

# Core 1

## Points and straight lines

### Multiple Choice Test

1. Which of the following points does **not** lie on the line  $2y + 5x - 4 = 0$ ?

- (a)  $(-0.8, 0)$  (b)  $(-1, 0.5)$   
(c)  $(0, 2)$  (d)  $(2, 3)$   
(e) I don't know

2. Here are four straight line equations.

1  $3y = 4x + 5$       2  $4y = 3x - 1$       3  $4y + 3x = 7$       4  $4x + 3y = 2$

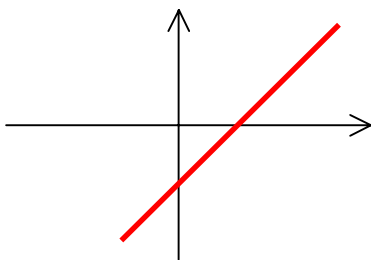
Which one of the following statements is true?

- (a) Lines 1 and 2 are perpendicular (b) Lines 1 and 4 are parallel  
(c) Lines 2 and 4 are perpendicular (d) Lines 2 and 3 are parallel  
I don't know

3. A straight line has equation  $10y = 3x + 15$ . Which of the following is true?

- (a) The gradient is 0.3 and the y-intercept is 1.5 (b) The gradient is 3 and the y-intercept is 15  
(c) The gradient is 15 and the y-intercept is 3 (d) The gradient is 1.5 and the y-intercept is 0.3  
(e) I don't know

4.



The diagram shows a sketch of one of the following lines. Which one?

- (a)  $y - x + 1 = 0$  (b)  $y + x = 1$   
(c)  $y = x + 1$  (d)  $y + x + 1 = 0$   
(e) I don't know

# Core 1

5. P is the point (2,7). Q is the point (6,-3).

What is the gradient of PQ?

- (a) 0.4  
(b) -0.4  
(c) 2.5  
(d) -2.5  
(e) I don't know

6. P is the point (4,-2). Q is the point (-3,-5). What is the length PQ?

- (a)  $\sqrt{50}$   
(b)  $\sqrt{98}$   
(c)  $\sqrt{40}$   
(d)  $\sqrt{58}$   
(e) I don't know

7. P is the point (3,5). Q is the point (-1,9). R is the midpoint of PQ.

Which one of the following lines does R lie on?

- (a)  $y = x + 6$   
(b)  $y = x + 8$   
(c)  $y = x - 6$   
(d)  $y = x - 8$   
(e) I don't know

8. A straight line has a gradient of  $-2$  and passes through the point (4,1). What is its equation?

- (a)  $y + 2x = 6$   
(b)  $y = 2x - 6$   
(c)  $y + 2x - 9 = 0$   
(d)  $2y = x - 2$   
(e) I don't know

9. The lines  $y = 5x - 3$  and  $y = 2x + 9$  intersect at P. What are the coordinates of P?

- (a) (2,7)  
(b) (2,13)  
(c) (4,17)  
(d) (-4,-23)  
(e) I don't know

10. A is the point (1,5), B is the point (4,7) and C is the point (5,2). Triangle ABC is

- (a) right-angled  
(b) scalene with no right angle  
(c) equilateral  
(d) isosceles  
(e) I don't know

# Core 1

## Coordinate geometry, section 1

### Multiple choice test solutions

① The correct answer is (d).

The line is  $2y + 5x - 4 = 0$ .

Substituting in the point  $(2, 3)$  gives

$2y + 5x - 4 = 2 \times 3 + 5 \times 2 - 4 = 12$ , which does not satisfy the line equation.

② The correct answer is (c).

If 2 lines are perpendicular, the product of their gradients is  $-1$ .

line 2 is  $4y = 3x - 1 \Rightarrow y = \frac{3}{4}x - \frac{1}{4} \Rightarrow \text{gradient} = \frac{3}{4}$

line 4 is  $4x + 3y = 2 \Rightarrow 3y = -4x + 2 \Rightarrow y = -\frac{4}{3}x + \frac{2}{3}$   
 $\Rightarrow \text{gradient} = -\frac{4}{3}$

$\Rightarrow$  Product of gradients of lines 2 and 4

is  $\frac{3}{4} \times -\frac{4}{3} = -\frac{12}{12} = -1 \Rightarrow$  lines perpendicular.

③ The correct answer is (a).

$10y = 3x + 15 \Rightarrow y = \frac{3}{10}x + \frac{3}{2}$

$\Rightarrow$  gradient =  $0.3$

$y$  intercept occurs when  $x = 0 \Rightarrow y = \frac{3}{2} = 1.5$

④ The correct answer is (a).

The line could have gradient 1 and  $y$ -intercept  $-1$ .

$y - x + 1 = 0 \Rightarrow y = x - 1$ , which does have gradient 1 and  $y$  intercept  $-1$ .

## Core 1

⑤ The correct answer is (d).

$$\text{gradient} = \frac{y_1 - y_2}{x_1 - x_2} = \frac{7 - -3}{2 - 6} = \frac{10}{-4} = -2.5$$

⑥ The correct answer is (d).

$$\begin{aligned} \text{length} &= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \\ &= \sqrt{(4 - -3)^2 + (-2 - -5)^2} \\ &= \sqrt{7^2 + 3^2} = \sqrt{58} \end{aligned}$$

⑦ The correct answer is (a).

$$\text{Midpoint} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = (1, 7)$$

and  $(1, 7)$  lies on the line  $y = x + 6$ .

⑧ The correct answer is (c).

$$y = -2x + c, \text{ when } x = 4, y = 1$$

$$\begin{aligned} \Rightarrow 1 &= -2 \times 4 + c \Rightarrow c = 9 \Rightarrow y = -2x + 9 \\ &\Rightarrow y + 2x - 9 = 0 \end{aligned}$$

⑨ The correct answer is (c).

$$5x - 3 = 2x + 9$$

$$\Rightarrow 3x = 12$$

$$\Rightarrow x = 4 \quad \text{then } y = 5x - 3 \Rightarrow y = 17$$

$$\text{check } y = 2x + 9 \Rightarrow y = 17 \checkmark$$

⑩ The correct answer is (b).

$$\begin{aligned} \text{distance } AB &= \sqrt{3^2 + 2^2} = \sqrt{13} \\ \text{distance } BC &= \sqrt{1^2 + 5^2} = \sqrt{26} \\ \text{distance } AC &= \sqrt{4^2 + 3^2} = 5 \end{aligned}$$

lengths are all different and do not satisfy Pythagoras's theorem  $\Rightarrow$  scalene with no right angle.