Higher

Mathematics

Straight Lines

Examples

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1 The Distance Between Points A

Points on Horizontal or Vertical Lines

1. Calculate the distance between the points $(-7, -3)$ and $(16, -3)$.

2 The Distance Between Points A

The Distance Formula

2. A is the point $(-2, 4)$ and B$(3, 1)$. Calculate the length of the line AB.

2 The Distance Between Points A

The Distance Formula

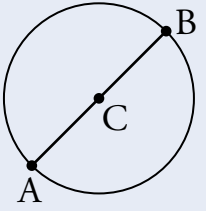
3. Calculate the distance between the points $\left(\frac{1}{2}, -\frac{15}{4}\right)$ and $(-1, -1)$.

2 The Midpoint Formula A

1. Calculate the midpoint of the points $(1, -4)$ and $(7, 8)$.

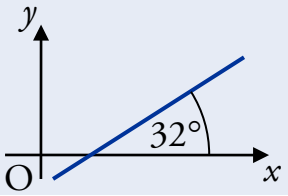
2 The Midpoint Formula A

2. In the diagram below, $A(9, -2)$ lies on the circumference of the circle with centre $C(17, 12)$, and the line AB is the diameter of the circle. Find the coordinates of B.



3 Gradients A

1. Calculate the gradient of the straight line shown in the diagram below.

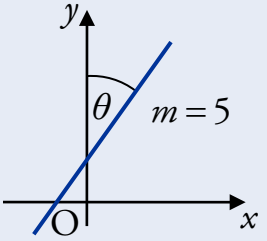


3 Gradients A

2. Find the angle that the line joining $P(-2, -2)$ and $Q(1, 7)$ makes with the positive direction of the x-axis.

3 Gradients A

3. Find the size of angle θ shown in the diagram below.



4 Collinearity A

1. Show that the points $P(-6, -1)$, $Q(0, 2)$ and $R(8, 6)$ are collinear.

4 Collinearity A

2. The points $A(1,-1)$, $B(-1,k)$ and $C(5,7)$ are collinear.

   Find the value of k.

5 Gradients of Perpendicular Lines A

1. Given that T is the point $(1, -2)$ and S is $(-4, 5)$, find the gradient of a line perpendicular to ST.

5 Gradients of Perpendicular Lines A

2. Triangle MOP has vertices $M(-3, 9)$, $O(0, 0)$ and $P(12, 4)$.

   Show that the triangle is right-angled.

6 The Equation of a Straight Line A

Lines Parallel to Axes

1. Find the equation of the line with gradient $\frac{1}{3}$ passing through the point $(3, -4)$.

6 The Equation of a Straight Line A

Lines Parallel to Axes

2. Find the equation of the line passing through $A(3, 2)$ and $B(-2, 1)$.

6 The Equation of a Straight Line A

Lines Parallel to Axes

3. Find the equation of the line passing through $\left(-\frac{3}{5}, 4\right)$ and $\left(-\frac{3}{5}, 5\right)$.

6 The Equation of a Straight Line A

Extracting the Gradient

4. Find the gradient of the line with equation $3x + 2y + 4 = 0$.

7 Medians A

Triangle ABC has vertices $A(4, -9)$, $B(10, 2)$ and $C(4, -4)$.

Find the equation of the median from A.

8 Altitudes A

Triangle ABC has vertices $A(3, -5)$, $B(4, 3)$ and $C(-7, 2)$.

Find the equation of the altitude from A.

9 Perpendicular Bisectors A

A is the point $(-2, 1)$ and B is the point $(4, 7)$.

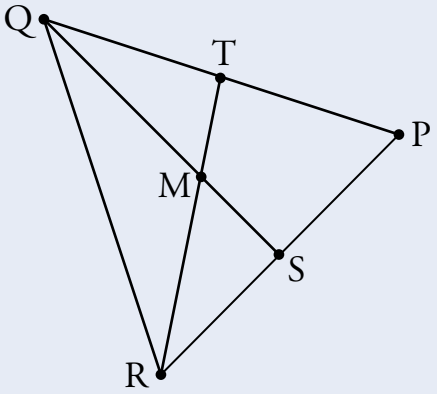
Find the equation of the perpendicular bisector of AB.

10 Intersection of Lines A

1. Find the point of intersection of the lines $2x - y + 11 = 0$ and $x + 2y - 7 = 0$.

10 Intersection of Lines A

2. Triangle PQR has vertices $P(8,3)$, $Q(-1,6)$ and $R(2,-3)$.



(a) Find the equation of altitude QS.

(b) Find the equation of median RT.

(c) Hence find the coordinates of M.