AQA

PRACTICE PAPER SET 3

WRITTEN SOLUTIONS

GCSE
MATHEMATICS

F

Foundation Tier   Paper 2 Calculator
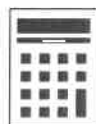
Date of Exam   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

8300/2F

Answer **all** questions in the spaces provided.

1   Circle the cube number.

[1 mark]

3   8   9   16

$1^3 = 1 \times 1 \times 1 = 1$
$2^3 = 2 \times 2 \times 2 = 8$

2   On a circle, which of these is the longest?

Circle your answer.

[1 mark]

chord   circumference   diameter   radius

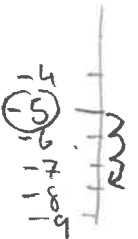**3**   Add −5 and −3 $-5 + (-3) = -5 - 3 = -8$

Circle your answer.

[1 mark]

−8   −2   2   8

−3

−4
−5
−6
−7
−8
−9

4   Circle the unit of mass.

[1 mark]

millimetres   grams   litres   degrees

**5** Write down **all** the whole numbers between 91 and 120 that have **exactly two** digits the same.

[2 marks]

91 92 93 94 95 96 97 98 ⟨99⟩ ⟨100⟩ ⟨101⟩ 102 103
104 105 106 107 108 109 ⟨110⟩ 111 ⟨112⟩ ⟨113⟩ ⟨114⟩ ⟨115⟩
⟨116⟩ ⟨117⟩ ⟨118⟩ ⟨119⟩ 120

Answer 99, 100, 101, 110, 112, 113, 114, 115, 116
117, 118, 119

6 Katy is facing North.

She does a three-quarter turn anti-clockwise.

She then turns 135° clockwise.

What direction is she facing now?

[2 marks]

N

1s TURN

W .... E 135° CLOCKWISE
45° 90° = 90 + 45°
135°
Answer
SW S SOUTH WEST
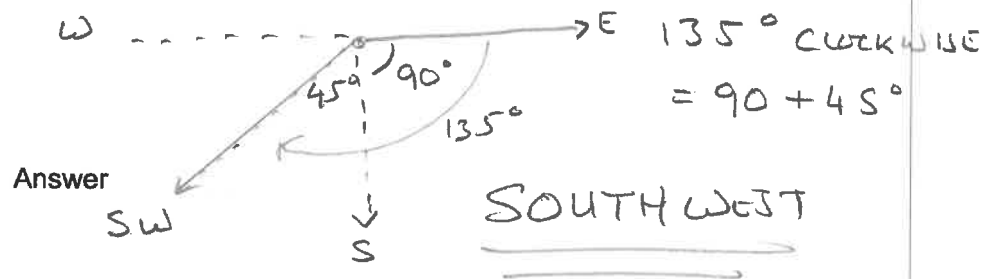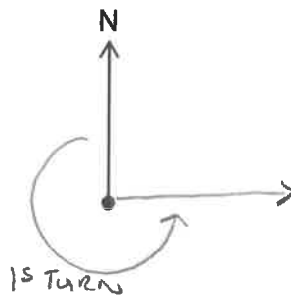
7 Here is a bank statement with three missing values.

Date	Description	Credit (£)	Debit (£)	Balance (£)
	Starting balance			37.60
13/04/2017	Salary	287.25		324.85
14/04/2017	Gas bill		50.00	274.85
17/04/2017	Council tax		61.84	213.01

Complete the bank statement.

[3 marks]

SALARY: 324.85 − 37.60 = 287.25

324.85 − 50 = 274.85

− 61.84

213.01

8 (a) Simplify $3a + 7b - a + 4b$

[2 marks]

$$= 3a - a + 7b + 4b$$

Answer $2a + 11b$

8 (b) Expand $4(2d + 5)$

[2 marks]

$$4 \times 2d + 4 \times 5$$

$$= 8d + 20$$

Answer $8d + 20$

8 (c) Factorise $15x + 18y$

$$= 15 \times x + 18 \times y$$

LOOK FOR A 'COMMON FACTOR' OF 15 AND 18

[1 mark]

$$= 3 \times 5 \times x + 3 \times 6 \times y = 3(5 \times x + 6 \times y)$$

Answer $3(5x + 6y)$

Turn over for the next question

Turn over ▶

9 Jack and Liam each get the same pocket money.

Jack spends 75% of his.
He has £2 left.

Liam spends 40% of his.

How much does Liam have left?

[4 marks]

Jack 100% − 75% LEAVES 25% = £2

So JACK MUST HAVE HAD: 4 × £2 = £8 = 100%

LIAM SPENDS 40% OF £8·00

10% = £800 ÷ 10 = £0·80

40% = 4 × 0·80 = £3·20

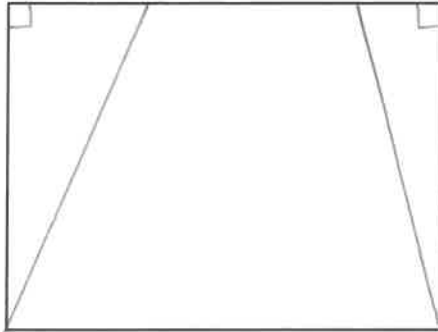£8 − £3·20 = £4·80

Answer £ 4·80

10   Draw **two** straight lines inside the rectangle to split it into

     1 trapezium

     and

     2 right-angled triangles.

[2 marks]

Practise on this diagram.

Put your answer on this diagram.

Turn over for the next question

Turn over ▶

11   Jo sold 132 mugs.

One quarter of the mugs were small.

The rest were large.

Jo made a profit of £2.45 on each small mug.

She made **twice** as much profit on each large mug.

Work out her total profit.

[6 marks]

SMALL MUGS:

$$132 \div 4 = 33$$

LARGE = 132 − 33 = 99

PROFIT ON SMALL MUG = £2.45

PROFIT ON LARGE MUG = £2.45 × 2 = £4.90

TOTAL PROFIT:

£2.45 × 33 + £4.90 × 99

= 80.85 + 485.10

= 565.95

Answer £ 565.95

12 Write down the integer values of x where $1 \leqslant x < 7$

[2 marks]

$x \geqslant 1, 2, 3, 4, 5, 6$ $x < 7$ so cannot be 7

Answer $1, 2, 3, 4, 5, 6$

13 Increase 400 by 37%

[2 marks]

$37\% \text{ of } 400 = 400 \div 100 \times 37 = 148$

Increase: $400 + 148 = 548$

OR//

$400 \times 1.37 = 548$

Answer 548

14 What is the **maximum possible** order of rotational symmetry of a quadrilateral?
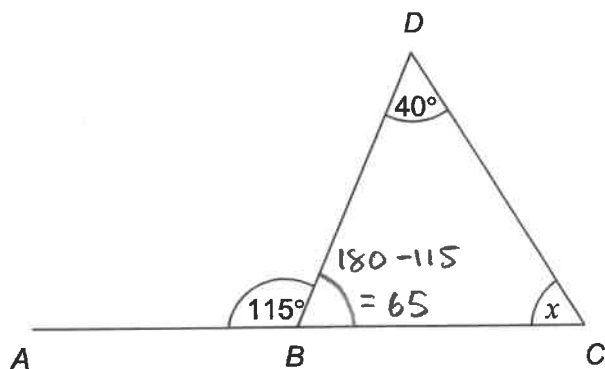Circle your answer.

[1 mark]

1   2   (4)   8

FOR SQUARE

Turn over for the next question

15 Han is trying to work out the size of angle x.

D

Not drawn accurately

40°

180 −115 = 65

115°

x
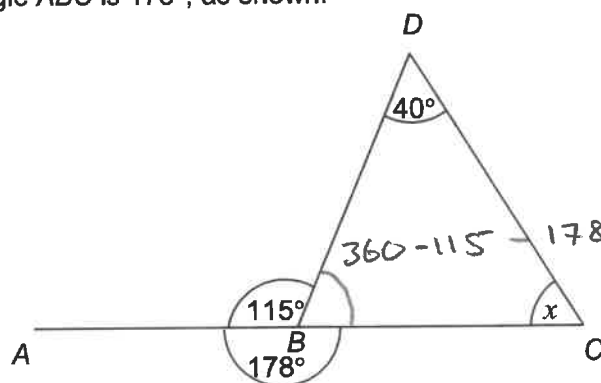
A   B   C

15 (a) He assumes that *ABC* is a straight line.

What answer should he get?

[2 marks]

ANGLES ON STRAIGHT LINE, 180−115 =65°

ANGLES IN TRIANGLE ADD TO 180 so...

180 −40 −65 = 75 GIVES x

Answer   75°   degrees

15 (b) In fact, angle *ABC* is 178°, as shown.

D

Not drawn accurately

40°

360 −115 −178 = 67°

115°

x

A   B   178°   C

What effect does this have on the size of angle x?

[1 mark]

NOW FOR x, 180−40−67 = 73

SO x HAS DECREASED BY 2°

16 The speed of the International Space Station is 27 576 kilometres per hour.

16 (a) The station travels 42 600 kilometres in one orbit.

Work out the number of **full** orbits the station does in one day.

[3 marks]

$$S = 27576 \text{ km/h}$$
$$D = 42600$$

TRAVELS 27576 km EVERY HOUR SO IN 24 HOURS
IF TRAVELS 27576 × 24 = 661824
ORBITS = 661824 ÷ 42600 = 15·54 SO

Answer 15 FULL ORBITS

16 (b) Convert 27 576 kilometres per hour into metres per second.

[3 marks]

27576 km × 1000 = 27576000 m IN ONE HOUR
SO 27576000 ÷ 60 = 459600 m IN ONE MINUTE
SO 459600 ÷ 60 = 7660 m IN ONE MINUTE

Answer 7660 m/s

Turn over for the next question
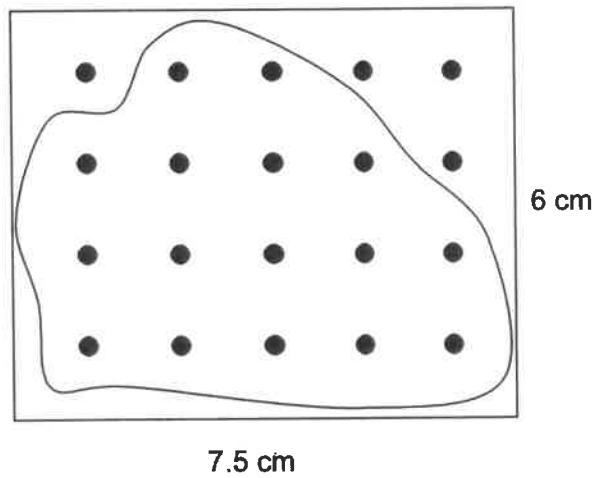
17 Here is a shape.
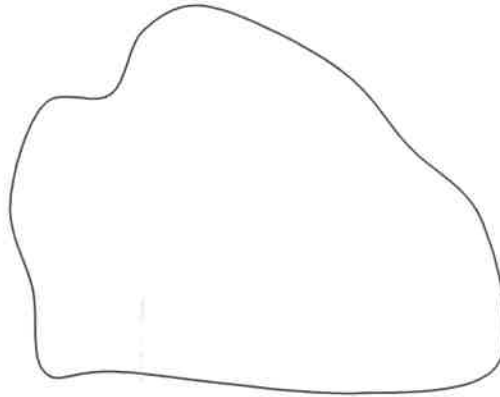
A method to estimate the area of the shape is shown below.

Put the shape onto a rectangular grid of dots.

Write the number of dots in the shape as a fraction of the total number of dots.

Work out this fraction of the area of the rectangle.

6 cm

7.5 cm

16 DOTS INSIDE

TOTAL DOTS = 20

Do not write outside the box

17 (a)   Use this method to estimate the area of the shape.

[3 marks]

16 INSIDE OUT OF TOTAL OF 20 DOTS

$$= \frac{16}{20} = \frac{8}{10} = \frac{4}{5}$$ TOTAL AREA = 7.5 × 6

$$= 45$$

$$\frac{4}{5} \times 45 = 36$$

Answer 36   cm²

17 (b)   How could you improve this method to give a more reliable answer?
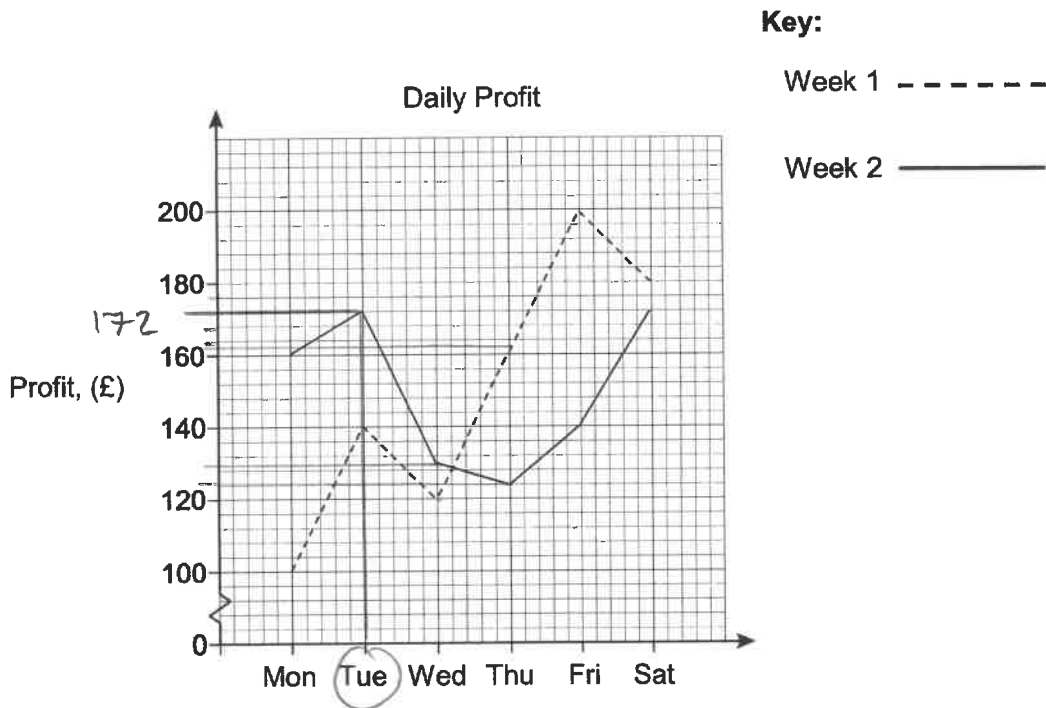
[1 mark]

INCREAS THE NUMBER OF DOTS.

Turn over for the next question

Do not write outside the box

18   The graph shows a shop's daily profit over two weeks.

Key:

Week 1 — — — — —

Week 2 ————

Daily Profit

172

Profit, (£)

200
180
160
140
120
100
0

Mon Tue Wed Thu Fri Sat

18 (a)   Circle the profit on Tuesday of week 2

[1 mark]

£140   £163   £166   (£172)   £178

SCALE ON y AXIS IS 1 SQUARE = 4

18 (b)   The **total** profit on Mondays for the two weeks was £260

Which day had the highest **total** profit for the two weeks?

[2 marks]

PROFIT

TUES = 172 + 140 = 312   FRI = 140 + 200

WED = 120 + 130 = 250   = 240

THUR = 124 + 162 = 286   SAT = 172 + 180

                                                            = 352

Answer   SATURDAY

£352

8300/2F

18 (c) The manager decides to close the shop on one day each week.

Use the graph to decide which day she should close.

Give a reason for your answer.

[2 marks]

Answer WEDNESDAY

Reason IT HAS THE LOWEST TOTAL PROFIT OVER THE TWO WEEKS

18 (d) Ruby says about the graph,

> "Friday week 1 is 6 large squares high.
>
> Friday week 2 is 3 large squares high.
>
> So, the profit on Friday week 1 is double Friday week 2"
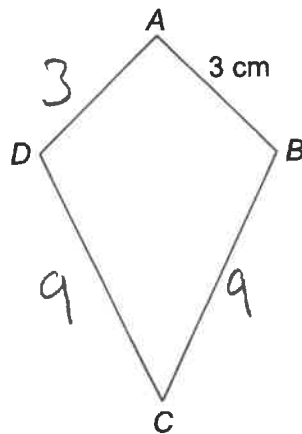
Is she correct?

Give a reason for your answer.

[2 marks]

NO, THE Y AXIS IS BROKEN AND DOES NOT SHOW SQUARES FOR 20, 40, 60 AND 80

Turn over for the next question

19 The perimeter of kite *ABCD* is 24 cm

A

3

3 cm

Not drawn accurately

D

B

9

9

C

$24 - 3 - 3 = 18$

$18 \div 2 = 9$

The length of side *AB* is 3 cm

Work out the length of side *CD*.

Circle your answer.

[1 mark]

3 cm   8 cm   ⟨9 cm⟩   21 cm

20 Kris is simplifying $3n^5 \times 2n^4$ $= 3 \times 2 \times n^5 \times n^4$

His answer is $5n^{20}$ $= 6 \times n^{5+4}$

Identify any mistakes he has made. $= 6n^9$

[2 marks]

HE HAS ADDED 3 AND 2 INSTEAD OF MULTIPLYING.

HE HAS MULTIPLIED 5 AND 4 INSTEAD OF ADDING THE POWERS (INDICES)

21   Volume of a sphere = $\frac{4}{3}\pi r^3$

A steel sphere, radius 9 cm, is shown.

21 (a)   Work out the volume of the sphere.

[2 marks]

$$\frac{4}{3} \times \pi \times 9^3 = \frac{4}{3} \times \pi \times 9 \times 9 \times 9 = 972\pi$$
$$= 3053.628\ldots$$

Answer 972π or 3053.63 cm³
           or 3053.6
           or 3054

21 (b)   The density of the steel is 7.8 grams/cm³ $D = \frac{m}{v}$

Work out the mass of the sphere.

[2 marks]

$$D = 7.8 \quad V = 3053.63$$
$$m = D \times V = 7.8 \times 305.63$$

Answer $= 23818.3$ grams

Turn over for the next question

Turn over ▶

22   Dev invests £1500 for 2 years.

The compound interest rate is 1.6% per year.

MULTIPLIER = $\frac{100 + 1.6}{100}$

$= 1.016$

22 (a)   Which calculation works out the total value after 2 years?

Circle your answer.

SO $1500 \times 1.016 \times 1.016$
$= 1500 \times 1.016^2$ **[1 mark]**

£1500 × 1.6 × 2   £1500 × 1.6²

£1500 × 1.016 × 2   (£1500 × 1.016²)

22 (b)   Emma invests £1500 for 2 years.

The interest rate is

     1.8% for the first year

     1.3% for the second year.

MULTIPLIER $= \frac{100 + 1.8}{100} = 1.018$

$= \frac{100 + 1.3}{100} = 1.013$

Whose investment is worth more after 2 years?

You **must** show your working.

[4 marks]

EMMA: $1500 \times 1.018 = 1527$

$1527 \times 1.013 = 1546.85$ (2 dp)

DEV: $1500 \times 1.016^2 = 1548.38$ (2 dp)

Answer   DEV'S IS WORTH MORE

23 (a) Expand and simplify $(x + 5)(x - 4)$

[2 marks]

$$x \times x + x \times (-4) + 5 \times x + 5 \times (-4)$$

$$= x^2 - 4x + 5x - 20$$

$$= x^2 + x - 20$$

Answer $x^2 + x - 20$

23 (b) Solve $(x - 8)(x + 7) = 0$

[1 mark]

SOLUTIONS: $x = 8$

$x = -7$

Answer 8 , -7

24 Write 225 as the product of its prime factors.

[2 marks]

Answer $225 = 3 \times 3 \times 5 \times 5$

25 The angles in triangle *A* are in the ratio 1 : 2 : 3

The angles in triangle *B* are in the ratio 4 : 5 : 6

Not drawn
accurately

A

B
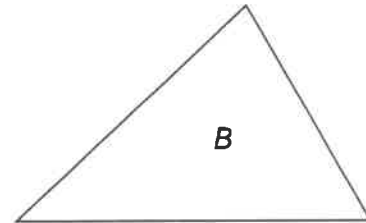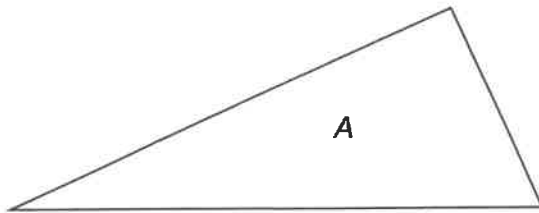
Jack says,

"The middle number in each ratio is one third of the total,
so one of the angles in each triangle is 60 degrees"

Is he correct?

Show working to support your answer.

[2 marks]

For A: 1 : 2 : 3 ADD = 6 PARTS

180° ÷ 6 = 30°

So ANGLES FOR A ARE: 1 × 30 = 30

2 × 30 = 60

3 × 30 = 90

= 30 : 60 : 90

For B: 4 : 5 : 6 ADD = 15 PARTS

180 ÷ 15 = 12°

So ANGLES ARE: 4 × 12 = 48°

5 × 12 = 60°

6 × 12 = 72°

= 48° : 60° : 72°

So MIDDLE ANGLE IN BOTH IS 60°

26 Here is the graph of a straight line.

GRADIENT

$y = mx + c$

↑ y INTERCEPT

GRADIENT = CHANGE IN y / CHANGE IN x

$= \frac{1}{2}$

$\left(\frac{RISE}{RUN}\right) = \left(\frac{1}{2}\right)$

(4, 5)

(4, 1)

y - INTERCEPT → -1
OF NEW LINE
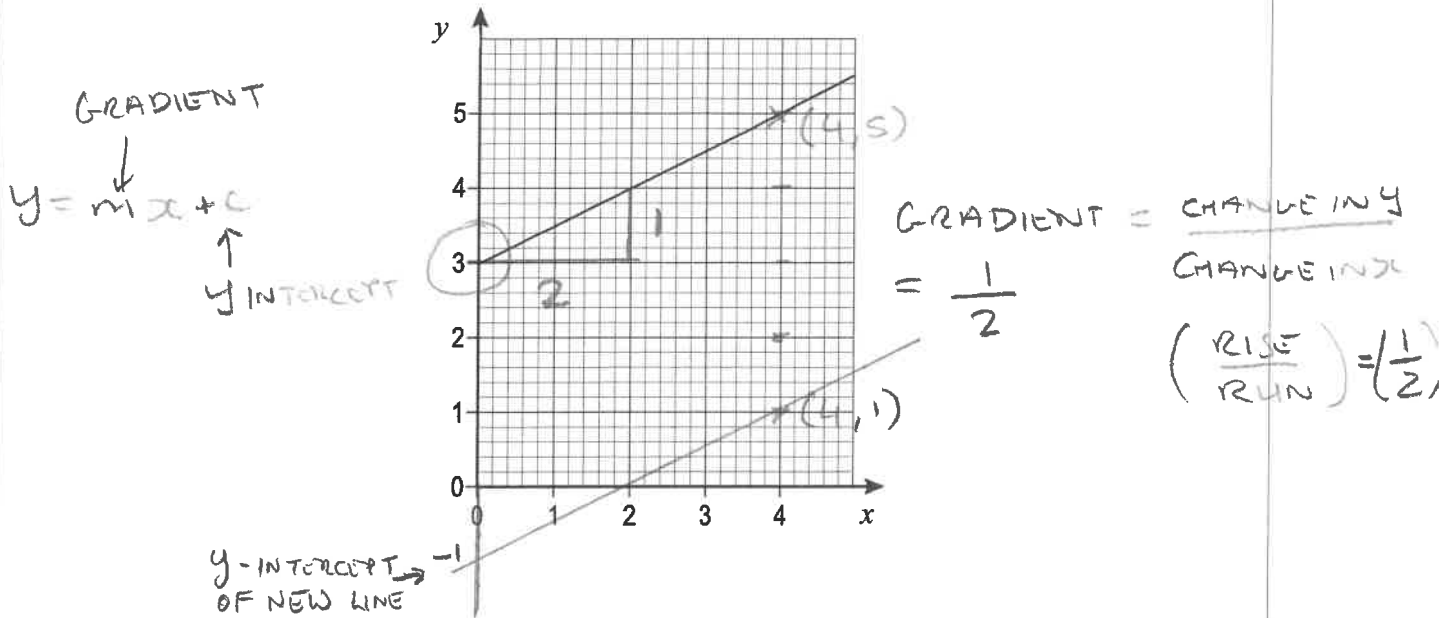
26 (a) Work out the equation of the line.

[2 marks]

y INTERCEPT = 3 (WHERE IT CROSSES y AXIS

$m = \frac{1}{2}$

$y = \frac{1}{2}x + 3$

Answer

26 (b) Work out the coordinates of the y-intercept of the line that

is parallel to the line in part (a)

and passes through (4, 1)

[2 marks]

(4, 1) is 4 BELOW (4, 5), so it's

y - INTERCEPT MUST BE 4 BELOW (0, 3) so is (0, -1)

Answer (0 , -1)

Turn over for the next question

27 A charity collection was made.

Information about the amounts given by men is shown in the table.

Amount, x (£)	Midpoint		Number of men		
$0 \leqslant x < 5$	2.5	×	11	=	27.5
$5 \leqslant x < 10$	7.5	×	7	=	52.5
$10 \leqslant x < 15$	12.5	×	2	=	+25
			Total = 20		105

ADD

The mean amount given by **women** was £6.30 per person.

Compare the mean amounts given by men and women.

[4 marks]

MEAN FOR MEN = 105 ÷ 20 = £5.25

WOMEN GAVE MORE

END OF QUESTIONS