Parallel and perpendicular

1 Here are the equations of five straight lines.

   P: $y = 2x + 7$ **Q:** $y = -2x + 7$ **R:** $y = x + 7$ **S:** $y = -\frac{1}{2}x + 8$ **T:** $y = \frac{1}{2}x + 4$

   (a) Write down the letter of the line that is parallel to $y = x + 4$

   > When two lines are parallel their gradients are the same.

   .... (1 mark)

   (b) Write down the letter of the line that is perpendicular to $y = 2x - 3$

   > When the gradient of a line is m, the gradient of a perpendicular line is $-\frac{1}{m}$.

   .... (1 mark)

2 (a) A straight line **L** is parallel to $y = 3x - 4$ and passes through the point $(4, 5)$. Find the equation of line **L**.

   Guided

   $m = $ ....

   ...... $= $ ......(......) $ + c$

   > Compare the straight line with $y = mx + c$ to find the value of m.

   Rearranging for c

   $c = $ ....

   Hence, $y = $ ......x ....   (3 marks)

   (b) Put a tick (✔) beside the equation which is the equation of a straight line that is perpendicular to the line with equation $y = 3x - 4$.

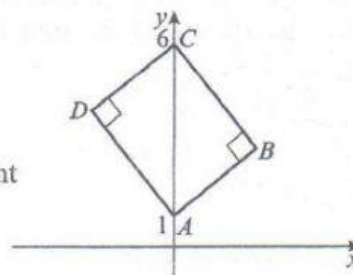 | $y = 3x - 4$ | $y = 4 - 3x$ | $y = \frac{1}{3}x - 4$ | $y = 4 - \frac{1}{3}x$ | $y = 3x + 4$ |
   |---|---|---|---|---|

   (1 mark)

3 A straight line **L** passes through the point with coordinates $(3, 7)$ and is perpendicular to the line with equation $y = 3x + 5$. Find the equation of the line **L**.

   .... (3 marks)

4 *ABCD* is a rectangle. *A* is the point $(0, 1)$ and *C* is the point $(0, 6)$. The equation of the straight line through *A* and *B* is $y = 2x + 1$

   (a) Find the equation of the straight line through *D* and *C*.

   .... (2 marks)

   (b) Find the equation of the straight line through *B* and *C*.

   .... (2 marks)

5 The point *P* has coordinates $(2, 1)$ and the point *Q* has coordinates $(-2, -1)$. Find the equation of the perpendicular bisector of *PQ*.

   .... (4 marks)