Name	Class

MATHS TEACHER HUB

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Parallel and perpendicular lines

(9 – 1) Topic booklet

Higher

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

Instructions

•Use **black** ink or ball-point pen.
•**Fill in the boxes** at the top of this page with your name, centre number and candidate number.
•Answer **all** questions.
•Answer the questions in the spaces provided
– *there may be more space than you need*.
•Diagrams are NOT accurately drawn, unless otherwise indicated.
•You must **show all your working out.**
•If the question is a **1H** question you are not allowed to use a calculator.
•If the question is a **2H** or a **3H** question, you may use a calculator to help you answer.

Information

•The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question*.

Advice

•Read each question carefully before you start to answer it.
•Keep an eye on the time.
•Try to answer every question.
•Check your answers if you have time at the end.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

6 The equation of the line L_1 is $y = 3x - 2$
The equation of the line L_2 is $3y - 9x + 5 = 0$

Show that these two lines are parallel.

May 2017 – Paper 1H **(Total for Question 6 is 2 marks)**

9 Here are the equations of two straight lines.

$$y = \frac{1}{2}x - 6 \qquad 6y = 3x + 7$$

Oscar says that these lines are parallel.

Is Oscar correct?
You must give a reason for your answer.

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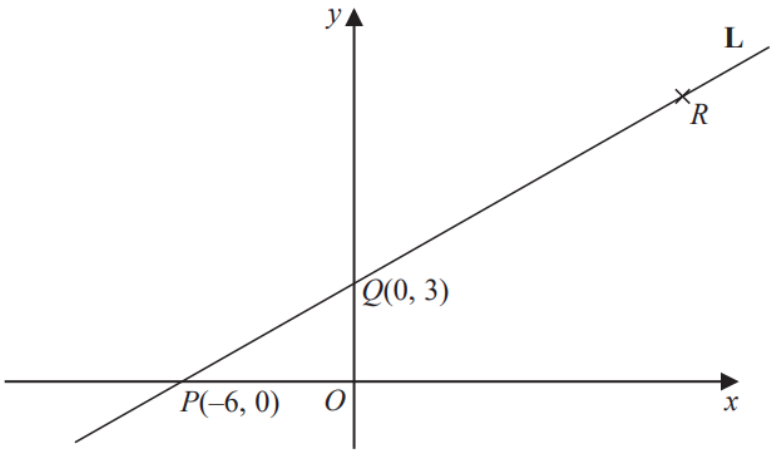
(Total for Question 9 is 2 marks)

11 Here is a sketch of the line **L**.



The points $P(-6, 0)$ and $Q(0, 3)$ are points on the line **L**.

The point R is such that PQR is a straight line and $PQ : QR = 2 : 3$

(a) Find the coordinates of R.

(..... , ...)

(2)

(b) Find an equation of the line that is perpendicular to **L** and passes through Q.

.....

(3)

(Total for Question 11 is 5 marks)

12 The straight line **L** has equation $2y = 3x - 7$

Find an equation of the straight line perpendicular to **L** that passes through $(6, -5)$

.....

November 2023 – Paper 1H

(Total for Question 12 is 3 marks)

12 The equation of the line $\mathbf{L}_1$ is $y = 2x + 3$
The equation of the line $\mathbf{L}_2$ is $5y - 10x + 4 = 0$

Show that these two lines are parallel.

June 2022 – Paper 2H

(Total for Question 12 is 2 marks)

15 The straight line L_1 has equation $y = 3x - 4$
The straight line L_2 is perpendicular to L_1 and passes through the point (9, 5)

Find an equation of line L_2

.....

(Total for Question 15 is 3 marks)

15 The equation of line $\mathbf{L_1}$ is $y = 2x - 5$
The equation of line $\mathbf{L_2}$ is $6y + kx - 12 = 0$

$\mathbf{L_1}$ is perpendicular to $\mathbf{L_2}$

Find the value of k.
You must show all your working.

$k =$ .....

(Total for Question 15 is 3 marks)

16 The straight line **L** has the equation $3y = 4x + 7$
The point A has coordinates $(3, -5)$

Find an equation of the straight line that is perpendicular to **L** and passes through A.

.....

(Total for Question 16 is 3 marks)

19 The point P has coordinates (3, 4)
The point Q has coordinates (a, b)

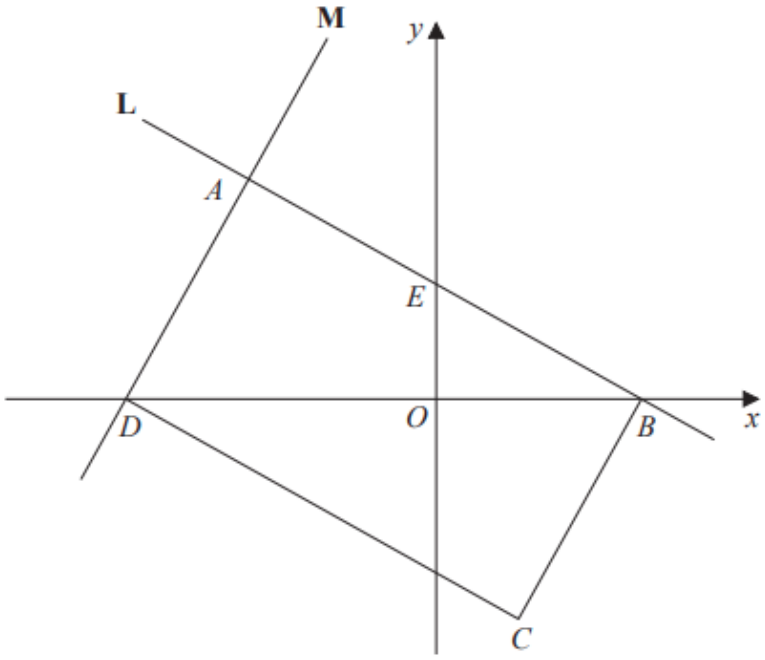
A line perpendicular to PQ is given by the equation $3x + 2y = 7$

Find an expression for b in terms of a.

.....

(Total for Question 19 is 5 marks)

19



ABCD is a rectangle.

A, *E* and *B* are points on the straight line **L** with equation $x + 2y = 12$
A and *D* are points on the straight line **M**.

$AE = EB$

Find an equation for **M**.

.....

(Total for Question 19 is 4 marks)

19 A triangle has vertices P, Q and R.

The coordinates of P are $(-3, -6)$
The coordinates of Q are $(1, 4)$
The coordinates of R are $(5, -2)$

M is the midpoint of PQ.
N is the midpoint of QR.

Prove that MN is parallel to PR.
You must show each stage of your working.

(Total for Question 19 is 4 marks)

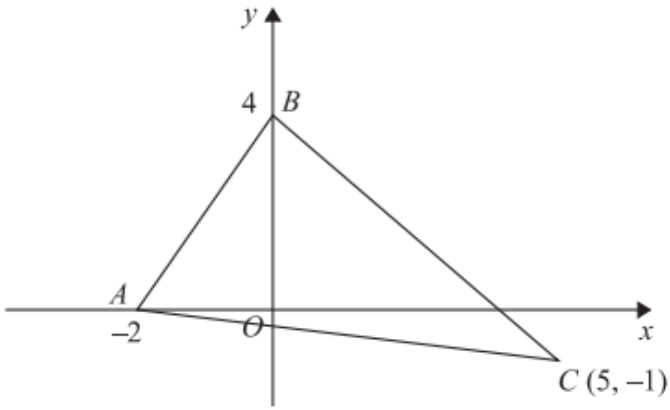
22 Given that the vector $a\begin{pmatrix}2\\6\end{pmatrix} + b\begin{pmatrix}8\\2\end{pmatrix}$ is parallel to the vector $\begin{pmatrix}13\\6\end{pmatrix}$

find an expression for b in terms of a.

.....

(Total for Question 22 is 3 marks)

23



Find an equation of the line that passes through C and is perpendicular to AB.

(Total for Question 23 is 4 marks)

25 The straight line **L** has equation $3x + 2y = 17$

The point A has coordinates $(0, 2)$
The straight line **M** is perpendicular to **L** and passes through A.

Line **L** crosses the y-axis at the point B.
Lines **L** and **M** intersect at the point C.

Work out the area of triangle ABC.
You must show all your working.

(Total for Question 25 is 5 marks)