$

- Regardless of N (except N=0), the zeroes occur at $n = -5$ and $n=7$.

Summary:

| Scenario | C-intercepts (n-values) | Notes |
| --- | --- | --- |
| N = 0 | All n | The function is identically zero |
| N ≠ 0 | n = -5, 7 | Fixed zeros independent of N |

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# Unveiling the N-Intercepts: The Role of N in the Function

While the C-intercepts are primarily about the zeros of $C(n)$, the N-intercept could refer to different concepts depending on the context:

- The value of N when $C(n)$ crosses a particular value (e.g., zero).
- The value of N for a fixed n that satisfies certain conditions.

Given the structure, the most meaningful interpretation is:

Finding N for which $C(n)$ equals a specific value, such as zero or another constant.

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## When is N Intercepted? Solving for N

Suppose we want to find the value of N such that $C(n)$ equals a certain value, say $C(n) = K$, for a fixed n:

$$
K = N(n+5)(n-7)
$$

If we're interested in the N-intercept where $C(n) = 0$, then:

$$
0 = N(n+5)(n-7)
$$

which, as shown, leads to the same zeros in n when $N \neq 0$.

Alternatively, if we fix n and vary N, the function behaves as:

$$
C(n) = N \times \text{constant}
$$

so the intercept in terms of N depends on the specific value of $C(n)$:

$$
N = \frac{C(n)}{(n+5)(n-7)}
$$

Implication:

- For a fixed n ≠ -5, 7, the value of N determines the output $C(n)$.
- Conversely, for fixed $C(n)$, the value of N is proportional to $C(n)$.

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## Special Cases and Graphical Interpretation

- When N is positive: The function's value $C(n)$ scales proportionally

with N, affecting the height of the graph.
- When N is negative: The function reflects across the n-axis, reversing the sign of $C(n)$.

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## Summary of Intercepts and Their Significance

| Intercept Type | Description | Calculation | Notes |
| --- | --- | --- | --- |
| C-intercepts (n-intercepts) | Points where $C(n) = 0$ | $n = -5, 7$ | Independent of N (except N=0) |
| N-intercept | The value(s) of N for a fixed $C(n)$ | $N = \frac{C(n)}{(n+5)(n-7)}$ | Depends on fixed n and desired output |

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## Implications for Graphing and Analysis

Understanding where the function crosses axes provides crucial insights:

- The zeros at $n = -5$ and $n=7$ are vertical asymptotes (roots) where the function evaluates to zero.
- For different N values, the graph's shape and scale change proportionally.
- When N=0, the entire function collapses to zero, indicating a flat, degenerate graph.

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## Final Thoughts: Practical Applications and Insights

The detailed analysis of $C(n) = N(n+5)(n-7)$ highlights several key principles:

- The roots of the polynomial component determine the intercepts on the n-axis.
- The parameter N acts as a scaling factor, influencing the amplitude or magnitude but not the location of the zeros.
- Recognizing these intercepts is essential in understanding the behavior of the function, particularly in physics, engineering, or economics, where such functions model real-world phenomena.

In conclusion, whether you're plotting the function or analyzing its

properties, knowing its C-intercepts at $n = -5, 7$ and understanding the role of N in shaping the graph are foundational steps. This comprehensive breakdown empowers you to interpret similar functions with confidence, making intercept analysis a powerful tool in your mathematical toolkit.

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