CHAPTER 6
Coordinate geometry

UNIT 1: The distance formula

QUESTION **1**   Calculate the distance between the following pairs of points. Leave your answer in surd form if necessary.

a   A(2, 1), B(5, 5)

b   A(3, 7), B(9, 15)

c   A(–2, –5), B(4, –7)

d   A(–2, 3), B(2, –5)

e   A(3, 4), B(6, 8)

f   A(6, –3), B(8, –7)

QUESTION **2**   Calculate the length of each side of $\triangle ABC$ and by using Pythagoras' Theorem find whether or not it is a right angled triangle.

a   A(0, 0), B(3, 0), C(3, 4)

b   A(1, 6), B(3, 2), C(–4, 3)

QUESTION **3**

a   Find the distance between the points A(–1, 3) and B(3, 8) and then square it.

b   Find the perimeter of the triangle whose vertices are A(4, 0), B(7, 4) and C(–1, –2).

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UNIT 2: The mid-point of an interval

QUESTION **1**   Find the mid-point of the interval joining the following points.

a   (0, 4) and (0, 8)

b   (1, 5) and (3, 7)

c   (–1, 4) and (–3, –2)

d   (2, 7) and (6, 1)

e   (5, 0) and (3, 0)

f   (–2, 6) and (2, 2)

g   (–1, –8) and (5, 2)

h   (7, 1) and (5, 3)

i   (0, 8) and (6, 6)

j   (3, 4) and (5, 8)

k   (–2, –5) and (2, 5)

l   (–6, 4) and (6, –4)

QUESTION **2**   The vertices of a triangle ABC are A(–2, 5), B(6, 7) and C(3, –3). Find the mid-point of each side.

QUESTION **3**   The vertices of $\triangle PQR$ are P(2, 3), Q(10, 9) and R(8, 0).

a   Find the mid-points of PR and QR.

b   Find the length of the interval joining these mid-points.

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UNIT 3: Different forms of linear equations

QUESTION 1   Write each of the following equations in general form.

a $2x + 3y = 7$

b $x - y = -9$

c $3x - 6 = 2y$

d $8y + 5 = 3x$

e $5x - y = 8$

f $y = 2x - 1$

g $y = -4x + 10$

h $8x - 7 = 5y$

i $3x - y = -4$

j $y = \dfrac{x}{3} + 1$

k $y - x = 14$

l $9x = 8y - 3$

QUESTION 2   Write each of the following equations in the gradient-intercept form.

a $3y = 6x + 12$

b $5y = -2x + 7$

c $9 + y = 6x$

d $8y - 3x = 9$

e $y + 3x = 0$

f $7x - y = 14$

g $x + y = 1$

h $3x - y = 8$

i $3y = 9x - 18$

j $y + 2x = 7$

k $7y = 8x - 10$

l $-3y = 9x$

QUESTION 3   Write down the gradient (m) and the y-intercept (b) for each of the following.

a $y = 2x + 1$ _____

b $y = 7x - 3$ _____

c $y = x + 5$ _____

d $y = -2x + 3$ _____

e $y = \dfrac{1}{2}x - 2$ _____

f $y = \dfrac{1}{4}x - 1$ _____

g $y = -\dfrac{1}{2}x - 4$ _____

h $y = -x$ _____

QUESTION 4   Write the equation of the line in the gradient-intercept form when the gradient (m) a
the y-intercept (b) are given.

a $m = 2, b = 1$ _____

b $m = 7, b = -2$ _____

c $m = -1, b = 4$ _____

d $m = \dfrac{1}{2}, b = 3$ _____

e $m = -\dfrac{4}{3}, b = 3$ _____

f $m = -2, b = 9$ _____

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UNIT 4: Graphing straight lines

QUESTION **1**   Complete the table of values and then draw the graph of each straight line.

a $y = x + 1$

| x	0	1	2
y			
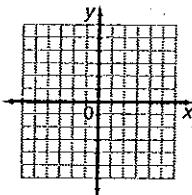
b $y = 2x - 1$

x	0	1	2
y			
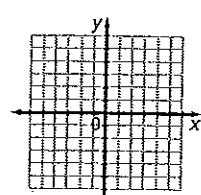
c $y = 4x + 3$

x	0	1	2
y			
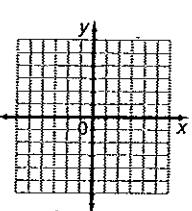
d $2x + 3y = 6$

x	0	1	2
y			
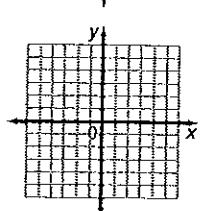
e $y = \dfrac{1}{2}x - 4$

x	0	1	2
y			
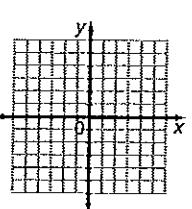
f $y = -x + 2$

x	0	1	2
y			

QUESTION **2**   Find the x-intercept and y-intercept of the graphs of the following equations and the draw the graph.

a $y = 2x + 1$

x	0	
y		0
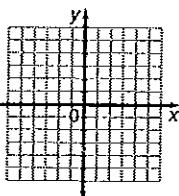
b $y = x + 2$

x	0	
y		0
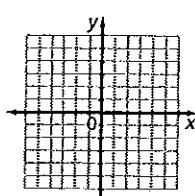
c $y = 3x - 2$

x	0	
y		0
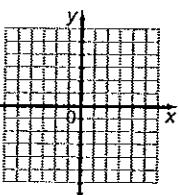
d $x + y = 3$

| x	0	
y		0
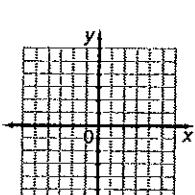
QUESTION **3**   On the same number plane draw the graphs of the following.

a $y = 3x$
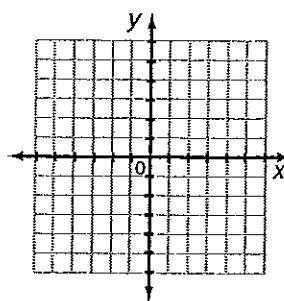
b $y = 3x + 2$

c $y = 3x - 1$

What do you notice? _____

QUESTION **4**   Which of the following points lie on the line $y = 2x + 1$?

(0, 0), (1, 2), (0, 1), (1, 3), (–2, 1), (–2, –3) _____

Answers

PAGE 43 1 a $x=3, y=2\frac{1}{2}$ b $x=5, y=1\frac{1}{3}$ c $x=5, y=1\frac{4}{5}$ d $x=3, y=4$ e $x=-2, y=5$ f $x=-1, y=-5$ 2 a $x=4, y=0$
28, $y=-18$ c $x=1, y=3$ d $x=1\frac{1}{2}, y=-\frac{1}{2}$

PAGE 44 1 a $x=6, y=4$ b $x=0, y=3$ c $x=-4, y=0$ d $x=0, y=2$ e $x=3, y=-1$ f $x=1, y=4$ 2 a $x=5, y=2$ b $x=3$,
c $x=-6, y=-5$ d $x=5, y=3\frac{2}{3}$

PAGE 45 1 C 2 C 3 C 4 C 5 A 6 C 7 D 8 B 9 D 10 B

PAGE 46 1 $x=6, y=-\frac{1}{3}$ 2 $x=5, y=\frac{1}{2}$ 3 $x=5\frac{1}{3}, y=2$ 4 $x=1\frac{1}{2}, y=-1$ 5 $x=8, y=1$ 6 $x=1, y=4$ 7 $x=2, y=4$ 8 x
$y=4$ 9 $x=7, y=-\frac{1}{3}$ 10 $x=-19, y=46$ 11 $x=3, y=-\frac{1}{5}$ 12 $x=1, y=2$ 13 $x=9, y=1$ 14 $a=9, b=-5$ 15 $x=2, y=8$

PAGE 47 1 a 5 units b 10 units c $2\sqrt{10}$ units d $4\sqrt{5}$ units e 5 units f $2\sqrt{5}$ units 2 a $AB=3$ units, $BC=4$ units, $CA=5$ unit
Yes rt $\angle$ d $\triangle$ b $AB=2\sqrt{5}$ units, $BC=\sqrt{53}$ units, $CA=\sqrt{34}$ units; No it is not a rt $\angle$ d $\triangle$ 3 a $\sqrt{41}$ units, 41 b $\left(5+6\sqrt{2}+\sqrt{29}\right)$ units

PAGE 48 1 a $(0,6)$ b $(2,6)$ c $(-2,1)$ d $(4,4)$ e $(4,0)$ f $(0,4)$ g $(2,-3)$ h $(6,2)$ i $(3,7)$ j $(4,6)$ k $(0,0)$ l $(0,0)$
2 $(2,6), (4\frac{1}{2}, 2), (\frac{1}{2}, 1)$ 3 a Midpoint of $PR\left(5, 1\frac{1}{2}\right)$, midpoint of $QR\left(9, 4\frac{1}{2}\right)$ b 5 units

PAGE 49 1 a $2x+3y-7=0$ b $x-y+9=0$ c $3x-2y-6=0$ d $3x-8y-5=0$ e $5x-y-8=0$ f $2x-y-1=0$ g $4x+y-$
h $8x-5y-7=0$ i $3x-y+4=0$ j $x-3y+3=0$ k $x-y+14=0$ l $9x-8y+3=0$ 2 a $y=2x+4$ b $y=-\frac{2}{5}x+7$ c $y=$
d $y=\frac{3}{8}x+\frac{9}{8}$ e $y=-3x$ f $y=7x-14$ g $y=-x+1$ h $y=3x-8$ i $y=3x-6$ j $y=-2x+7$ k $y=\frac{8}{7}x-\frac{10}{7}$ l $y=-3x$ 3 a
$b=1$ b $m=7, b=-3$ c $m=1, b=5$ d $m=-2, b=3$ e $m=\frac{1}{2}, b=-2$ f $m=\frac{1}{4}, b=-1$ g $m=-\frac{1}{2}, b=-4$ h $m=-1, b=0$ 4 a $y=$
b $y=7x-2$ c $y=-x+4$ d $y=\frac{1}{2}x+3$ e $y=\frac{-4x}{3}+3$ f $y=2x+9$

PAGE 50 1 a

x	0	1	2
y	1	2	3
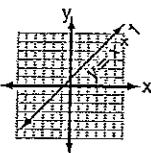
b

x	0	1	2
y	-1	1	3
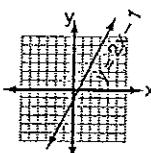
c

x	0	1	2
y	3	7	11
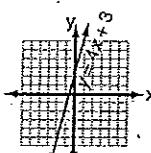
d

x	0	1	2
y	2	$1\frac{1}{3}$	$\frac{2}{3}$
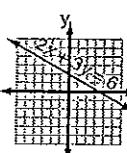
e

x	0	1	2
y	-4	$-3\frac{1}{2}$	-3

f

x	0	1	2
y	2	1	0

2 a
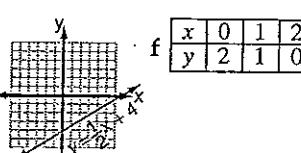
x	0	$-\frac{1}{2}$
y	1	0
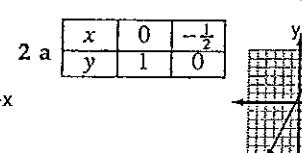
b

x	0	-2
y	2	0
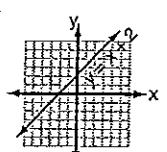
c

x	0	$\frac{2}{3}$
y	-2	0

d

x	0	3
y	3	0
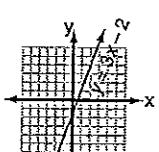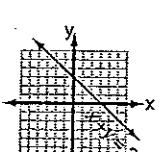
3 4 $(0,1), (1,3), (-2,$

PAGE 51 1 a -12 b $1\frac{1}{2}$ c $-\frac{2}{3}$ d $\frac{1}{3}$ e $-\frac{1}{6}$ f $-\frac{1}{2}$ g $3\frac{1}{2}$ h 3 i $\frac{2}{5}$ j -1 k $-\frac{2}{5}$ l $1\frac{1}{2}$ 2 $\frac{5+1}{-1-1}=\frac{-7-5}{3+1}=\frac{-7+1}{3-1}$
3 b and c 4 m of $AB=m$ of $CD=\frac{-4}{3}$ and m of $BC=m$ of $DA=\frac{3}{4}$

PAGE 52 1 a $2x-y-2=0$ b $x+y-4=0$ c $2x-y=0$ d $2x+y-7=0$ e $x-y+3=0$ f $4x-y=0$ g $x-2y+16=0$
h $x-4y+2=0$ i $4x-y-6=0$ j $2x-y-3=0$ k $2x+y+5=0$ l $3x-y-5=0$ 2 $2x-y-7=0$ 3 $3x-y-4=0$

PAGE 53 1 a $x-y+1=0$ b $2x-y+1=0$ c $7x-2y+11=0$ d $y=4$ e $8x-5y=0$ f $x-y=0$ g $x-2y+7=0$ h $4x-y-$
i $x-y+1=0$ j $x+2y-11=0$ k $3x+y-10=0$ l $x-2y=0$ 2 $2x-y+3=0; 0-3+3=0$ 3 $3x-2y=0$

PAGE 54 1 a yes b no c yes d yes e yes f yes g yes h no 2 a no b yes c no d yes e no f yes g no h yes 3 a p
b parallel c neither d perpendicular e perpendicular f neither g parallel h neither 4 a $3x-y-1=0$ b $4x-5y=0$ c $x-2y+$
d $x+y+1=0$