FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

G11: Coordinate geometry

Reason and prove with coordinates

20 marks · 25 minutes · Non-calculator

1) Show that the distance from $(1, 2)$ to $(4, 6)$ is 5

[Question 1: 2 marks]

2) Show that $(1, 1)$, $(5, 3)$ and $(3, 7)$ form a right-angled isosceles triangle.

[Question 2: 3 marks]

3) Show that $A(0,0)$, $B(4,0)$, $C(5,3)$ and $D(1,3)$ form a parallelogram.

[Question 3: 2 marks]

4) Show that the line through $(0,1)$ and $(2,5)$ is perpendicular to the line through $(1,0)$ and $(5,-2)$.

[Question 4: 2 marks]

5) Explain how you could use coordinates to show that four points form a square.

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[Question 5: 2 marks]

6) Show that the midpoint of $(-3, 5)$ and $(7, 1)$ lies on the line $y = x + 1$

[Question 6: 2 marks]

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7) Kim says the gradient from $(1, 2)$ to $(3, 8)$ is $\frac{1}{3}$. Explain her mistake.

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[Question 7: 2 marks]

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8) Show that the triangle with vertices $(0, 0)$, $(6, 0)$ and $(3, 5)$ is isosceles.

[Question 8: 2 marks]

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9) Show that $P(3,4)$ lies on $x^2 + y^2 = 25$ and explain why the tangent at P has gradient $-\frac{3}{4}$.

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[Question 9: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Shown	$\sqrt{9+16}$ (M1); C1.
2	Shown	Two sides $\sqrt{20}$ (M1); third side $\sqrt{40}$ (M1); 20 + 20 = 40 (C1).
3	Shown	*AB* and *DC* both $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$ (M1); C1.
4	Shown	Gradients 2 and $-\frac{1}{2}$ (M1); product -1 (C1).
5	Explanation	All sides equal (C1); adjacent sides perpendicular (C1).
6	Shown	(2, 3) (M1); 2 + 1 = 3 (C1).
7	3	She did change in *x* over change in *y* (C1); $\frac{6}{2} = 3$ (B1).
8	Shown	Both slanted sides $\sqrt{34}$ (M1); C1.
9	Explanation	9 + 16 = 25 (B1); radius gradient $\frac{4}{3}$ (M1); tangent perpendicular (C1).