

# Find the equations of perpendicular lines H

1 Write the negative reciprocals of the numbers.

- |                  |                      |                   |                      |         |                      |
|------------------|----------------------|-------------------|----------------------|---------|----------------------|
| a) 3             | <input type="text"/> | d) $-\frac{1}{4}$ | <input type="text"/> | g) 0.75 | <input type="text"/> |
| b) -7            | <input type="text"/> | e) $\frac{2}{3}$  | <input type="text"/> | h) -0.6 | <input type="text"/> |
| c) $\frac{1}{2}$ | <input type="text"/> | f) $-\frac{3}{8}$ | <input type="text"/> | i) 2.8  | <input type="text"/> |

2 The lines  $y = mx + c$  and  $y = px + q$  are perpendicular. Is each statement true or false? Tick your answers.

- |                                          | true                     | false                    |
|------------------------------------------|--------------------------|--------------------------|
| $m$ is equal to $p$                      | <input type="checkbox"/> | <input type="checkbox"/> |
| $m \times p = -1$                        | <input type="checkbox"/> | <input type="checkbox"/> |
| $m \times p = 1$                         | <input type="checkbox"/> | <input type="checkbox"/> |
| $m$ is the negative reciprocal of $p$    | <input type="checkbox"/> | <input type="checkbox"/> |
| $m$ is the reciprocal of $p$             | <input type="checkbox"/> | <input type="checkbox"/> |
| $p$ is the negative reciprocal of $m$    | <input type="checkbox"/> | <input type="checkbox"/> |
| $p$ is the reciprocal of $m$             | <input type="checkbox"/> | <input type="checkbox"/> |
| If $m$ is positive, then $p$ is negative | <input type="checkbox"/> | <input type="checkbox"/> |

Compare answers with a partner.

3 Are the lines  $y = 4x + 5$  and  $y = 6 - \frac{1}{4}x$  perpendicular? Show workings to justify your answer.

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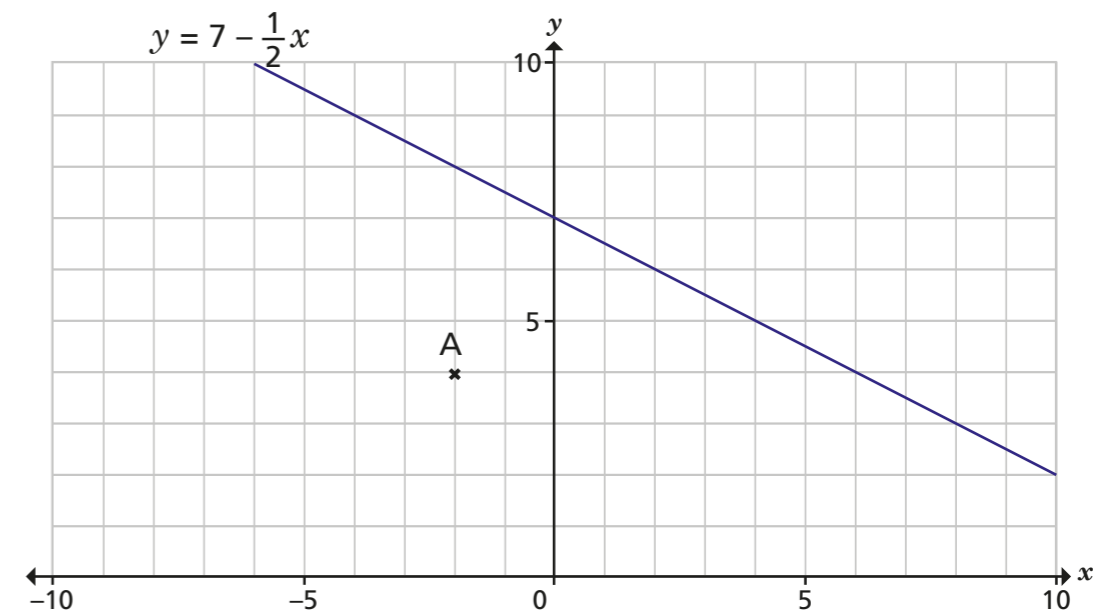
4  $L_1$  is given by the equation  $y = 3x + 5$   
 $L_2$  is perpendicular to  $L_1$  and passes through the origin.  
 Work out the equation of  $L_2$

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5  $L_1$  is given by the equation  $y = -4x + 7$   
 $L_2$  is perpendicular to  $L_1$  and passes through the point  $(0, 42)$ .  
 Work out the equation of  $L_2$

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6 The graph shows the line  $y = 7 - \frac{1}{2}x$ .



Work out the equation of the line perpendicular to  $y = 7 - \frac{1}{2}x$  that passes through point A.

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7 Work out the equation of the line that is perpendicular to  $y = 10 - 7x$  and passes through the point  $(14, 12)$ .

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**8** Line  $L_1$  is given by the equation  $y = 9 - \frac{1}{4}x$ .  
 Point A is at  $(-4, 6)$ .  
 a)  $L_2$  is parallel to  $L_1$  and passes through point A.  
 Work out the equation of  $L_2$

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b)  $L_3$  is perpendicular to  $L_1$  and passes through point A.  
 Work out the equation of  $L_3$

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**9** P, Q and R are straight lines.  
 The equation of P is  $y = \frac{5}{8}x + 4$   
 a) Q is perpendicular to P and passes through the point  $(-20, 3)$ .  
 What is the equation of Q?

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b) R is parallel to Q and passes through the point  $(-45, -17)$ .  
 What is the equation of R?

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**10** Work out the equation of the line that is perpendicular to  $3y = 21 - 5x$  and passes through the point  $(10, -31)$ .

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**11** Points A, B and C have coordinates A  $(14, -7)$ , B  $(-21, 18)$  and C  $(35, 51)$ .  
 a) Work out the equation of the straight line that passes through points A and B.

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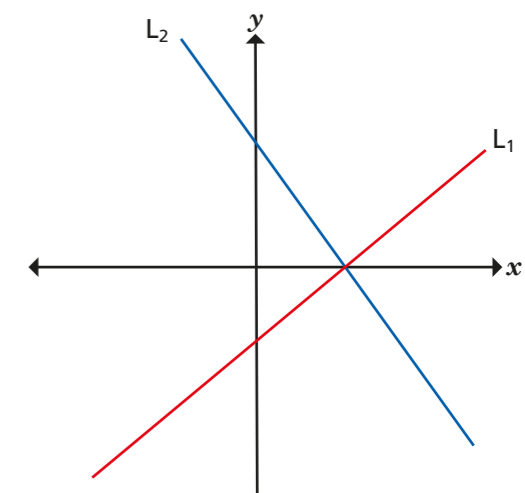
b) Work out the equation of the line perpendicular to AB that passes through point C.

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**12** Points P and Q have coordinates P  $(19, 7)$  and Q  $(-5, 31)$ .  
 Work out the equation of the line perpendicular to PQ that passes through the point  $(\frac{3}{5}, 4\frac{1}{5})$ .

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**13** The diagram shows two perpendicular lines,  $L_1$  and  $L_2$ .  
 The equation of  $L_1$  is  $4y = 5x - 40$   
 Work out the equation of  $L_2$



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