

## **Parallel And Perpendicular Lines Worksheet**

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## Part 1: Foundational Knowledge

| What is the defining characteristic of parallel lines?   |
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| Hint: Think about how parallel lines behave in relation to each other.   |
| <ul> <li>a) They intersect at a right angle</li> <li>b) They have different slopes</li> <li>c) They do not intersect</li> <li>d) They form a triangle</li> </ul>             |
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| Which of the following are true about perpendicular lines?   |
| Hint: Consider the angles formed when two lines intersect.   |
| <ul> <li>a) They intersect at a 90-degree angle</li> <li>b) Their slopes are equal</li> <li>c) The product of their slopes is -1</li> <li>d) They never intersect</li> </ul> |
| Which of the following are true about perpendicular lines?   |
| Hint: Consider the properties of slopes for perpendicular lines.   |
| a) They intersect at a 90-degree angle   |



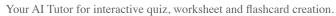
| <ul> <li>b) Their slopes are equal</li> <li>c) The product of their slopes is -1</li> <li>d) They never intersect</li> </ul> |
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| Explain the difference between parallel and perpendicular lines in terms of their slopes.                                    |
| Hint: Focus on how the slopes relate to each other for both types of lines.  |
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| Provide the slope-intercept form and standard form of a line equation.   |
| Hint: Recall the general forms of line equations.  |
| 1. Slope-intercept form:   |
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| 2. Standard form:  |
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| Part 2: Understanding Concepts   |



| If two lines have slopes of 3 and -1/3, what is their relationship?                      |
|--|
| Hint: Consider the product of the slopes.  |
| ○ a) Parallel  |
| ○ b) Perpendicular   |
| ○ c) Neither   |
| Od) Cannot be determined   |
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| Hint: Consider the product of the slopes.  |
| ○ a) Parallel  |
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| ○ c) Neither   |
| Od) Cannot be determined   |
|  |
| Which of the following equations represent parallel lines?                               |
| Hint: Look for lines with the same slope.  |
| $\Box$ a) y = 2x + 3   |
| $\Box$ b) y = 2x - 4   |
| $\Box$ c) y = -1/2x + 5  |
| $\Box$ d) y = 2x + 1   |
|  |
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| Describe how you would graphically determine if two lines are parallel or perpendicular. |

Hint: Think about the angles and slopes of the lines.





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| Part 3: Applying Knowledge                             |  |
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| Given the line equation $y = -2x + 5$ , which of the   | following lines is parallel to it?         |
| Hint: Look for a line with the same slope.             |  |
| ○ a) y = 2x + 1  |  |
| ○ b) y = -2x - 3                                       |  |
| $\bigcirc$ c) y = 1/2x + 4                             |  |
| $\bigcirc d) y = 3x - 5$                               |  |
| <i>(</i> , <i>,</i> , , , , , , , , , , , , , , , , ,  |  |
|  | falls to Proceedings 100                   |
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| $\bigcirc$ a) y = 2x + 1                               |  |
| ○ b) y = -2x - 3                                       |  |
| $\bigcirc$ c) y = 1/2x + 4                             |  |
| ○ d) y = 3x - 5  |  |
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Identify the equations of lines that are perpendicular to y = 1/3x + 2.



| Hint: Look for lines with slopes that are negative reciprocals.  |
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| $\Box$ a) y = -3x + 4  |
| □ b) y = 3x - 1  |
| $\Box$ c) y = -1/3x + 5  |
| $\Box$ d) y = 1/3x - 2   |
|  |
| Identify the equations of lines that are perpendicular to $y = 1/3x + 2$ .                                     |
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| $\Box$ a) y = -3x + 4  |
| □ b) y = 3x - 1  |
| $\Box$ c) y = -1/3x + 5  |
| $\Box$ d) y = 1/3x - 2   |
|  |
| Write the equation of a line that passes through the point $(2, 3)$ and is parallel to the line $y = 4x + 1$ . |
| Hint: Use the slope from the given line to find the new line's equation.                                       |
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| Part 4: Analyzing Relationships  |



| Analyze and explain why the lines $y = 2x + 5$ and $y = -1/2x + 3$ are perpendicular.                |    |
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| Hint: Consider the slopes of both lines.   |    |
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| Analyze and explain why the lines $y = 2x + 5$ and $y = -1/2x + 3$ are perpendicular.                |    |
| Hint: Focus on the slopes of the lines.  |    |
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| Part 5: Synthesis and Reflection   |    |
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| Which statement best evaluates the relationship between the lines $y = 4x + 7$ and $y = -1/4x + 2$ ? |    |
| Hint: Consider the slopes of both lines.   |    |
| a) They are parallel   |    |
| Ob) They are perpendicular   |    |
| O c) They are coincident   |    |
| Od) They are neither parallel nor perpendicular  |    |
| Which statement best evaluates the relationship between the lines $y = 4x + 7$ and $y = -1/4x + 2$ ? |    |
| Hint: Consider the slopes of both lines.   |    |
| ○ a) They are parallel   |    |
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| ○ c) They are coincident  |
|---|
| Od) They are neither parallel nor perpendicular   |
|   |
| Evaluate the following statements and select those that are true:   |
| Hint: Consider the definitions of parallel and perpendicular lines.   |
| a) Two lines with slopes 0 and undefined are perpendicular  |
| ☐ b) Two vertical lines are parallel  |
| c) Two horizontal lines are perpendicular   |
| $\square$ d) A line with slope 1 is perpendicular to a line with slope -1   |
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| ☐ d) A line with slope 1 is perpendicular to a line with slope -1   |
|   |
| Create a real-world scenario where determining whether two lines are parallel or perpendicular is crucial. Explain how you would solve it using the concepts learned. |
| Hint: Think about applications in architecture or engineering.  |
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| Design a pair of line   | es that are perpend | dicular and prov | vide their equati | ions. Explain y | our reasoning. |
|   |                     | dicular and prov | vide their equati | ions. Explain y | our reasoning. |
| Design a pair of line  Hint: Consider the slop  1. Line 1 equation: |                     | dicular and prov | vide their equati | ions. Explain y | our reasoning. |
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