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.

Solutions

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.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Work out 5.4×0.24

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

3 figs after points in question so 3 figs after point in answer

1.296

(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.

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

71.5 $\leq H <$ 72.5

(Total 2 marks)

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

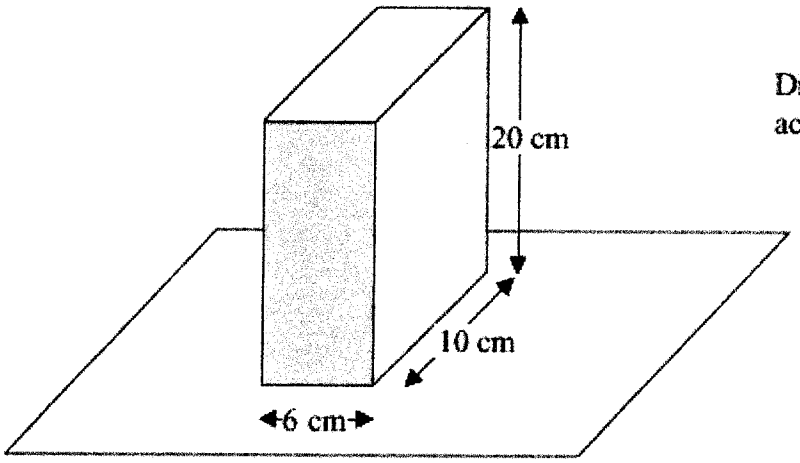


Diagram **NOT** accurately drawn

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.

Juice volume = $10 \times 6 \times 8 = 480\ cm^3$

Depth when standing on shaded face

$= 480 \div$ Area of shaded face

$= 480 \div (20 \times 6)$

$= \frac{480}{120}$

$= 4\ cm$

4 ..... cm

(Total 3 marks)

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

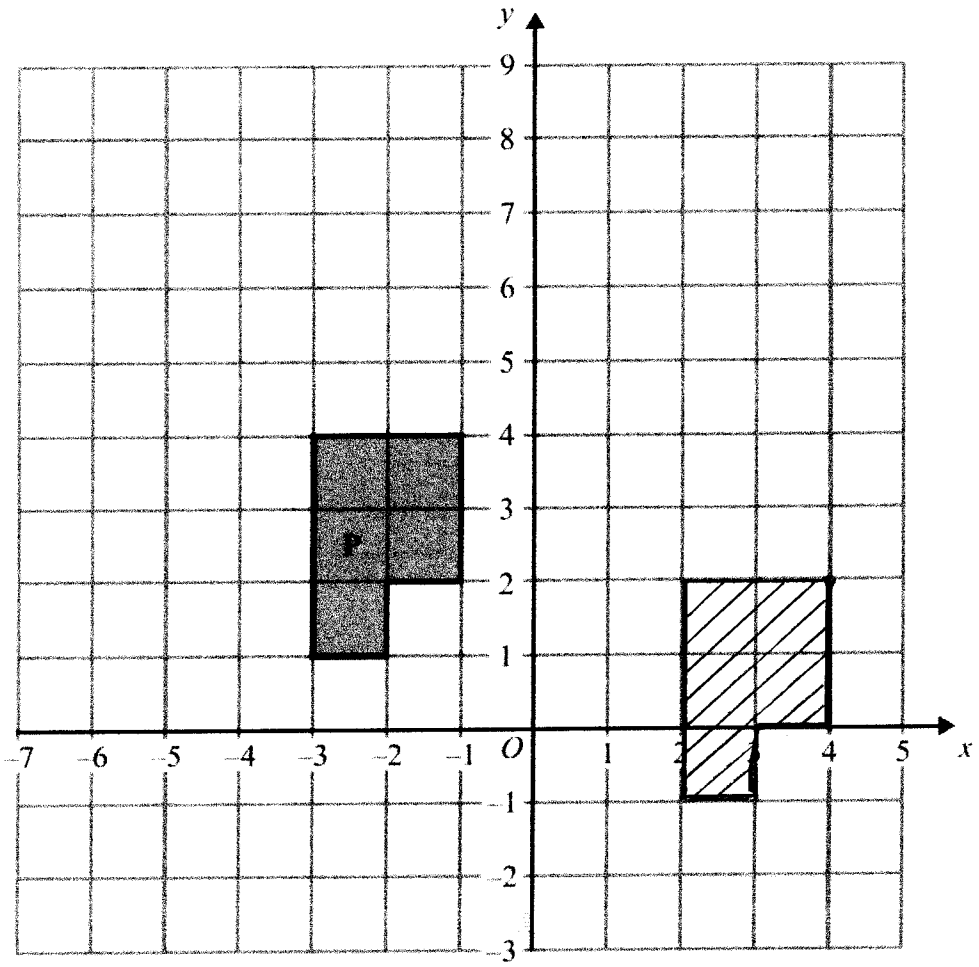
0.038×10^{2} 3800×10^{-4} 380 0.38×10^{-1}

$= 3.8$ $= 0.38$ $= 380$ $= 0.038$

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

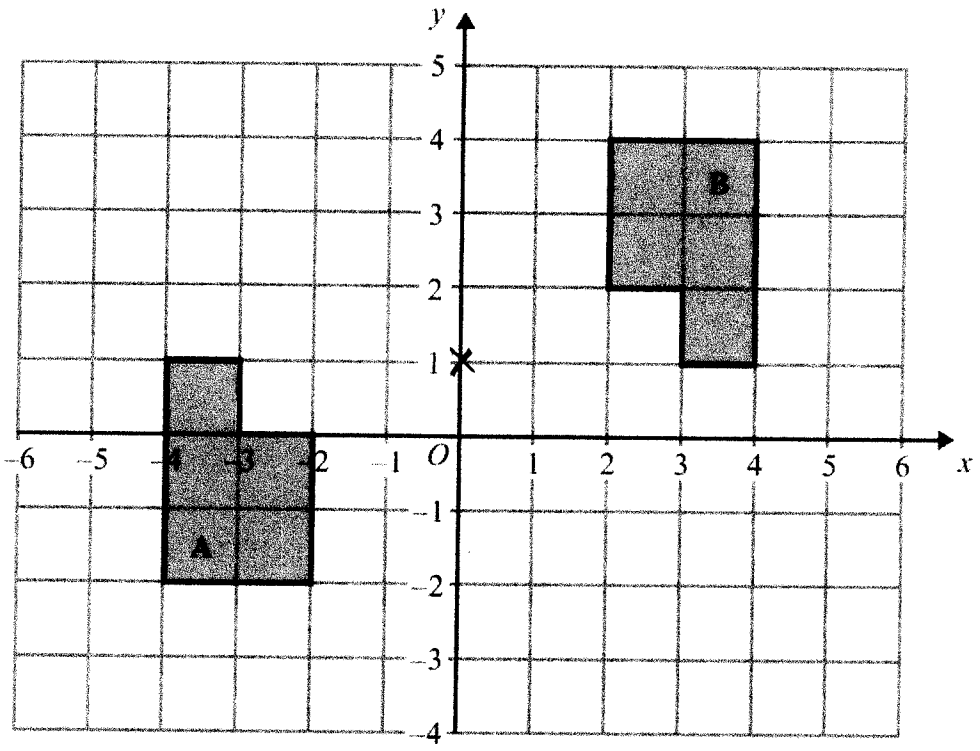
(Total 2 marks)

5.



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

(2)



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

Rotation by 180° about point (0, 1)

(3)

(Total 5 marks)

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

$x+2$

(1)

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

$6a^5b^2$

(2)

(Total 3 marks)

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7. Talil is going to make some concrete mix.
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?

$1 + 3 + 5 = 9$ parts

9 parts $= 180$ kg

1 part $= \frac{180}{9} = 20$ kg

Talil requires cement $1 \times 20\text{kg} = 20$ kg

sand $3 \times 20\text{kg} = 60$ kg

gravel $5 \times 20\text{kg} = 100$ kg

Cannot make 180 kg of concrete mix because he would need another 5 kg of cement.

(Total 4 marks)

8. 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

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

$\frac{1}{4}$ of 600 ml = 150 ml

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

150 ml wallpaper remover : 4500 ml of water
÷3 50 ml " : 1500 ml "
÷2 25 ml " : 750 ml "

25 .....ml

(Total 4 marks)

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
Cumulative		19	28	42	60

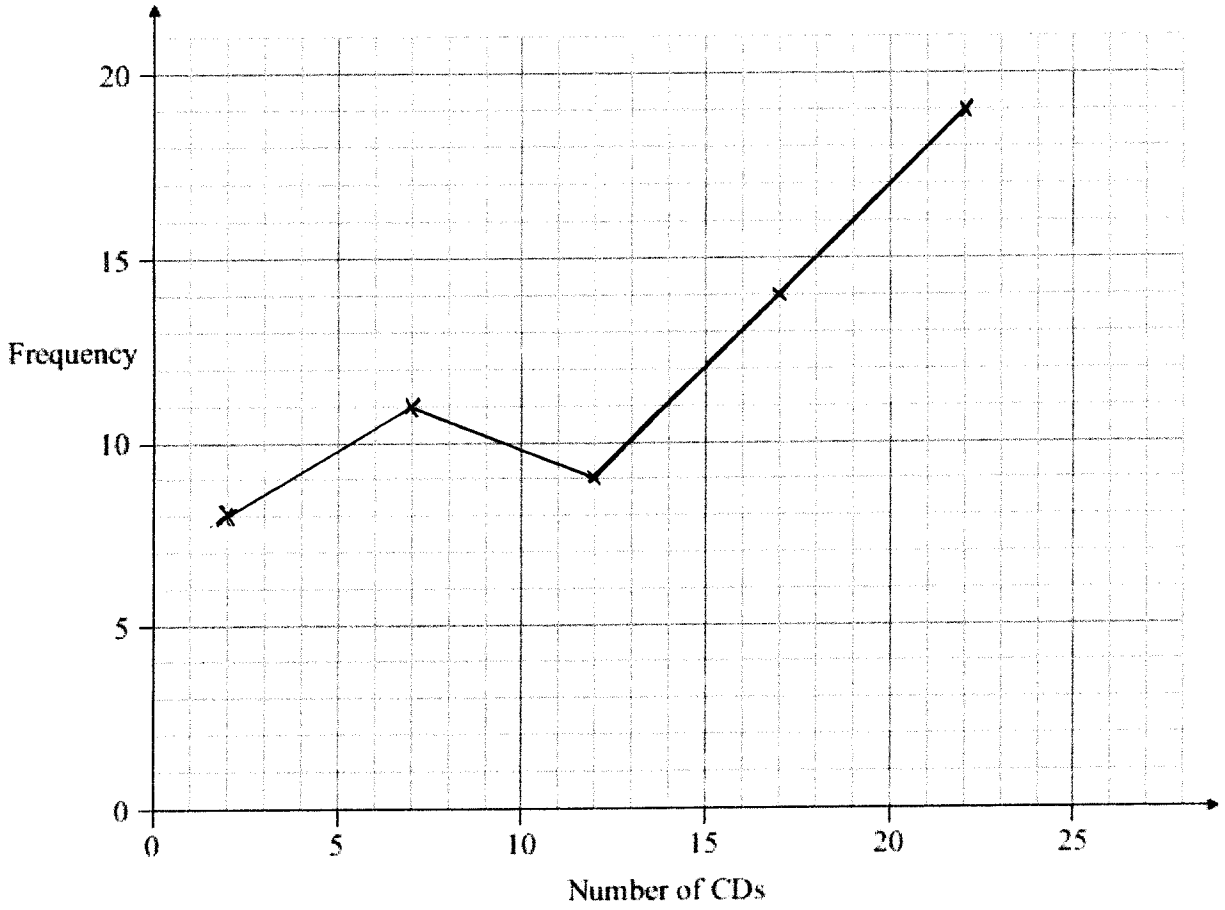
(a) Write down the class interval containing the median.

15 – 19

Median is item $\frac{60+1}{2} = 30.5$ which is in 15 – 19

(1)

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



(2)

(Total 3 marks)

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

$$5(q+p) = 4 + 8p$$
$$5q + 5p = 4 + 8p$$
$$5q = 4 + 8p - 5p$$
$$5q = 4 + 3p$$
$$q = \frac{4 + 3p}{5}$$

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

(Total 3 marks)

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

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

$= x^2 + 2x - 15$

$x^2 + 2x - 15$

(2)

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

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

$\Rightarrow$ $x - 1 = 0$ or $x + 9 = 0$

$x = 1$ $\quad$ $x = -9$

$\begin{cases} x = 1 \\ x = -9 \end{cases}$

(3)

(Total 5 marks)

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12. (a) Solve the inequality

$3t + 1 < t + 12$

$3t - t < 12 - 1$

$2t < 11$

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

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

(2)

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

$3t + 1 < t + 12$

$t = 5$

(1)

(Total 3 marks)

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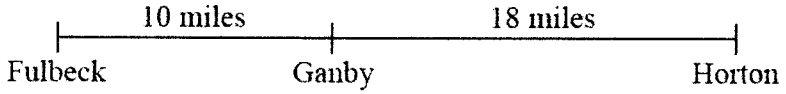
13. The distance from Fulbeck to Ganby is 10 miles.
The distance from Ganby to Horton is 18 miles.



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.

10 miles at 40 mph takes $\frac{1}{4}$ hr = 15 min

Arrives at Ganby at 1015

Has 20 min for second part of journey.

18 miles in $\frac{1}{3}$ of an hour requires speed of 18x3
= 54 mph

54 .....mph

(Total 3 marks)

14. M is directly proportional to L^3.

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

Find the value of M when $L = 3$

$M = kL^3$

Sub $L = 2$, $M = 160$

$160 = k \times 2^3$

$160 = 8k$

$\frac{160}{8} = k$

$20 = k$

$\therefore M = 20L^3$

When $L = 3$, $M = 20 \times 3^3$

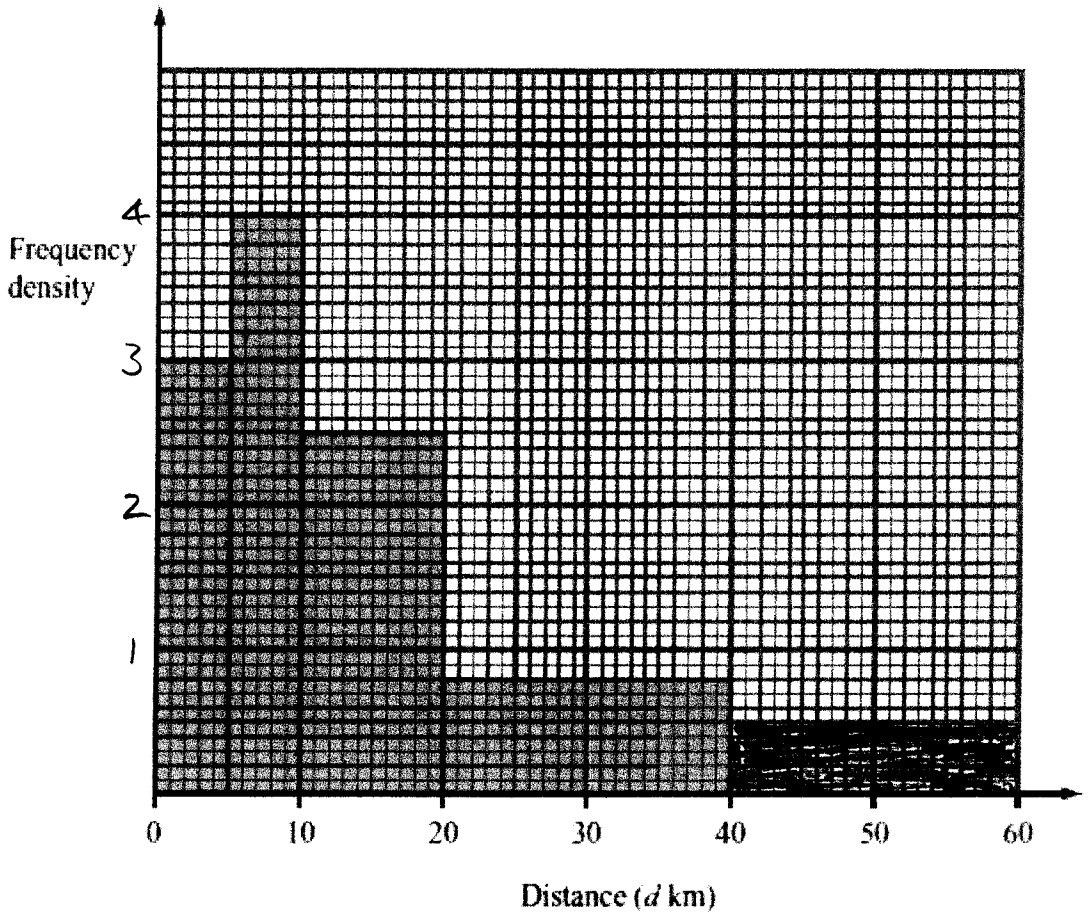
$M = 20 \times 27$

$M = 540$

$M = 540$

(Total 4 marks)

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)	Frequency
$0 < d \leq 5$	15
$5 < d \leq 10$	20
$10 < d \leq 20$	25
$20 < d \leq 40$	16
$40 < d \leq 60$	10

Freq Density

$\frac{15}{5} = 3$

(2.5×10)

(0.8×20)

$\frac{10}{20} = 0.5$

(2)

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

(1)

(Total 3 marks)

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

7

(1)

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

Probably meant to ask for $\sqrt{45}$ in form $k\sqrt{5}$

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

$3\sqrt{5}$

(1)

(Total 2 marks)

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

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

Let $x = 0.0454545.....$

$\Rightarrow 10x = 0.454545.....$

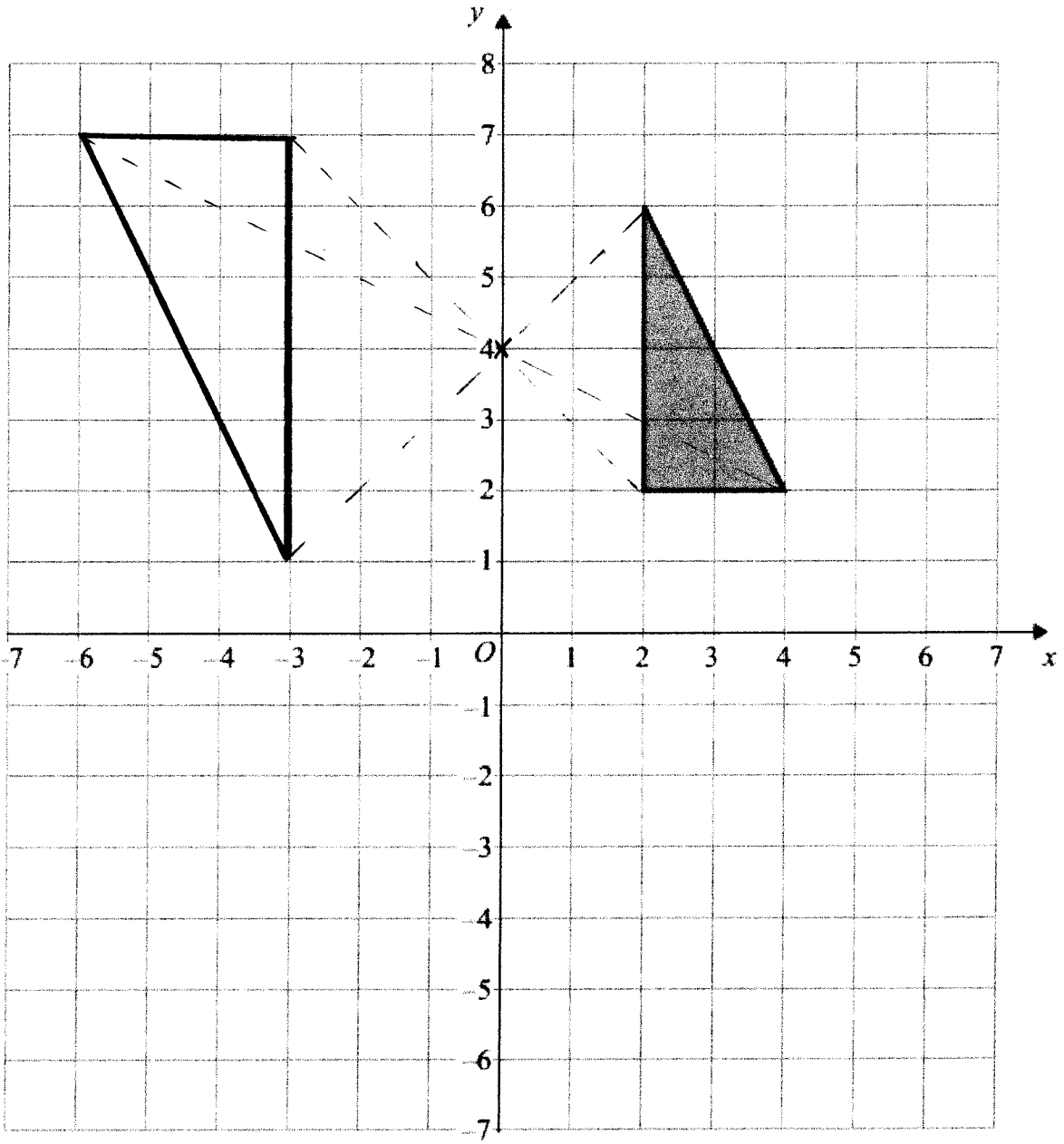
$\Rightarrow 1000x = 45.454545.....$

Subtract $\Rightarrow 990x = 45$

$\Rightarrow x = \frac{45}{990} = \frac{5}{110} = \frac{1}{22}$

(Total 3 marks)

18.



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

(Total 3 marks)

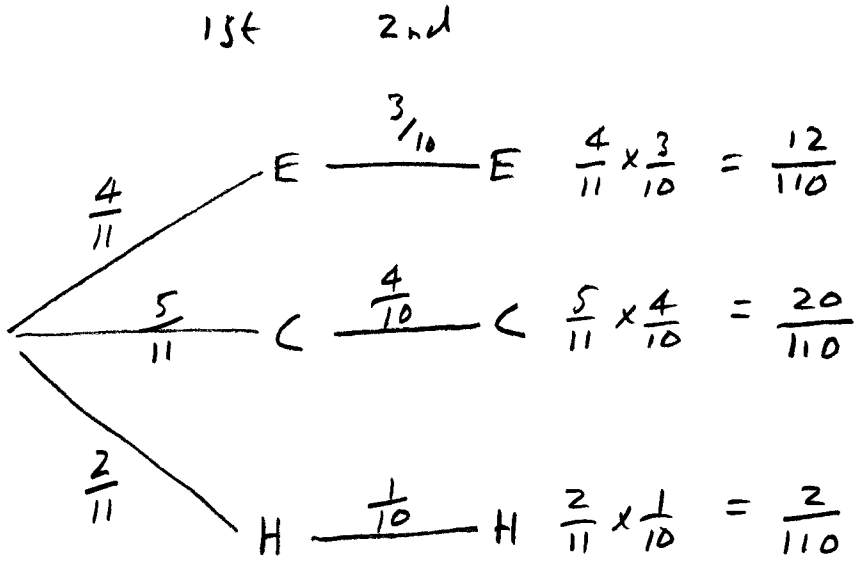
19. There are three different types of sandwiches on a shelf.

There are

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

Erin takes at random 2 of these sandwiches.

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



Prob (Both sandwiches the same) $= \frac{12}{110} + \frac{20}{110} + \frac{2}{110} = \frac{34}{110}$

Prob (2 different types) $= 1 - \text{Prob (Both the same type)}$

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

$= \frac{76}{110}$

$= \frac{38}{55}$

$\frac{38}{55}$

(Total 5 marks)

20.

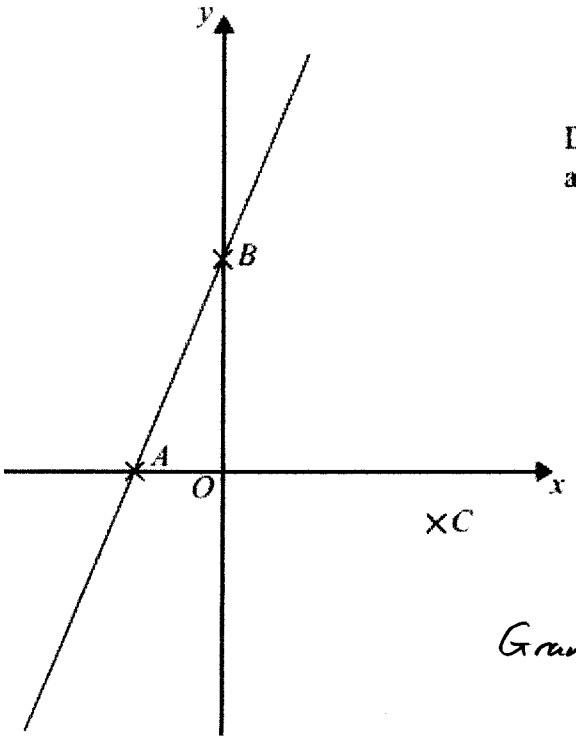


Diagram **NOT** accurately drawn

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.

Gradient of AB $= \frac{y_2 - y_1}{x_2 - x_1}$

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

$= \frac{4}{2}$

$= 2$

Gradient of $\perp$ line $= -\frac{1}{2}$

$y = -\frac{1}{2}x + c$ passing through $(5, -1)$

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

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

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

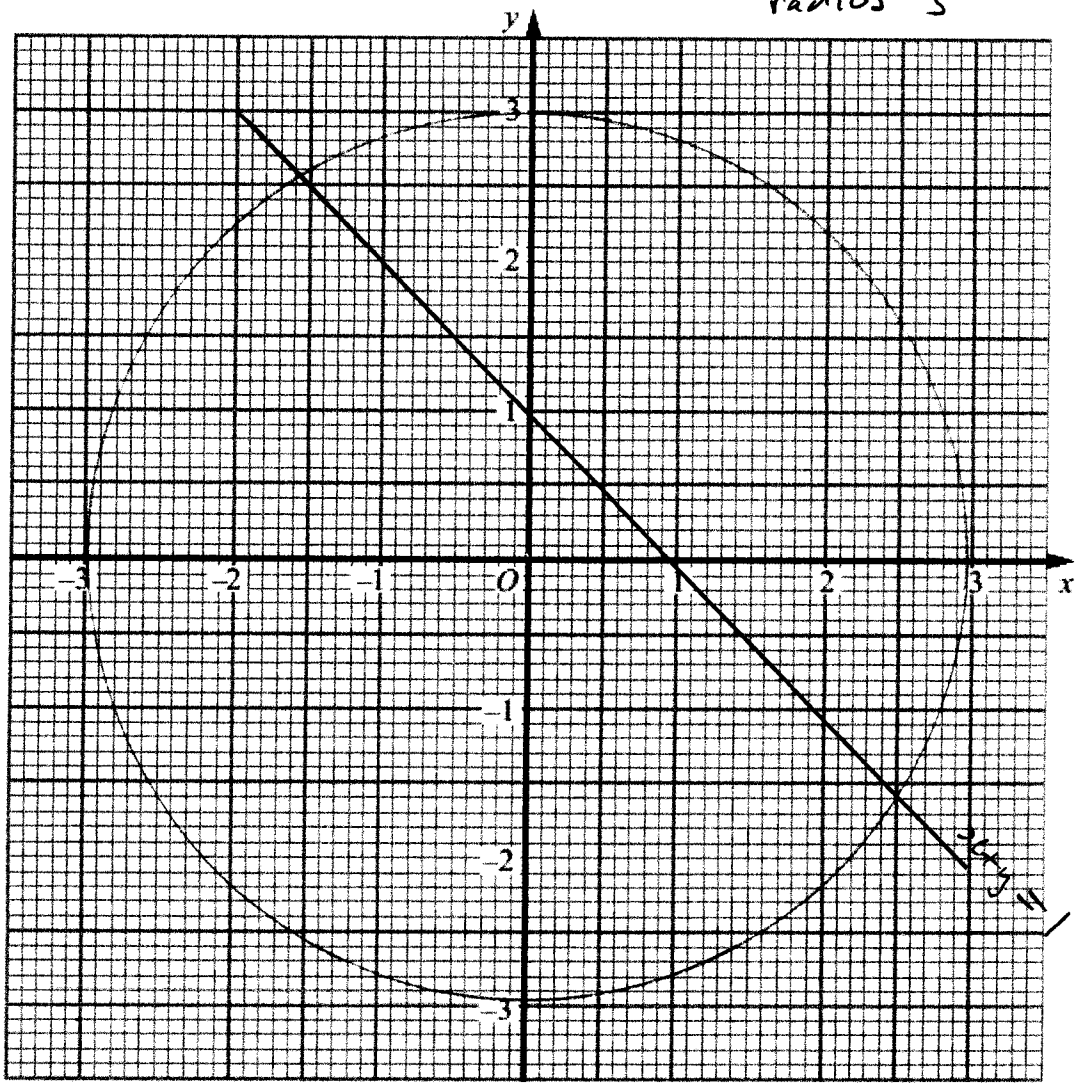
$\frac{3}{2} = c$ $\Rightarrow$ $y = -\frac{1}{2}x + \frac{3}{2}$

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

.....

(Total 4 marks)

21. (a) Construct the graph of $x^2 + y^2 = 9$ circle centre (0, 0) radius 3



(2)

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

Solution from points of intersection of circle and line

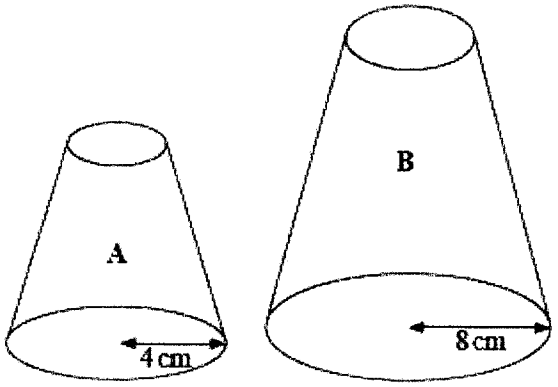
$x =$ 2.5 , $y =$ −1.6

or $x =$ −1.6 , $y =$ 2.5

(3)

(Total 5 marks)

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**.

Length 4 : 8
= 1 : 2

Area = $1 : 2^2$
= 1 : 4

$80 \times 4 = 320\ cm^2$

320 ..... cm^2
(2)

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

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

Volume = $1 : 2^3$
= 1 : 8

Volume of A = $\frac{600}{8} = 75\ cm^3$

75 ..... cm^3
(2)

(Total 4 marks)

23.

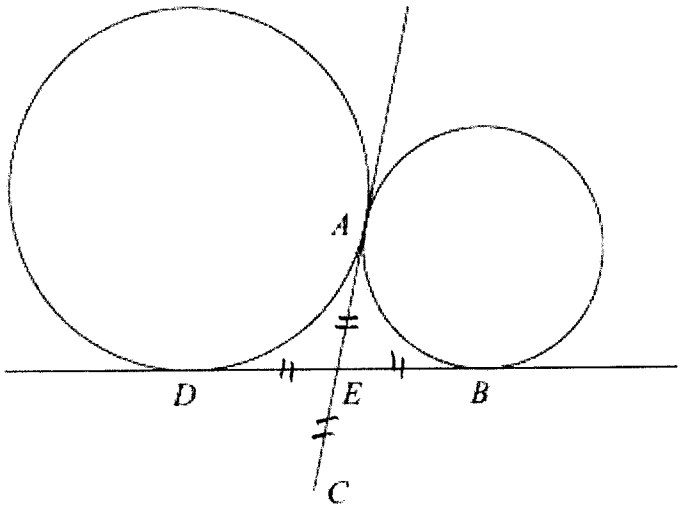


Diagram **NOT** accurately drawn.

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.

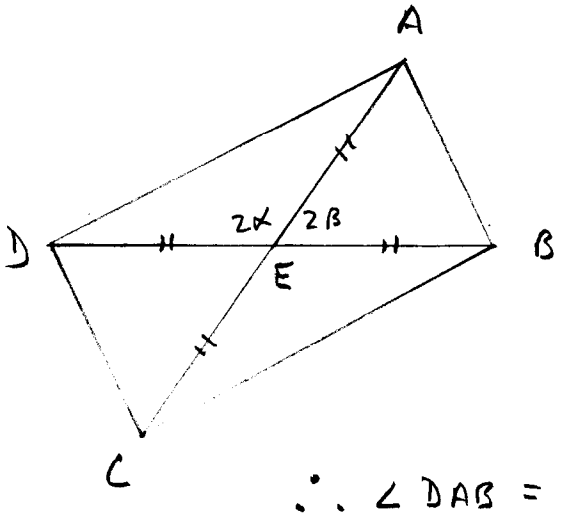
Prove that $ABCD$ is a rectangle.

$ED = EA$ tgts from a single point equal in length

$EB = EA$ same reason for other circle

$EC = EA$ given

$\therefore ED = EA = EB = EC$



Let $\angle AED = 2\alpha$
and $\angle BEA = 2\beta$

then $2\alpha + 2\beta = 180$
$\alpha + \beta = 90$

As $\triangle AED$ is isosceles
$\angle DAE = \frac{180 - 2\alpha}{2} = 90 - \alpha$

As $\triangle AEB$ is isosceles
$\angle EAD = \frac{180 - 2\beta}{2} = 90 - \beta$

$\therefore \angle DAB = 90 - \alpha + 90 - \beta$
$= 180 - (\alpha + \beta)$
$= 180 - 90$
$= 90°$

Proof the same for other 3 corners $= 90°$

(Total 4 marks)

$\therefore$ ABCD is a rectangle

TOTAL FOR PAPER IS 80 MARKS