

8. a) Given A(0, -2), B(4, 1), A' (0, 2) and B' (4, 5) four points on the Cartesian plane. What can be said about the lines AB and A'B'? Justify your answer.

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$a = \frac{3}{4}, a' = \frac{3}{4}$ . Since  $a = a'$  then  $AB \parallel A'B'$ .

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- b) Given A(5, 4), B(-5, -2), A'(3, -4) and B' (-3, 6) four points on the Cartesian plane. What can be said about the lines AB and A'B'? Justify your answer.

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$a = \frac{3}{5}, a' = \frac{-5}{3}$ . Since  $a \times a' = -1$  then  $AB \perp A'B'$ .

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9. Given A(2, 4), B(2, 0) and C(6, 8) the vertices of triangle ABC. Verify the following theorem: "The line passing through the mid-points of two sides of a triangle is parallel to the third side of the triangle."

*Given M and N the respective mid-points of  $\overline{AB}$  and  $\overline{AC}$ . We have: M(2, 2), N(4, 6).*

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*Slope of MN = 2; slope of BC = 2. Therefore, MN//BC.*

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10. Given A (1, 2), B(3, 4), C(6, 1) and D(4, -1) the vertices of the quadrilateral ABCD. Show that the quadrilateral ABCD is a rectangle.

*We need to show that the opposite sides are parallel and at least one of the angles is a right angle.*

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*Slope of AB = 1, slope of CD = 1, slope of AD = -1, slope of BC = -1.*

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*We have: AB//CD, AD//BC and  $AB \perp AD$ .*

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11. Given A(0, 3), B(1, 0), C(4, 1) and D(3, 4) the vertices of the quadrilateral ABCD. Show that the quadrilateral ABCD is a square.

*You need to show that the sides are congruent and at least one of the angles is a right angle.*

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$m\overline{AB} = m\overline{BC} = m\overline{CD} = m\overline{AD} = \sqrt{10}$

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*Slope of AB = -3, slope of AD =  $\frac{1}{3}$ .  $\overline{AD} \perp \overline{AB}$ , since the product of the slopes is -1.*

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