

Algebra 1
Perpendicular Lines

Equations of Parallel and Perpendicular Lines | A1-U05-P14

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
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Topic focus
Across 96 tasks this topic asks for an exact equation, coordinate, parameter set, or justified verdict.
8 PDFs and a README; 71 buyer pages.

Algebra 1

Perpendicular Lines

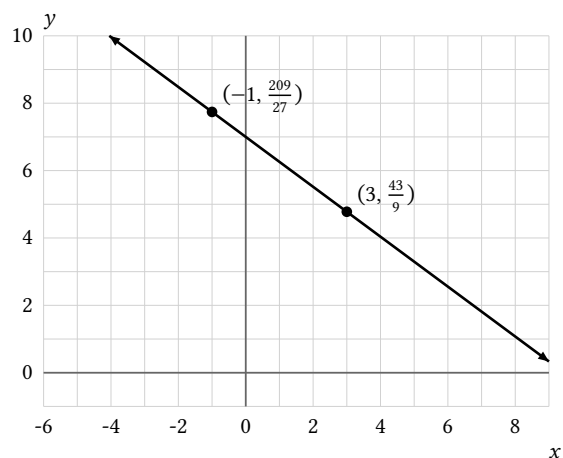
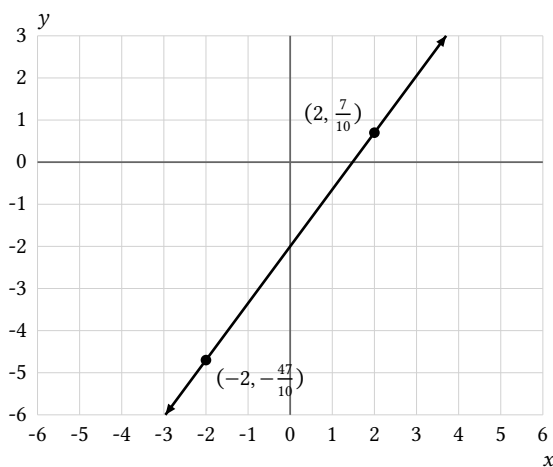
Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Construct the exact line through $(-1, 5)$ perpendicular to the reference $y - 7 = -3(x + 2)$. Show how the direction exception or negative reciprocal is used.

Bank label: _____

Determine whether line A through $(-2, -\frac{47}{10})$ and $(2, \frac{7}{10})$ and line B through $(-1, \frac{209}{27})$ and $(3, \frac{43}{9})$ are perpendicular. Recover both exact directions and account for axis-parallel exceptions.



Bank label: _____

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Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Complete the second point $(u, 10)$ so its line with $(0, -3)$ is perpendicular to the reference direction. Determine u. The reference is parallel to $y = -\frac{5}{6}x$. Reject a repeated-point result. 	Reference: $y = \frac{9}{7}x - 1$. Candidate: $y = (\frac{4}{7}t + \frac{1}{7})x + 7$. Find t so the lines are perpendicular.
A line perpendicular to the reference direction must pass through $(-\frac{7}{3}, 5)$ and $(\frac{13}{6}, u)$. Recover u. The reference is parallel to vertical line $x = \frac{11}{4}$. Reject a repeated-point result. 	Construct the exact line through $(-6, \frac{5}{2})$ perpendicular to the reference $2y = 5$. Show how the direction exception or negative reciprocal is used.
Construct the exact line through $(1, 4)$ perpendicular to the reference $x = -5$. Show how the direction exception or negative reciprocal is used. 	Complete the second point $(u, 6)$ so its line with $(7, -4)$ is perpendicular to the reference direction. Determine u. The reference is parallel to $y = 0x$. Reject a repeated-point result.

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Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $u = -7$; the completed second point is $(5, -7)$. Construct the exact line through $(8, -8)$ perpendicular to the reference $y - \frac{33}{4} = -\frac{13}{8}(x + 2)$. Show how the direction exception or negative reciprocal is used. Your response: _____	Incoming: The perpendicular line through $(8, -8)$ is $y = \frac{8}{13}x - \frac{168}{13}$. The displacement $\langle 4, -1 \rangle$ descends as it moves right. Make a clockwise quarter-turn and explain why the resulting direction is perpendicular. Your response: _____
Incoming: $u = 1$; the completed second point is $(1, 7)$. A line perpendicular to the reference direction must pass through $(0, 3)$ and $(5, u)$. Recover u. The reference is parallel to $y = \frac{1}{2}x$. Reject a repeated-point result. Your response: _____	Incoming: $u = \frac{6733}{2205}$; the completed second point is $(-\frac{17}{7}, \frac{6733}{2205})$. Reference: $y = \frac{1}{2}x - 2$. Candidate: $y = (\frac{3}{2}t - \frac{1}{2})x + 6$. Find t so the lines are perpendicular. Your response: _____

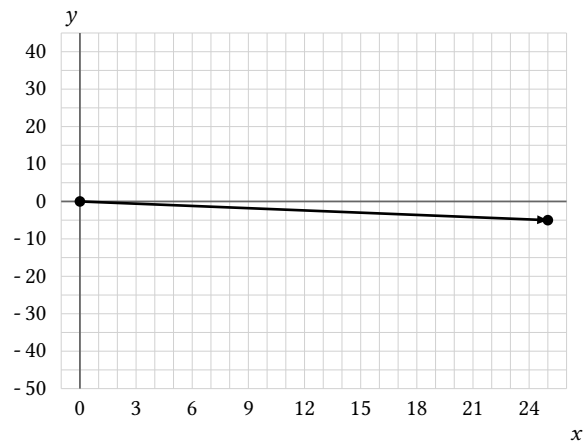
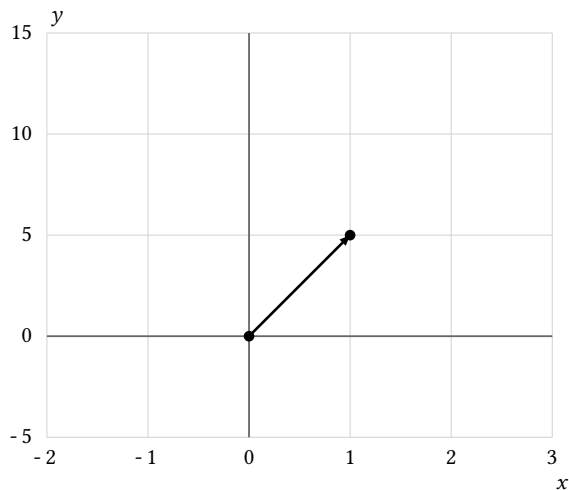
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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Evidence: A graph uses x -scale 1 per tick and y -scale 5 per tick. A moves 1 tick right and 1 up; B moves 25 ticks right and 1 down. Judge the perpendicularity claim from coordinate evidence, and explain any effect of plotting scale.



Perpendicular Lines

Full Worked Solutions - excerpt

Worked example

Problem. Construct the exact line through $(-1, 5)$ perpendicular to the reference $y - 7 = -3(x + 2)$. Show how the direction exception or negative reciprocal is used.

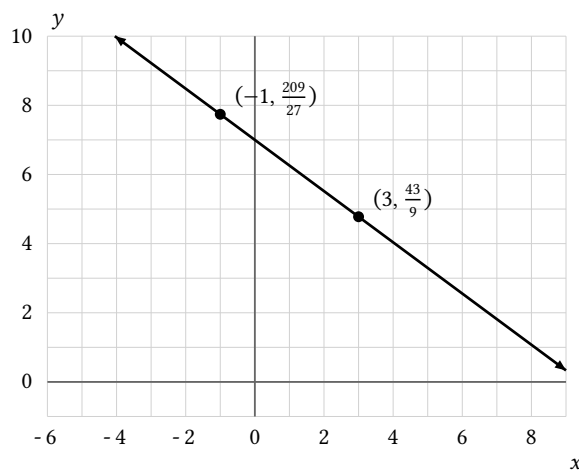
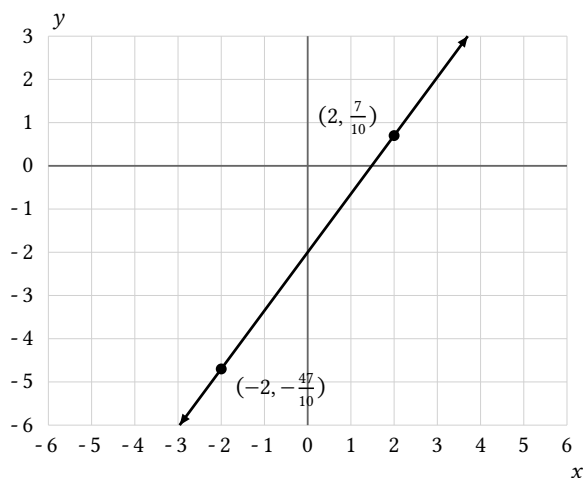
Answer. The perpendicular line through $(-1, 5)$ is $y = \frac{1}{3}x + \frac{16}{3}$.

Explanation and check.

Use the coefficient in point-slope form as the reference direction and take its negative reciprocal. The perpendicular slope is $\frac{1}{3}$; imposing the point gives intercept $\frac{16}{3}$.

Worked example

Problem. Determine whether line A through $(-2, -\frac{47}{10})$ and $(2, \frac{7}{10})$ and line B through $(-1, \frac{209}{27})$ and $(3, \frac{43}{9})$ are perpendicular. Recover both exact directions and account for axis-parallel exceptions.



Answer. For $y = \frac{27}{20}x - 2$ and $y = -\frac{20}{27}x + 7$, the verdict is perpendicular. The exact slope product is -1 , equal to -1 .

Explanation and check.

The exact slope product is -1 , equal to -1 .