

(C1-5.1a) Name:

### **Homework Questions 1 – Gradient of a Line using $y=mx+c$**

1. State the gradient and the y-intercept of the following linear equations

a)  $y = 2x - 3$

$$m = 2 \quad c = -3$$

b)  $y = 4 - 6x$

$$m = -6 \quad c = 4$$

c)  $2y = 8x + 4$

$$m = 4 \quad c = 2$$

d)  $4 = 7x + 3y$

$$m = -\frac{7}{3} \quad c = \frac{4}{3}$$

2. These lines intercept the y axis at (0, c) find the value of c.

a)  $3x = 2y - 5$

$$C = 2.5$$

b)  $7y - 2x + 4 = 0$

$$C = -\frac{4}{7}$$

c)  $y = 6 - 2x$

$$C = 6$$

3. A line is parallel to the line  $y=4x-2$  and has an intercept of 4. What is the equation of the line?

$$y = 4x + 4$$

4. A line is parallel to  $2x-4y-6=0$  and passes through the point (0,5). What is the equation of the line?

$$2y = x + 10$$

5. The line  $2x-5y=20$  meets the y-axis at point A and the x-axis at point B. work out the coordinates of points A and B.

$$A(0, -4) \quad B(10, 0)$$

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## **Homework Questions 2 – Finding the Gradient of a Line given Two points**

1. Find the gradient of the line AB which passes through the points A(3,7) and B(2,5)

Ans 2

2. Find the gradient of the line CD which passes through the points C(9,8) and D(3,5)

Ans 0.5

3. Find the gradient of the line EF which passes through the points E(4,2) and F(3,5)

Ans -3

4. Find the gradient of the line GH which passes through the points G(2,7) and H(1,4)

Ans 3

5. The line joining I(a,10) and J(1,6) has a gradient of 4. Work out the value of a.

Ans 2

6. The line joining K(2b,-3) and L(2,7) has a gradient of -1. Find the value of b.

Ans 6

7. The line joining M(a,7) to N(3,4) has a gradient of 1. Form an equation and solve it to work out the value of a.

Ans 6

8. The line joining P(f, -2f) and Q(10,10) has a gradient of 3. Find the value of f

Ans 4

9. Are the points R(1,1) S(5,13) and T(-3,-11) collinear? Prove it

Ans  $m_1 = 3$   $m_2 = 3$

10. Show that the points V(2,3), W(4,8) and X(8,18) are collinear?

Ans  $m_1 = 2.5$   $m_2 = 2.5$

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### **Homework Questions 3 – Finding the Equation of a Line given One point and the Gradient**

2. Find the equation of the line which has a gradient of 5 and passes through the point (3,7).  
Write your answer in the form  $y=mx+c$

Ans  $y = 5x - 8$

2. Find the equation of the line which has a gradient of -2 and passes through the point (4,3).  
Write your answer in the form  $ax+by+c=0$

Ans  $2x - y + 11 = 0$

3. The line  $y=5x-10$  meets the x-axis at the point A. Find the coordinate of point A and hence find the equation of the line with gradient 3 that passes through point A. Write your answer in the form  $y=mx+c$

Ans  $y = 3x - 6$

4. The line  $y=2x-7$  meets the y-axis at the point B. Find the coordinate of point B and hence find the equation of the line with gradient 4 that passes through point B. Write your answer in the form  $ax+by+c=0$

Ans  $4x - y - 7 = 0$

5. The lines  $y=3x-2$  and  $y=2x+1$  intersect at point C. Find the coordinate of point C and hence find the equation of the line with gradient -0.25 that passes through point C. Write your answer in the form  $ax+by+c=0$

Ans  $x + 4y - 31 = 0$

6. The line  $y=4x-8$  meets the x-axis at point D, the line  $y=2x-4$  meets the y axis at point E. Find the gradient of the line DE and find the equation of the line joining DE. Leave your answer in the form  $ax+by+c=0$

Ans  $2x + y - 4 = 0$

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### **Homework Questions 4 – Finding the Equation of a Line given Two points**

3. Find the equation of the line AB which passes through the points A(3,7) B(2,5)

$$\text{Ans } y = 2x + 1$$

2. Find the equation of the line CD which passes through the points C(9,8) D(3,5)

$$\text{Ans } 2y = x + 7$$

3. Find the equation of the line EG, given the points E(2,10) F(3,15) and G(1,6)

$$\text{Ans } y = 4x + 2$$

4. The line that passes through (10, 5) and (4,1) meets the x-axis at point H. Find the coordinates of point H.

$$\text{Ans } (2.5, 0)$$

5. The line that passes through (1,10) and (3,7) meets the y-axis at point J. Find the coordinates of point J.

$$\text{Ans } (0, 11.5)$$

6. The lines  $y=x-3$  and  $y=2x-6$  intersect at point T. Point W has coordinates (10,-2). Find the point of intersection of the two lines (T) and hence find the equation of the line joining T and W.

$$\text{Ans } 2x + 7y - 6 = 0$$

7. Find the equation of the line that cuts the x-axis at 4 and the y-axis at -2.

$$\text{Ans } x - 2y - 4 = 0$$

8. The vertices of a triangle ABC have coordinate A(3,5) B(4,8) and C(6,12). Find the equations of the sides AB and BC

$$\begin{aligned} \text{Ans } y &= 3x - 4 \\ y &= 2x \end{aligned}$$

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### **Homework Questions 5 – Parallel and Perpendicular Lines**

4. If the gradient of a line is 2, what is the gradient of the parallel line to it?

Ans 2

2. If the gradient of a line is  $\frac{3}{5}$ , what is the gradient of a line perpendicular to it?

Ans  $-\frac{5}{3}$

3. Line A has the equation  $y = 5x + 2$  and line B has the equation  $y = 5x - 3$   
Are the lines parallel or perpendicular? You must prove it.

Ans parallel

4. What is the gradient of a line perpendicular to the line  $4x + 7y = 3$

Ans  $\frac{7}{4}$

5. Find the equation of the line which passes through the point (0,-3) and which is parallel to the line  $y = 7x + 2$  Write your answer in the form of  $ax+by+c=0$

Ans  $7x - y - 3 = 0$

6. A line has an equation of  $y = 8x + 3$ . What is the equation of the line perpendicular to this one which has a y-intercept of -2 Write your answer in the form of  $ax+by+c=0$

Ans  $x + 8y + 16 = 0$

7. A(-1,1) B(8,3) C(9,7) D(0,5) Show that ABCD is a parallelogram

$$ab = cd = \frac{2}{9}$$

$$bc = ad = 4$$

8. Find the equation of the line through (5,-1) which is perpendicular to the line  $x+3y=4$

Ans  $y = 3x - 16$

9. Two lines are perpendicular and intersect on the x-axis. One of the lines is  $y=2x-6$ . Find the equation of the other line.

Ans  $x + 2y - 3 = 0$

10. a) show that the triangle XYZ with X(4,15) Y(-1,4) and Z(7,7) is a right angled triangle  
b) find the equation of the hypotenuse

Ans  $5y = 11x + 31$