3.1 Coordinate Geometry: Straight Lines: 30-minute Pack

AQA 8365 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A straight line passes through the point (3, -1) and has gradient 4.

(a) Find the equation of the line, giving your answer in the form y = mx + c. **(3)**

(b) Write your equation from part (a) in the form ax + by + c = 0, where a, b and c are integers and a > 0. **(2)**

(Total for Question 1 is 5 marks)

2 Line L1 has equation y = 3x + 2. Line L2 is parallel to L1 and passes through the point (2, 5).

(a) Find the equation of L2, giving your answer in the form y = mx + c. **(3)**

(b) Determine, with justification, whether the point (4, 11) lies on L2. **(2)**

(Total for Question 2 is 5 marks)

© Revision Library | revisionlibrary.co.uk

3 A circle has centre O, the origin, and passes through the point P(6, 8).

(a) Find the radius of the circle. **(2)**

.....

(b) Find the gradient of OP. **(1)**

.....

(c) Find the equation of the tangent to the circle at P, giving your answer in the form $y = mx + c$. **(3)**

.....

(Total for Question 3 is 6 marks)

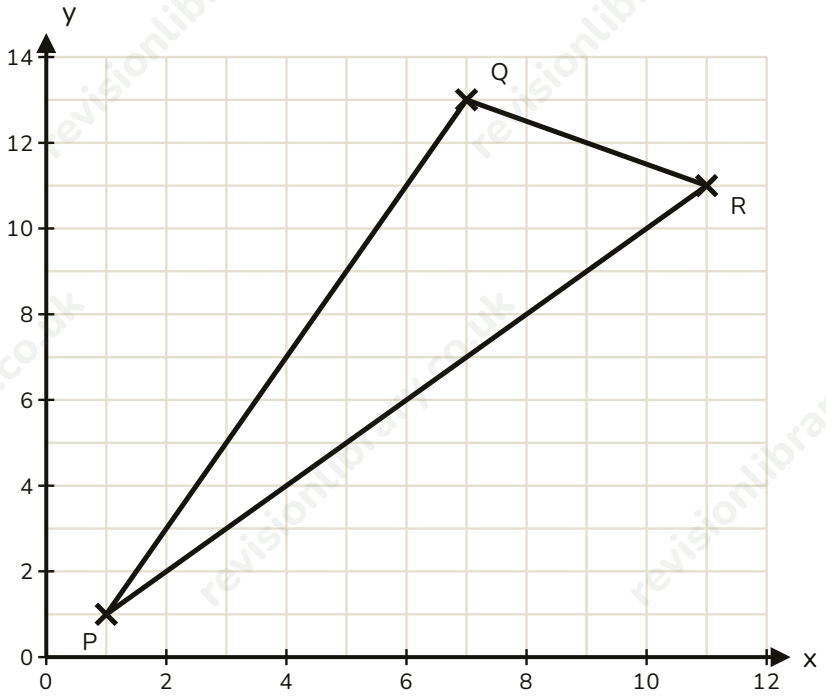
---

4 Determine whether the lines $y = 2x + 3$ and $y = 2x - 7$ are parallel, perpendicular, or neither.

(Total for Question 4 is 2 marks)

© Revision Library | revisionlibrary.co.uk

5 Triangle PQR has vertices P(1, 1), Q(7, 13) and R(11, 11).



(a) Show that PQ is perpendicular to QR. **(3)**

(b) Find the area of triangle PQR. **(3)**

(c) Find the length of PR and hence verify Pythagoras' theorem for triangle PQR. **(3)**

(Total for Question 5 is 9 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 3.1 Coordinate Geometry: Straight Lines: 30-minute Pack

Question 1

(a) $y - (-1) = 4(x - 3)$ oe **M1**

(a) correct expansion, e.g. $y + 1 = 4x - 12$ **M1**

(a) $y = 4x - 13$ cao **A1**

(a) Answer: $y = 4x - 13$

(b) correct rearrangement of terms, ft from part (a) **M1**

(b) $4x - y - 13 = 0$ oe cao **A1**

(b) Answer: $4x - y - 13 = 0$

Question 2

(a) gradient of L2 = 3 (parallel lines have equal gradient) **B1**

(a) $y - 5 = 3(x - 2)$ oe **M1**

(a) $y = 3x - 1$ cao **A1**

(a) Answer: $y = 3x - 1$

(b) substitute $x = 4$ into equation of L2, ft from part (a): $3(4) - 1$ **M1**

(b) = 11, which matches the y-coordinate, so (4, 11) lies on L2 cso **A1**

(b) Answer: Yes, (4, 11) lies on L2

Question 3

(a) $\sqrt{6^2 + 8^2}$ oe **M1**

(a) 10 cao **A1**

(a) Answer: 10

(b) 4/3 oe **B1**

(b) Answer: 4/3

(c) perpendicular gradient = -3/4, ft from part (b) **M1**

(c) $y - 8 = -3/4(x - 6)$ oe **M1**

(c) $y = -0.75x + 12.5$ oe cao **A1**

(c) Answer: $y = -0.75x + 12.5$

Question 4

identifies that both lines have gradient 2 **M1**

parallel (equal gradients, different y-intercepts, so distinct lines) cao **A1**

Answer: Parallel

Question 5

(a) gradient PQ = (13-1)/(7-1) = 2 **M1**

(a) gradient QR = (11-13)/(11-7) = -1/2 **M1**

(a) product of gradients = 2 x (-1/2) = -1, so PQ is perpendicular to QR cso **A1**

(a) Answer: Product of gradients = -1, so PQ is perpendicular to QR

(b) PQ = $\sqrt{6^2 + 12^2} = \sqrt{180} = 6\sqrt{5}$ oe **M1**

(b) QR = $\sqrt{4^2 + 2^2} = \sqrt{20} = 2\sqrt{5}$ oe **M1**

(b) Area = 1/2 x $6\sqrt{5}$ x $2\sqrt{5}$ = 30 (units^2) cao, using the right angle at Q from part (a) **A1**

(b) Answer: 30 square units

(c) PR = $\sqrt{(11-1)^2 + (11-1)^2} = \sqrt{200}$ oe **M1**

(c) $PQ^2 + QR^2 = 180 + 20 = 200$, ft from part (b) **M1**

(c) $PR^2 = 200 = PQ^2 + QR^2$, verifying Pythagoras' theorem cso **A1**

(c) Answer: PR = $10\sqrt{2}$; $PQ^2 + QR^2 = PR^2 = 200$, verifying Pythagoras' theorem

© Revision Library | revisionlibrary.co.uk