EXCEL IN MATHSCI
HIGHER MATHEMATICS • TOPIC RESOURCE

2026–27
Portfolio 9

Straight Line

PUPIL WORKSHEET

Skills covered: Gradients and equations; parallel and perpendicular lines; angle of inclination; midpoints and distances; medians, altitudes and perpendicular bisectors.

Instructions: Attempt all questions. Show sufficient working to justify your answers. Give exact values unless a degree of accuracy is stated. Each section is separate for targeted revision.

Prerequisite core skills revise earlier learning; *topic practice* develops individual techniques; *exam-style and challenge* combines skills.

Pupil: _____ **Date:** _____

SECTION A | Prerequisite core skills

Question 1

[2 marks]

Find the gradient of the line passing through $A(-2, 5)$ and $B(4, -1)$.

Question 2

[3 marks]

Find the equation of the line with gradient $\frac{3}{2}$ passing through $(2, -1)$. Give your answer in the form $ax + by = c$.

Question 3

[3 marks]

Find the equation of the line through $(-3, 4)$ parallel to $2x + 3y = 12$.

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Question 4 [3 marks]

Find the equation of the line through $(4, 1)$ perpendicular to $y = -4x + 5$.

Question 5 [2 marks]

Find the coordinates of the midpoint of the line segment joining $(-3, 2)$ and $(5, -4)$.

Question 6 [2 marks]

Calculate the distance between $(1, 2)$ and $(7, 10)$.

SECTION B | Topic practice

Question 7 [4 marks]

A line has an angle of inclination of $135°$ and passes through $(2, 5)$. Find its equation in the form $ax + by = c$.

Question 8 [4 marks]

Find the coordinates of the point of intersection of $3x + 2y = 11$ and $x - y = 2$.

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Question 9

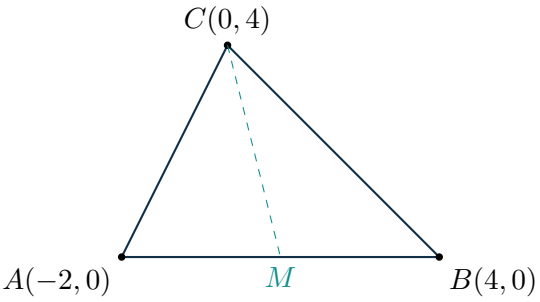
[4 marks]

Find the equation of the line through $P(3, -2)$, perpendicular to $5x - 2y = 8$.

Question 10

[5 marks]

Triangle ABC has vertices $A(-2, 0)$, $B(4, 0)$ and $C(0, 4)$. Find the equation of the median from C to AB.



Question 11

[5 marks]

Find the equation of the perpendicular bisector of the line segment joining $A(-4, 1)$ to $B(2, 7)$.

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Question 12

[3 marks]

Calculate the angle of inclination of the line $2x - 3y = 6$, giving your answer to one decimal place.

Question 13

[4 marks]

Find the perpendicular distance between the parallel lines $y = 2x - 3$ and $y = 2x + 7$.

Question 14

[5 marks]

$A(2, -1)$, $B(-4, 3)$ and $C(6, 5)$ are the vertices of a triangle. Find the equation of the median from A.

SECTION C | Exam-style and challenge

Question 15

[6 marks]

Triangle ABC has vertices $A(1, 1)$, $B(7, 3)$ and $C(3, 9)$. Find the equations of the altitude and median from C.

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Question 16

[3 marks]

A line has equation $3x - 2y = 12$. Find its angle of inclination, to one decimal place.

Question 17

[5 marks]

The lines $y = (k-1)x + 2$ and $2x + (k+3)y = 5$ are perpendicular. Find k.

Question 18

[6 marks]

$ABCD$ is a parallelogram with $A(0,0)$, $B(6,2)$ and $D(-2,6)$. Show that $\angle BAD = 90°$, find C, and determine the equation of diagonal BD.

— End of pupil worksheet —

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