Coordinate geometry and the straight line

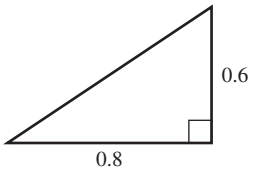
1 **a** Draw axes using $-10 \leqslant x \leqslant 10$ and $-10 \leqslant y \leqslant 10$.

b Plot and label points A to G with coordinates $A\ (-5, 2)$, $B\ (-8, -8)$, $C\ (-1, 10)$, $D\ (-10, 10)$, $E\ (0, 9)$, $F\ (5, -2)$, $G\ (10, -8)$.

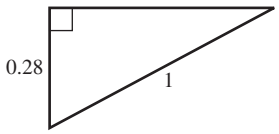
c Find the coordinates of the mid-points of the line segments:
i AC **ii** BD **iii** EG **iv** CF **v** AG

2 Use Pythagoras' rule to find the unknown lengths in these triangles.

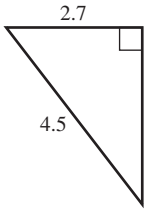
a



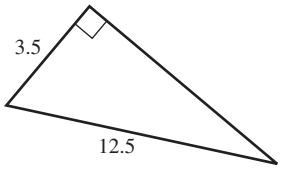
b



c



d



3 **a** Use Pythagoras' rule to find the length of the line segment joining the points with coordinates (1, 1) and (4, 5).

b Repeat **a** for the following pairs of points.
i $(-5, 1)$ and $(7, 6)$ **ii** $(-3, -1)$ and $(1, -4)$
iii $(6, 1)$ and $(-2, -5)$ **iv** $(-3, -12)$ and $(4, 12)$

c The line AB has length 10.
A has coordinates $(0, 6)$.
B is a point on the x-axis.
There are two possible positions for the point B.
Find their coordinates.

4 **a** Find the gradient of the line joining the point $(0, 0)$ to:
i $(1, 2)$ **ii** $(2, 1)$ **iii** $(2, 6)$ **iv** $(6, 2)$
v $(1, -2)$ **vi** $(-2, 1)$ **vii** $(2, -6)$ **viii** $(-6, 2)$
ix $(2, 3)$ **x** $(-2, 3)$ **xi** $(6, 8)$ **xii** $(6, -8)$

b Find the gradient of the lines joining:
i $(1, 2)$ to $(-3, 6)$ **ii** $(-1, -2)$ to $(3, 6)$
iii $(2, -1)$ to $(4, -9)$ **iv** $(0, -2)$ to $(4, 0)$

c **i** Draw a line with gradient 2 that passes through the point $(0, 3)$.

ii Draw a line with gradient $\frac{1}{2}$ that passes through the point $(3, 3)$.

iii Draw a line with gradient $-\frac{2}{3}$ that passes through $(1, -2)$.

5 **a** **i** Draw a line with gradient 2 that passes through (0, 0).

ii On the same diagram draw a line with gradient $-\frac{1}{2}$ that passes through (0, 0).

iii What do you notice about the two lines you have drawn?

b Repeat **a** for lines with:

i Gradients 4 and $-\frac{1}{4}$ passing though the point (0, 0).

ii Gradients -3 and $\frac{1}{3}$ passing though the point (5, 5).

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