OCR Core 1

Coordinate geometry

Section 1: Coordinates, points and lines

Multiple Choice Test

Do not use a calculator in this test.

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

(a) (2, 3)
(b) (1, -0.5)
(c) (0, 2)
(d) (0.8, 0)
(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 $4x + 3y = 2$

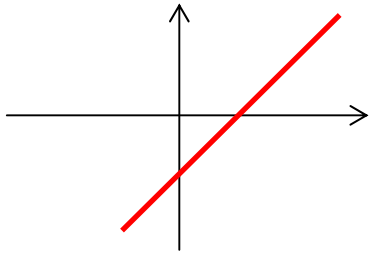
Which one of the following statements is true?

(a) Lines 2 and 4 are perpendicular
(b) Lines 1 and 4 are parallel
(c) Lines 1 and 2 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 3 and the y-intercept is 15
(b) The gradient is 0.3 and the y-intercept is 1.5
(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) $y + x = 1$
(b) $y - x + 1 = 0$
(c) $y = x + 1$
(d) $y + x + 1 = 0$
(e) I don't know

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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.
On which one of the following lines does R lie?

(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) $y + 2x - 9 = 0$
(b) $y = 2x - 6$
(c) $y + 2x = 6$
(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

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Solutions to Multiple Choice Test

1. The correct answer is (a)

$2\times0+5\times0.8-4=0+4-4=0$
$2\times-0.5+5\times1-4=-1+5-4=0$
$2\times2+5\times0-4=4+0-4=0$
$2\times3+5\times2-4=6+10-4\neq0$

2. The correct answer is (a)

Line 1 can be written as $y=\frac{4}{3}x+\frac{5}{3}$
Line 2 can be written as $y=\frac{3}{4}x-\frac{1}{4}$
Line 3 can be written as $y=-\frac{3}{4}x+\frac{7}{4}$
Line 4 can be written as $y=-\frac{4}{3}x+\frac{2}{3}$

None of the lines are parallel, since they all have different gradients.
Lines 1 and 2 are not perpendicular, since $\frac{4}{3}\times\frac{3}{4}\neq-1$.
Lines 2 and 4 are perpendicular, since $\frac{3}{4}\times-\frac{4}{3}=-1$

3. The correct answer is (b)

The equation of the line can be written as $y=0.3x+1.5$
So the gradient is 0.3 and the y-intercept is 1.5.

4. The correct answer is (b)

(a) can be written as $y=x-1$
(b) can be written as $y=-x+1$
(c) can be written as $y=x+1$
(d) can be written as $y=-x-1$
The line in the diagram has a positive gradient and a negative intercept, so (a) is the correct equation.

5. The correct answer is (d)

$$\text{Gradient of PQ} = \frac{y_1 - y_2}{x_1 - x_2} = \frac{7 - (-3)}{2 - 6} = \frac{10}{-4} = -2.5$$

6. The correct answer is (d)

$$\begin{aligned}\text{Length PQ} &= \sqrt{(4-(-3))^2 + (-2-(-5))^2} \\ &= \sqrt{7^2 + 3^3} \\ &= \sqrt{49 + 9} \\ &= \sqrt{58}\end{aligned}$$

7. The correct answer is (c)

$$R = \left(\frac{3 + (-1)}{2}, \frac{5 + 9}{2}\right) = (1, 7)$$

R lies on the line $y = x + 6$.

8. The correct answer is (a)

$$\begin{aligned}y - y_1 &= m(x - x_1) \\ y - 1 &= -2(x - 4) \\ y - 1 &= -2x + 8 \\ y + 2x - 9 &= 0\end{aligned}$$

9. The correct answer is (c)

$$\begin{aligned}5x - 3 &= 2x + 9 \\ 3x &= 12 \\ x &= 4\end{aligned}$$

When $x = 4$, $y = 5 \times 4 - 3 = 17$

The coordinates of P are (4, 17).

10. The correct answer is (b)

Length AB $= \sqrt{(4-1)^2+(7-5)^2} = \sqrt{9+4} = \sqrt{13}$

Length BC $= \sqrt{(4-5)^2+(7-2)^2} = \sqrt{1+25} = \sqrt{26}$

Length AC $= \sqrt{(5-1)^2+(2-5)^2} = \sqrt{16+9} = \sqrt{25}$

The sides are all different lengths.

Gradient AB $= \frac{7-5}{4-1} = \frac{2}{3}$

Gradient BC $= \frac{7-2}{4-5} = \frac{5}{-1} = -5$

Gradient AC $= \frac{2-5}{5-1} = \frac{-3}{4} = -\frac{3}{4}$

None of the lines are perpendicular, so there is no right-angle.

The triangle is scalene with no right-angle.