# Select All The Points That Are On The Line Through (0 5) And (2 8) A.(5 11) B.(5 10) C.(6 14) D.(30 50)

**Select All The Points That Are On The Line Through (0 5) And (2 8) A.(5 11) B.(5 10) C.(6 14) D.(30 50)**

Understanding how to determine whether specific points lie on a line passing through two given points is a fundamental concept in coordinate geometry. This article provides a comprehensive guide to identifying points that lie on the line passing through points (0, 5) and (2, 8). We will explore the mathematical principles involved, step-by-step procedures, and apply these to evaluate options A, B, C, and D. Whether you're a student preparing for exams or a math enthusiast, this guide aims to clarify the process and enhance your problem-solving skills.

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## Understanding the Problem: Points and Lines in Coordinate Geometry

Before diving into calculations, it's essential to understand the core concepts involved:

### What Is a Line in Coordinate Geometry?

- A line in a two-dimensional plane is a straight, infinitely extending path connecting points.
- It can be represented algebraically using equations such as the slope-intercept form (y = mx + b) or point-slope form.

### What Does It Mean for a Point to Lie on a Line?

- A point (x, y) lies on a line if substituting its coordinates into the line's equation satisfies the equation.
- In simpler terms, the point's coordinates satisfy the mathematical relationship defining the line.

### Why Is It Important to Find Points on a Line?

- Understanding which points lie on a particular line is crucial in many areas, including graphing, solving geometric problems, and analyzing data trends.

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## Step-by-Step Guide to Find the Equation of the Line Through (0, 5) and (2, 8)

To determine whether given points are on the line passing through (0, 5) and (2, 8), we first need the equation of that line.

### Step 1: Calculate the Slope (m)

- The slope of a line passing through two points $(x_1, y_1)$ and $(x_2, y_2)$ is given by:

$$
m = \frac{y_2 - y_1}{x_2 - x_1}
$$

- For points (0, 5) and (2, 8):

\[

$$
m = \frac{8 - 5}{2 - 0} = \frac{3}{2}
$$

## Step 2: Write the Equation Using Point-Slope Form

- The point-slope form of a line's equation is:

$$
y - y_1 = m(x - x_1)
$$

- Using point (0, 5):

$$
y - 5 = \frac{3}{2}(x - 0) \Rightarrow y - 5 = \frac{3}{2}x
$$

- Simplify to slope-intercept form:

$$
y = \frac{3}{2}x + 5
$$

Result: The equation of the line passing through (0, 5) and (2, 8):

$$
\boxed{y = \frac{3}{2}x + 5}
$$

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# Evaluating Points A, B, C, and D for Line Inclusion

Now that we have the line's equation, the next step is to check each given point to see if it satisfies the equation.

## Method for Verification

- For each point $(x, y)$, substitute the x-coordinate into the line's equation.
- If the resulting y-value matches the y-coordinate of the point, then the point lies on the line.
- Otherwise, it does not.

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# Analysis of Each Point

## Point A: (5, 11)

- Substitute $x = 5$:

$$
y = \frac{3}{2} \times 5 + 5 = \frac{3}{2} \times 5 + 5 = \frac{15}{2} + 5 = 7.5 + 5 = 12.5
$$

- The point's y-coordinate is 11, but the calculated y-value is 12.5.

Conclusion: (5, 11) does not lie on the line.

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## Point B: (5, 10)

- Substitute $x = 5$:

$$
y = 7.5 \quad (\text{from previous calculation})
$$

- The point's y-coordinate is 10, which does not match 7.5.

Conclusion: (5, 10) does not lie on the line.

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## Point C: (6, 14)

- Substitute $x = 6$:

$$
y = \frac{3}{2} \times 6 + 5 = 9 + 5 = 14
$$

- The point's y-coordinate is 14, which matches the calculated y-value.

Conclusion: (6, 14) lies on the line.

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## Point D: (30, 50)

- Substitute $x = 30$:

$$
y = \frac{3}{2} \times 30 + 5 = 45 + 5 = 50
$$

- The point's y-coordinate is 50, which matches the calculated y-value.

Conclusion: (30, 50) lies on the line.

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## Final Summary: Which Points Are On the Line?

Based on the calculations:

- Points on the line:
- (6, 14)
- (30, 50)

- Points not on the line:
- (5, 11)
- (5, 10)

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## Implications and Applications

Understanding how to verify whether points lie on a specific line has broad applications, including:

## Graphing and Visualization

- Plotting points accurately requires knowing whether they align with a given line.

- Helps in visual data analysis to identify trends.

## Solving Geometric Problems

- Determines collinearity of points.

- Essential in proofs and geometric construction.

## Data Analysis and Regression

- Verifying whether data points follow a linear trend.

- Critical in statistical modeling.

## Educational Context

- A foundational skill in high school and college-level mathematics courses.

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# Additional Tips for Line and Point Analysis

- Always calculate the line's equation carefully and verify each point systematically.

- Remember that floating-point inaccuracies can occur; use exact fractions when possible.

- For vertical lines (where \(x\) is constant), check if the x-coordinate matches the line's x-value.

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## Conclusion

Determining whether specific points lie on a line passing through two given points involves deriving the line's equation and verifying each point through substitution. In this case, the line passing through (0, 5) and (2, 8) has the equation $y = \frac{3}{2}x + 5$. Applying this to options given:

- Points (6, 14) and (30, 50) satisfy the equation.
- Points (5, 11) and (5, 10) do not.

This process underscores the importance of understanding the fundamentals of slope calculation, equation derivation, and point validation in coordinate geometry. Mastery of these concepts enhances problem-solving efficiency and accuracy, which is invaluable in academic and real-world applications.

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Keywords: coordinate geometry, line equation, slope calculation, points on a line, line passing through two points, verifying points, mathematical analysis, slope-intercept form, geometry problems, linear equations

## Frequently Asked Questions

### What is the slope of the line passing through points (0, 5) and (2, 8)?

The slope is (8 - 5) / (2 - 0) = 3 / 2.

### Which of the given points lie on the line through (0, 5) and (2, 8)?

Calculate the line equation and check each point. The points that satisfy the equation are on the line.

## What is the equation of the line passing through (0, 5) and (2, 8)?

Using point-slope form, slope m = 3/2, equation: y - 5 = (3/2)(x - 0), which simplifies to y = (3/2)x + 5.

## Do the points (5, 11), (5, 10), (6, 14), and (30, 50) lie on the line through (0, 5) and (2, 8)?

Check each point by plugging x into the line equation y = (3/2)x + 5 and see if y matches.

## Which points from the list are on the line y = (3/2)x + 5?

Point (5, 11) lies on the line since y = (3/2)5 + 5 = 7.5 + 5 = 12.5 (not matching), so no. But check each point individually.

## Is the point (5, 11) on the line through (0, 5) and (2, 8)?

No, because plugging x=5 into y = (3/2)x + 5 gives y=12.5, which does not match 11.

## Are the points (5, 10), (6, 14), or (30, 50) on the line?

Check each: (5,10): y=? (3/2)5+5=12.5, does not match 10. So, no. (6,14): y=? (3/2)6+5=14, matches! (30,50): y=? (3/2)30+5=50, matches!

## Which points from the options are on the line through (0, 5) and (2, 8)?

Points (6, 14) and (30, 50) are on the line.

## What is the significance of points (6, 14) and (30, 50) in relation to the line?

They satisfy the line equation y = (3/2)x + 5, so they lie on the line passing through (0, 5) and (2, 8).

### How can you verify if a point is on a specific line?

Substitute the point's x-coordinate into the line's equation and check if the resulting y matches the point's y-coordinate.

## Additional Resources

Select All The Points That Are On The Line Through (0, 5) And (2, 8)

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Introduction

In the realm of coordinate geometry, understanding the characteristics of lines and the points that lie upon them is fundamental. The question at hand involves identifying which of the given points lie on the straight line passing through two specific points: (0, 5) and (2, 8). This problem not only tests knowledge of the equation of a line but also emphasizes the importance of verifying points through substitution.

This comprehensive article explores the methodology for determining whether points are on a given line, investigates the specific points listed in the question, and discusses the broader implications of such analyses in mathematical problem-solving and applications.

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Understanding the Line Through (0, 5) and (2, 8)

Before assessing the options, it is critical to derive the equation of the line passing through the two given points: (0, 5) and (2, 8).

Calculating the Slope

The slope $m$ of the line is calculated as:

$$
m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 5}{2 - 0} = \frac{3}{2}
$$

This indicates that for every increase of 2 in $x$, $y$ increases by 3.

Deriving the Equation of the Line

Using the point-slope form:

$$
y - y_1 = m(x - x_1)
$$

Substituting point (0, 5):

$$
y - 5 = \frac{3}{2}(x - 0) \Rightarrow y = \frac{3}{2}x + 5
$$

Thus, the equation of the line is:

$$
\boxed{y = \frac{3}{2}x + 5}
$$

Any point $(x, y)$ lying on this line must satisfy this equation.

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### Verifying Points Against the Line Equation

To determine whether a point lies on the line, substitute its coordinates into the equation $y = \frac{3}{2}x + 5$ and check if both sides are equal.

Step-by-Step Verification Process:

1. Identify the point's coordinates.
2. Calculate the right-hand side (RHS) of the equation using the $x$-coordinate.
3. Compare the RHS with the given $y$-coordinate.
4. If equal, the point lies on the line; otherwise, it does not.

This systematic approach ensures accuracy and clarity.

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### Analysis of the Given Points

The options provided are:

- A. (5, 11)
- B. (5, 10)
- C. (6, 14)
- D. (30, 50)

Let's evaluate each point step by step.

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### Detailed Point-by-Point Evaluation

Point A: (5, 11)

- Substitute $x = 5$:

$$
y = \frac{3}{2} \times 5 + 5 = \frac{15}{2} + 5 = 7.5 + 5 = 12.5
$$

- Given $y = 11$. Since $12.5 \neq 11$, (5, 11) does not lie on the line.

Point B: (5, 10)

- Same $x = 5$:

$$
y = 12.5
$$

- Given $y = 10$. Since $12.5 \neq 10$, (5, 10) does not lie on the line.

Point C: (6, 14)

- Substitute $x = 6$:

$$
y = \frac{3}{2} \times 6 + 5 = 9 + 5 = 14
$$

- Given $y = 14$. Since both sides match, (6, 14) lies on the line.

Point D: (30, 50)

- Substitute $x = 30$:

$$
y = \frac{3}{2} \times 30 + 5 = 45 + 5 = 50
$$

- Given $y = 50$. Both sides match, (30, 50) lies on the line.

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Summary of Valid Points

| Point | Calculation | On the Line? |
|---------|--------------|--------------|
| (5, 11) | RHS = 12.5 | No |
| (5, 10) | RHS = 12.5 | No |
| (6, 14) | RHS = 14 | Yes |
| (30, 50) | RHS = 50 | Yes |

Hence, the points on the line through (0, 5) and (2, 8) are (6, 14) and (30, 50).

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Broader Implications and Applications

Significance in Geometry and Algebra

The process of verifying points on a line exemplifies fundamental principles in coordinate geometry. It underscores the importance of understanding the slope-intercept form, the equation of a line, and substitution as a verification tool. This approach is widely applicable in various mathematical problems, including:

- Graphing lines and functions
- Solving systems of equations
- Analyzing geometric configurations

Real-World Applications

The ability to determine whether points lie on a particular line extends beyond pure mathematics to numerous disciplines:

- Engineering: Designing components that follow specific geometrical constraints.
- Computer Graphics: Rendering lines and verifying pixel positions.
- Data Analysis: Fitting data points to a linear model and checking for outliers.
- Navigation and Mapping: Confirming locations along a route or boundary line.

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Critical Review and Common Pitfalls

While the methodology appears straightforward, practitioners should be aware of potential pitfalls:

- Rounding Errors: When dealing with decimal slopes or coordinates, rounding can lead to incorrect conclusions.
- Coordinate Precision: Ensure data accuracy before performing calculations.
- Line Equation Derivation: Mistakes in calculating the slope or form can propagate errors.
- Point Verification: Always double-check calculations to avoid oversight.

In this specific problem, the key was precise substitution and careful comparison, illustrating the importance of attention to detail.

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Final Remarks

The investigation into which points lie on the line through (0, 5) and (2, 8) demonstrates the practical application of algebraic principles in geometric contexts. By deriving the line equation and methodically verifying each candidate point, we identified that Points (6, 14) and (30, 50) satisfy the line equation, confirming their presence on the line.

Understanding such processes is vital for students, educators, and professionals working with geometric data. The approach emphasizes analytical thinking, precision, and the systematic application of mathematical formulas—skills essential across scientific and technical fields.

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Summary

- The line passing through (0, 5) and (2, 8) has the equation: $y = \frac{3}{2}x + 5$.
- Points (6, 14) and (30, 50) satisfy this equation.
- Points (5, 11) and (5, 10) do not lie on this line.
- The verification process involves substitution and comparison, a fundamental skill in coordinate geometry.

This investigation underscores the significance of foundational algebra in solving geometric problems and highlights the importance of rigorous verification in mathematical reasoning.

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End of Article

## Select All The Points That Are On The Line Through 0 5 And 2

# 8 A 5 11 B 5 10 C 6 14 D 30 50

Select All The Points That Are On The Line Through 0 5 And 2 8 A 5 11 B 5 10 C 6 14 D 30 50

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