LJH. WORKED SOLUTIONS

edexcel

GCSE Mathematics Practice Tests: Set 1

Paper 1H (Non-calculator)

Time: 1 hour 30 minutes

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

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.*
- **Calculators must not be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The total mark for this paper is 80
- 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.

Practice Tests: Set 1 Regular (1H) – Version 1.0

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

mw 66

1. Work out 5.4×0.24

$$\begin{array}{r} 54 \\ \times\ 24 \\ \hline 216 \\ 1080 \\ \hline 1296 \end{array}$$

or

×	20	4
50	1000	200
4	80	16

1000
200
80
16
1296

P1 correct process to multiply

M1 digits 1296 seen

3 digits after decimal point

1.296 A1 cao

(Total 3 marks)

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2. The height, H cm, of a table is measured as 72 cm correct to the nearest centimetre. mw 132

Complete the following statement to show the range of possible values of H.

B1 B1

71.5 $\leq H <$ 72.5

(Total 2 marks)

MW 115

3. Jane has a carton of orange juice.
The carton is in the shape of a cuboid.

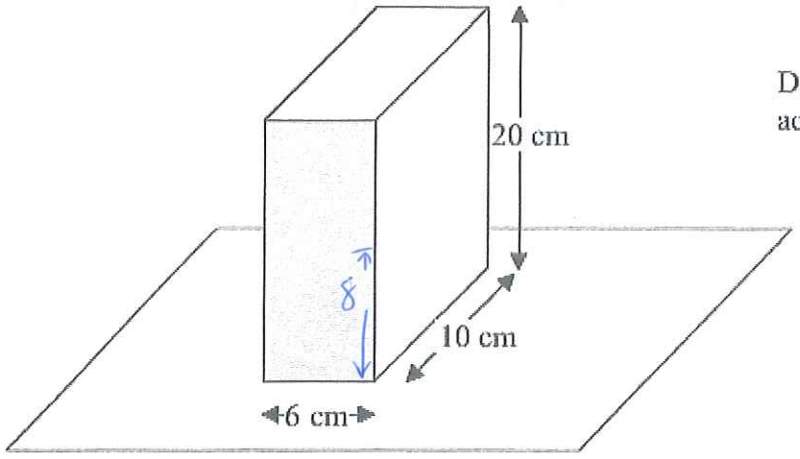


Diagram **NOT** accurately drawn

The depth of the orange juice in the carton is 8 cm.

Jane closes the carton.
Then she turns the carton over so that it stands on the shaded face.

Work out the depth, in cm, of the orange juice now.

$V = 6 \times 10 \times 8$
$= 480 \text{ cm}^3$ M1

$6 \times 20 \times x = 480$ M1
$120x = 480$
$x = 4$ M1

4 A1

..... cm

(Total 3 marks)

4. Write the following numbers in order of size.
Start with the smallest number.

0.038×10^2 3800×10^{-4} 380 0.38×10^{-1}

MW 83

3·8 0·38 380 0·038 M1

A1

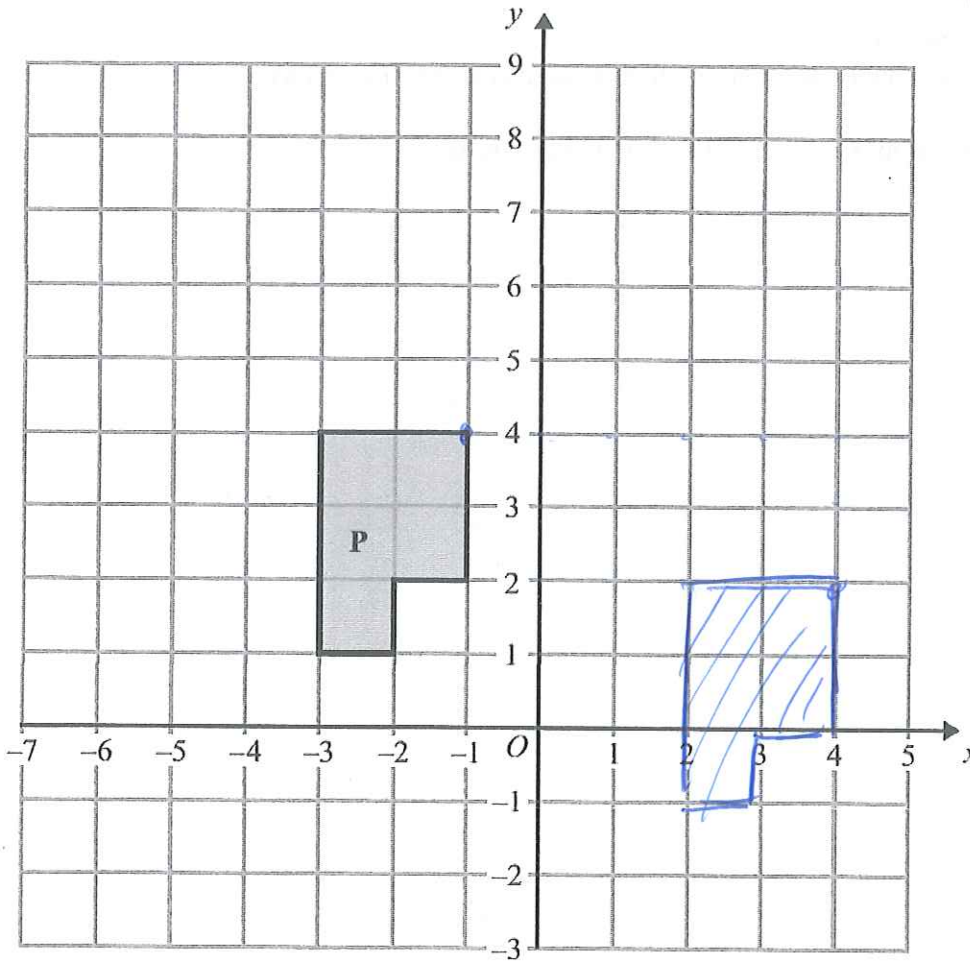
0.38×10^{-1}, 3800×10^{-4}, 0.038×10^{2}, 380 A1

.....

(Total 2 marks)

5.

MW 50



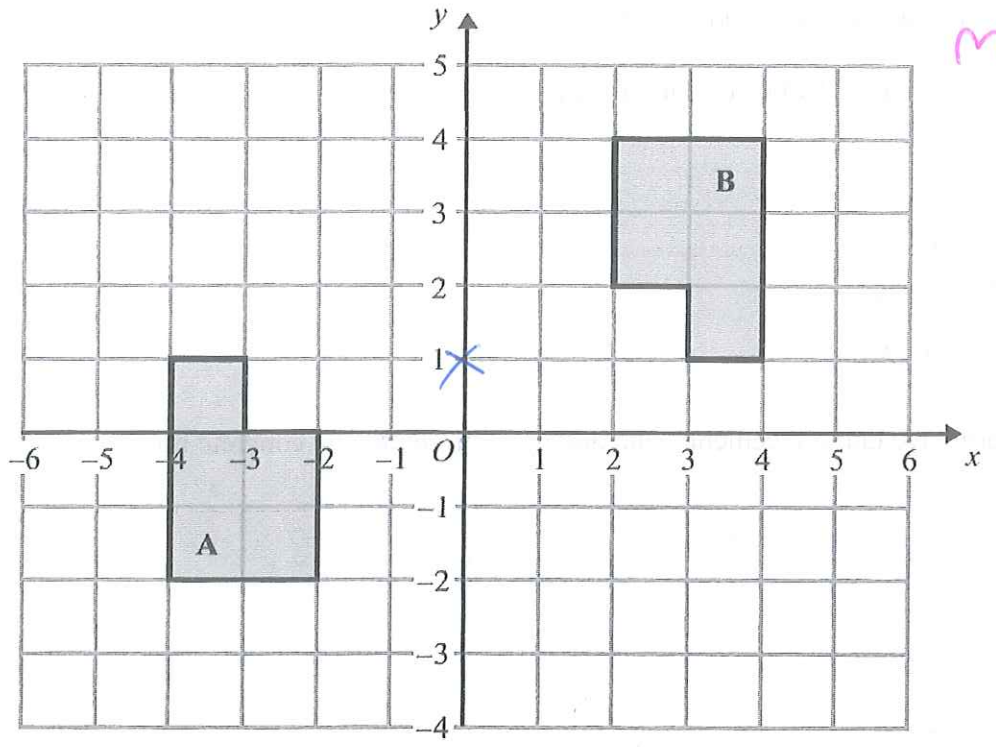
B1 position

B1 shape with correct orientation

(*a*) Translate shape P by the vector $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$.

(2)

mw 49



(*b*) Describe fully the single transformation that maps shape **A** onto shape **B**.

Rotation, 180° Centre (0, 1)

B1 B1 B1

(3)

(Total 5 marks)

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6. (a) Simplify $\dfrac{(x+2)^2}{x+2}$ $= \dfrac{(x+2)(x+2)}{x+2}$

$x+2$ B1

(1)

(b) Simplify $2a^2b \times 3a^3b$

$= 6a^5b^2$

B1 2 out of 3 terms

B2 all correct

(2)

(Total 3 marks)

MW 106

7. Talil is going to make some concrete mix. C:S:G
He needs to mix cement, sand and gravel in the ratio 1 : 3 : 5 by weight.

Talil wants to make 180 kg of concrete mix.

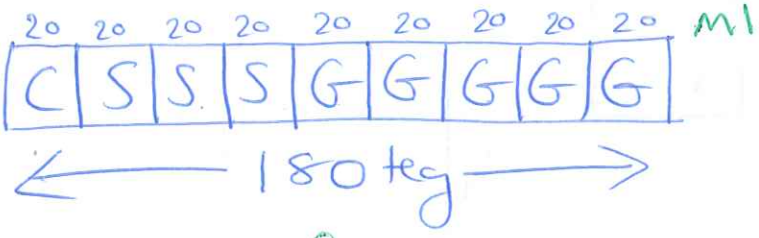
Talil has

15 kg of cement

85 kg of sand

100 kg of gravel

Does Talil have enough cement, sand and gravel to make the concrete mix?



M1

Talil needs { 20teg Cement NOT enough
M1 { 60teg Sand ✓
A1 { 100 teg Gravel ✓

No Talil cannot make 180 teg as he needs 20 teg of cement and only has 15 teg. He is 5 teg short of cement. C1

(Total 4 marks)

MW 106

Suha has a full 600 m*l* bottle of wallpaper remover.
She is going to mix some of the wallpaper remover with water.

Here is the information on the label of the bottle.

Wallpaper remover
600 m*l*
Mix $\frac{1}{4}$ of the wallpaper remover with 4500 m*l* of water

$\frac{600}{4} = 150ml$ M1

Suha is going to use 750 m*l* of water.

How many millilitres of wallpaper remover should Suha use?
You must show your working.

remover : water
150ml : 4500ml
÷6 ↓ M1 ↓ ÷6
25ml : 750ml
M1

A1

.....25.....m*l*

(Total 4 marks)

MW 65

9. Sasha carried out a survey of 60 students.
She asked them how many CDs they each have.

This table shows information about the numbers of CDs these students have.

Number of CDs	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24
Frequency	8	11	9	14	18

/60

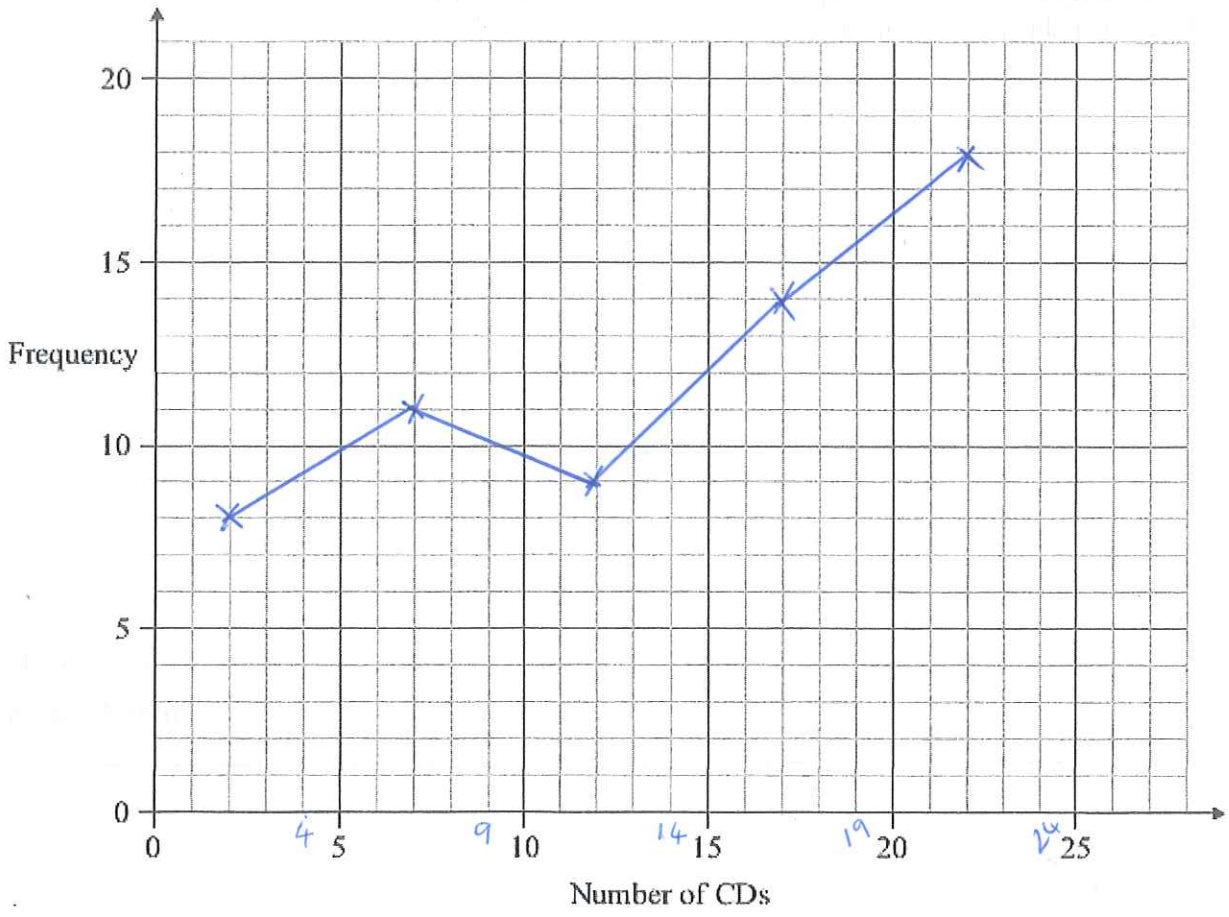
(a) Write down the class interval containing the median.

15–19 B1

.....

(1)

(b) On the grid, draw a frequency polygon to show the information given in the table.



B2

(2)

(Total 3 marks)

mw 136

Make q the subject of the formula $5(q + p) = 4 + 8p$
Give your answer in its simplest form.

$5q + 5p = 4 + 8p$ [−5p M1

$5q = 4 + 3p$ [÷5 M1

$q = \frac{4+3p}{5}$ A1

$q =$ .....

(Total 3 marks)

mw 157

11. (a) Expand and simplify $(x - 3)(x + 5)$

$= x^2 + 5x - 3x - 15$ M1

$= x^2 + 2x - 15$ A1

.....

(2)

(b) Solve $x^2 + 8x - 9 = 0$

$0 = (x + 9)(x - 1)$ M1

$x = -9$ or $x = 1$

A1 (both)

.....

(3)

(Total 5 marks)

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mw 139

12. (a) Solve the inequality

$3t + 1 < t + 12$ [$-t$

$2t + 1 < 12$ [-1 M1

$2t < 11$ [$\div 2$

$t < \frac{11}{2}$ A1

.....

(2)

(b) t is a whole number.
Write down the largest value of t that satisfies

$3t + 1 < t + 12$

$t < 5.5$

$\therefore$ largest $t = 5$ B1

.....

(1)

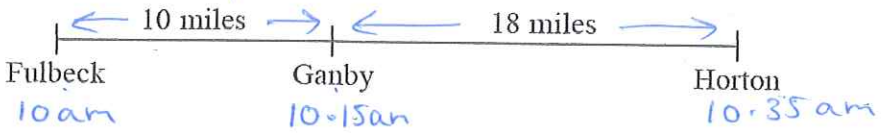
(Total 3 marks)

MW 142

D
S T

The distance from Fulbeck to Ganby is 10 miles.
The distance from Ganby to Horton is 18 miles.

40 mph



Raksha is going to drive from Fulbeck to Ganby.
Then she will drive from Ganby to Horton.

Raksha leaves Fulbeck at 10 00.
She drives from Fulbeck to Ganby at an average speed of 40mph.

Raksha wants to get to Horton at 10 35.

Work out the average speed Raksha must drive at from Ganby to Horton.

F → G
D = 10
S = 40
$T = \frac{D}{S}$
$= \frac{10}{40}$ M1
$= \frac{1}{4}$ how

G → H
D = 18
S = ?
T = 20 mins = $\frac{1}{3}$ hour
$S = \frac{D}{T}$
$= \frac{18}{1/3}$ M1
$= 18 \times 3$
$= 54$

54 mph A1 cao

(Total 3 marks)

MW 199

14. M is directly proportional to L^3.

When $L = 2$, $M = 160$

Find the value of M when $L = 3$

$M \propto L^3$

$M = kL^3$ M1

$160 = k(2)^3$

$160 = 8k$

$20 = k$ A1

$\therefore M = 20L^3$

$L=3$ $M = 20 \times 3^3$ M1

$= 20 \times 27$

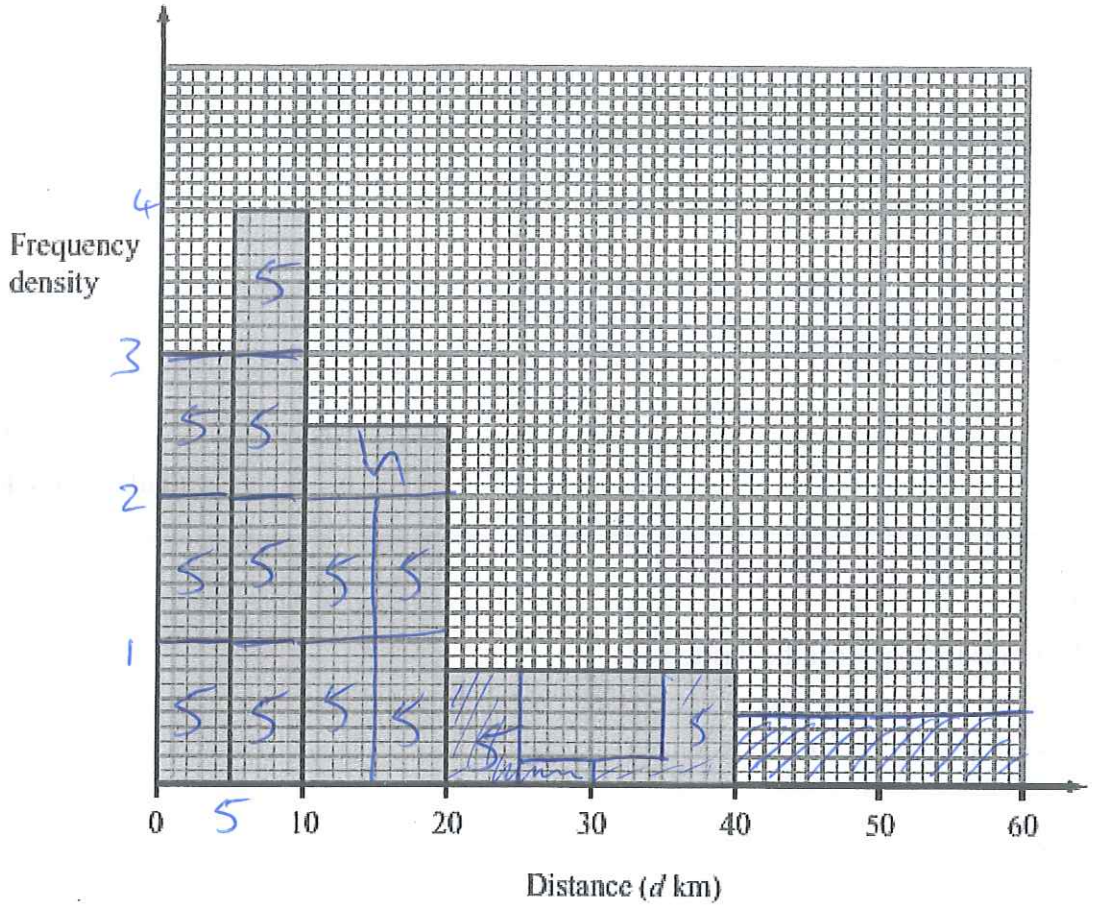
$= 540$

540 A1

(Total 4 marks)

MW 205

15. The incomplete histogram and table give some information about the distances some teachers travel to school.



(a) Use the information in the histogram to complete the frequency table.

Distance (d km)	w	Frequency	fd = f/w
$0 < d \leq 5$	5	15	3
$5 < d \leq 10$	5	20	4
$10 < d \leq 20$	10	25	2.5
$20 < d \leq 40$	20	16	0.8
$40 < d \leq 60$	20	10	0.5

0.8 × 20 = 16

M1 A1

(2)

(b) Use the information in the table to complete the histogram.

A1

(1)

(Total 3 marks)

MW 188

16. (a) Write down the value of $49^{\frac{1}{2}}$ $= \sqrt{49} = 7$ B1

.....

(1)

MW 207

(b) Write $\sqrt{45}$ in the form $k\sqrt{5}$, where k is an integer.

$\sqrt{45} = \sqrt{9 \times 5} = 3\sqrt{5}$ B1

.....

(1)

(Total 2 marks)

MW 189

17. $x = 0.0\dot{4}\dot{5}$

Prove algebraically that x can be written as $\frac{1}{22}$

$100x = 4.5454545$
$x = 0.0454545...$ M1

$99x = 4.5$

$990x = 45$

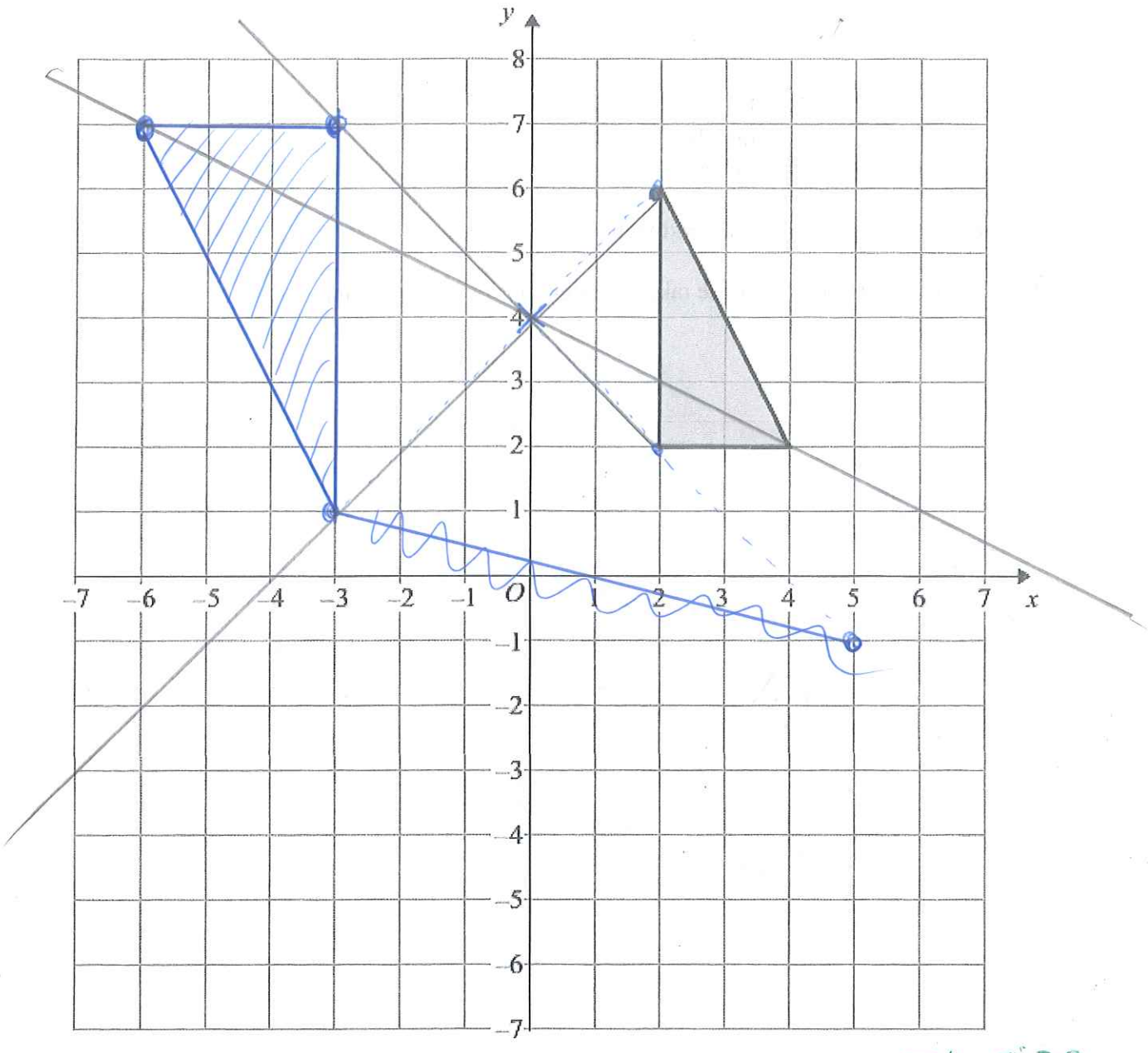
$x = \frac{45}{990}$ M1

$= \frac{1}{22}$ A1

(Total 3 marks)

MW 181

18.



Enlarge the shaded shape by a scale factor of $-1\frac{1}{2}$, centre (0, 4).

B1 size
B1 orientation
B1 position

(Total 3 marks)

MW 175

19. There are three different types of sandwiches on a shelf.

There are

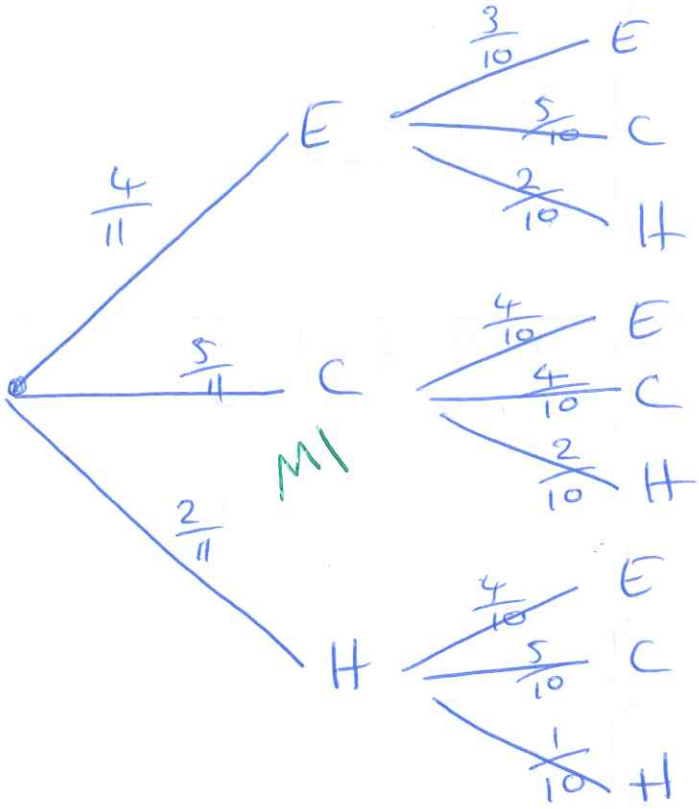
4 egg sandwiches,
5 cheese sandwiches
and 2 ham sandwiches.

4E
5C
2H

(11)

Erin takes at random 2 of these sandwiches.

Work out the probability that she takes 2 different types of sandwiches.



M1

M1

$1 - P(EE \text{ or } CC \text{ or } HH)$

$= 1 - \left(\frac{4}{11} \times \frac{3}{10} + \frac{5}{11} \times \frac{4}{10} + \frac{2}{11} \times \frac{1}{10}\right)$ M1

$= 1 - \left(\frac{12}{110} + \frac{20}{110} + \frac{2}{110}\right)$

$= 1 - \frac{34}{110}$ M1

$= \frac{110 - 34}{110}$

$= \frac{76}{110}$

$\frac{38}{55}$ A1 oe

.....

(Total 5 marks)

$\frac{38}{55}$

20.

MW 208

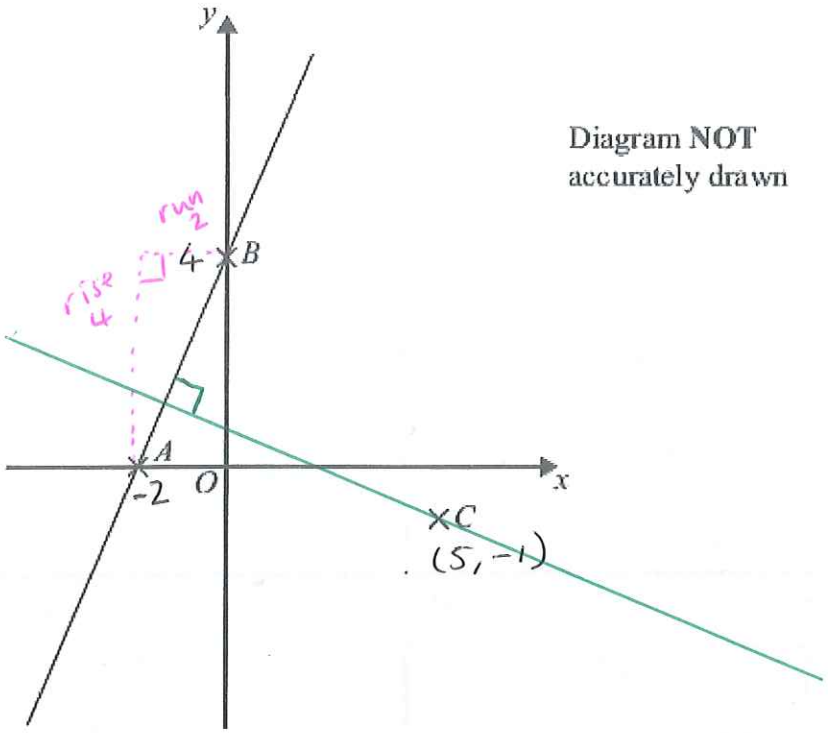


Diagram **NOT** accurately drawn

In the diagram A is the point $(-2, 0)$

B is the point $(0, 4)$

C is the point $(5, -1)$

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

Equation of line through C

$y = mx + c$

m is negative reciprocal of gradient of line through AB

$y = -1$ and $x = 5$

Step 1 Find gradient of line AB

gradient $= \frac{\text{rise}}{\text{run}}$

$= \frac{4}{2}$ M1

$= 2$

or gradient $= \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{4 - 0}{0 - -2}$

$= \frac{4}{2}$

$= 2$

Step 2

gradient of line through AB = 2

∴ gradient of perpendicular line through point C is $-\frac{1}{2}$ M1

Step 3

$y = mx + c$

$m = -\frac{1}{2}$ $y = -\frac{1}{2}x + c$

now use $x = 5$ and $y = -1$ to find c

$-1 = -\frac{1}{2} \times 5 + c$

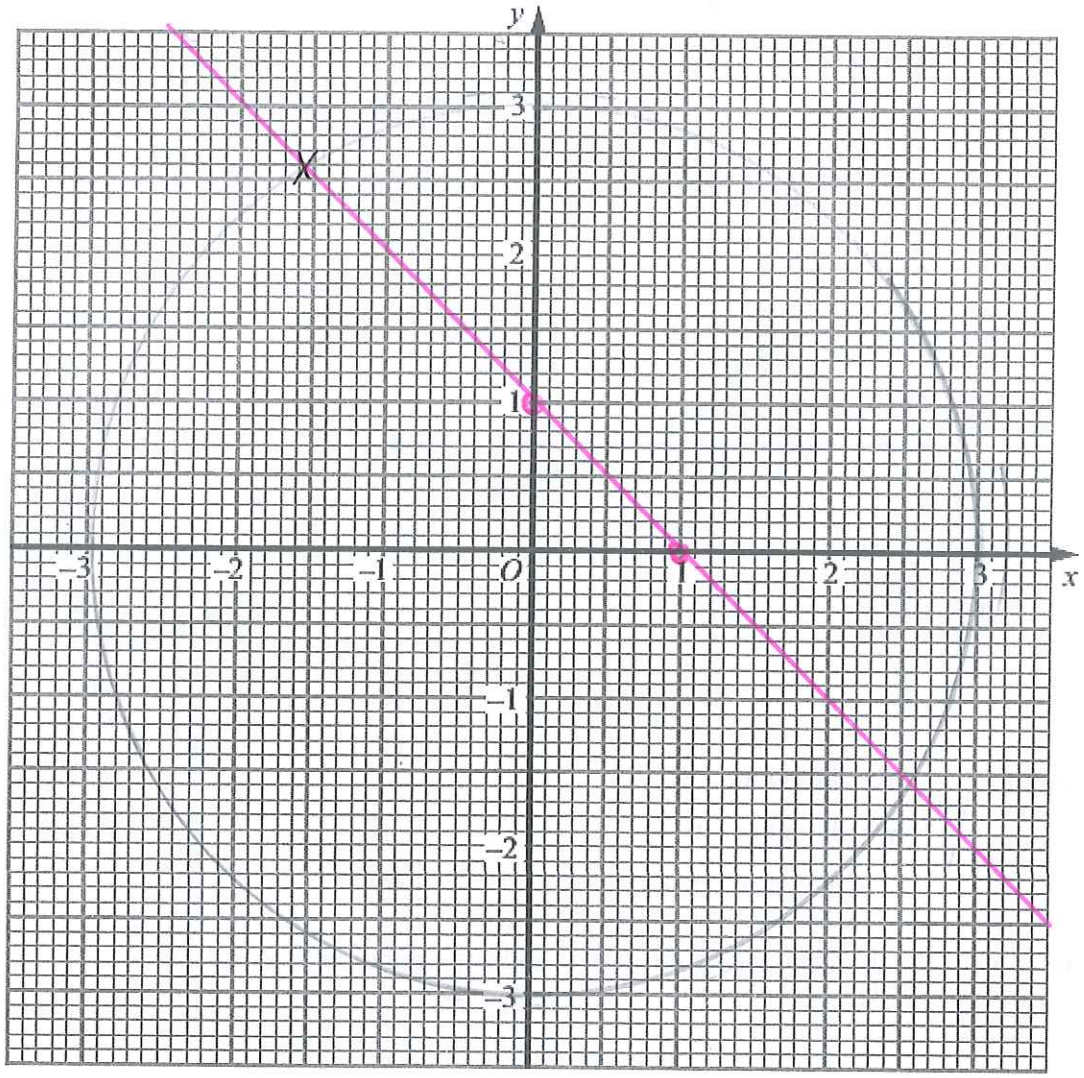
$-1 = -\frac{5}{2} + c$ $+\frac{5}{2}$ M1

$\frac{3}{2} = c$

∴ $y = -\frac{1}{2}x + \frac{3}{2}$ **(Total 4 marks)** A1

MW 19-7

21. (a) Construct the graph of $x^2 + y^2 = 9$



B1 circle centre (0,0)
B1 radius 3

(2)

(b) By drawing the line $x + y = 1$ on the grid, solve the equations $x^2 + y^2 = 9$, $x + y = 1$

B1 correct line

$x^2 + y^2 = 9$ is a circle centre (0,0) radius $\sqrt{9} = 3$

$x =$ −1.6 , $y =$ 2.6 A1 both

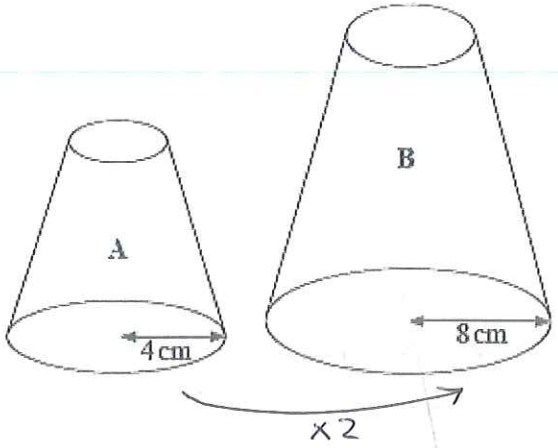
or $x =$ 2.6 , $y =$ −1.6 A1 both

(3)

(Total 5 marks)

MW 200

22.



Two solid shapes, **A** and **B**, are mathematically similar.

The base of shape **A** is a circle with radius 4 cm.
The base of shape **B** is a circle with radius 8 cm.
The surface area of shape **A** is 80 cm^2.

(a) Work out the surface area of shape **B**.

Scale Factor length $= 2$

$\therefore$ Scale Factor area $= 2^2 = 4$

Surface Area Shape B $= 4 \times$ Surface Area Shape A
$= 4 \times 80\ cm^2$ M1
$= 320$

320 ..... cm^2 A1

(2)

The volume of shape **B** is 600 cm^3.

(b) Work out the volume of shape **A**.

Scale Factor length $= 2$

$\therefore$ Scale Factor Volume $= 2^3 = 8$

Volume Shape B $= 4 \times$ Volume Shape A

M1 $600\ cm^3 = 8 \times$ Volume Shape A ÷8

~~150~~ 75 cm^3 = Volume Shape A

75 ..... cm^3 A1

(2)

(Total 4 marks)

MW 1814

23.

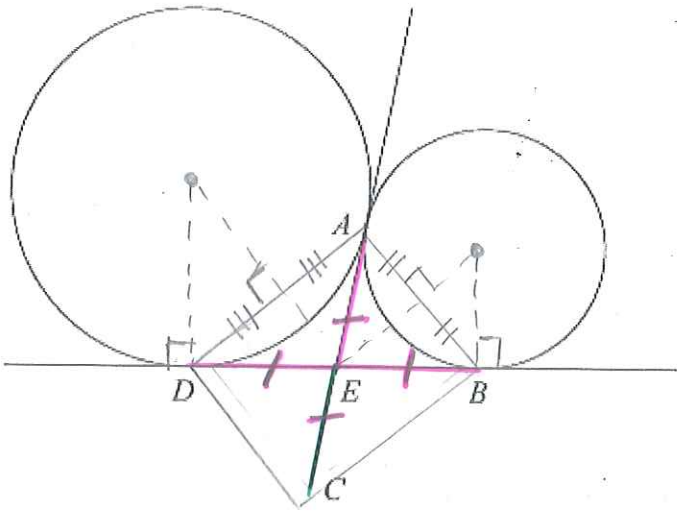


Diagram NOT accurately drawn.

A and *D* are two points on the circumference of a circle.
A and *B* are two points on the circumference of a smaller circle.
DB and *AC* are tangents to both circles.
E is the intersection of *DB* and *AC*.
E is the midpoint of *AC*.

Prove that *ABCD* is a rectangle.

- We can prove that the diagonals of the quadrilateral ABCD bisect each other and this is one property of a rectangle
- Tangents from a circle which meet at a point are equal B1
  ∴ EA = EB and EA = ED ∴ EA = EB = ED
  E is the midpoint of AC (told in question)
  ∴ EA = EC
  ∴ we have proved that EA = EB = ED = EC B1, the diagonals bisect each other (bisect means cut in half)
- The diagonals must also be equal such that
  AC = DB B1 (

C1
The diagonals of the quadrilateral ABCD bisect each other and are equal. ABCD is therefore a rectangle.

(Total 4 marks)

TOTAL FOR PAPER IS 80 MARKS