

General Exam Paper 1 Solutions 2002

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1. (a) Given $9.2 - 3.71 + 6.47$

$$\begin{array}{r} 9.20 \\ - 3.71 \\ \hline 5.49 \end{array}$$

$$\begin{array}{r} 5.49 \\ + 6.47 \\ \hline 11.96 \\ \hline 1 \end{array}$$

- (b). Given 7.29×8

$$\begin{array}{r} 7.29 \\ \times 8 \\ \hline 58.32 \\ \hline 27 \end{array}$$

- (c). Given $687 \div 300$

Divide by 100 first then

$$\begin{array}{r} 0.229 \\ 3 \overline{)0.687} \end{array}$$

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(d).

$$3 \times 2\frac{3}{4}$$

Step 1 : Make top heavy the same $\frac{3}{1} \times \frac{11}{4}$

Step 2 : Multiply top then bottom $\frac{3}{1} \times \frac{11}{4} = \frac{33}{4} = 8\frac{1}{4}$

2. Given a bag of sweets contains 3 yellow sweets, 4 purple sweets, 2 red sweets and 6 pink sweets.

(a) The probability that if a sweet falls out it will be yellow:

$$P(\text{yellow}) = \frac{\text{number of yellow}}{\text{total number of sweets}} = \frac{3}{15} = \frac{1}{5}$$

(b) Given that it was a yellow sweet that fell out and it was put in the bin. The probability that the next sweet to fall out is pink:

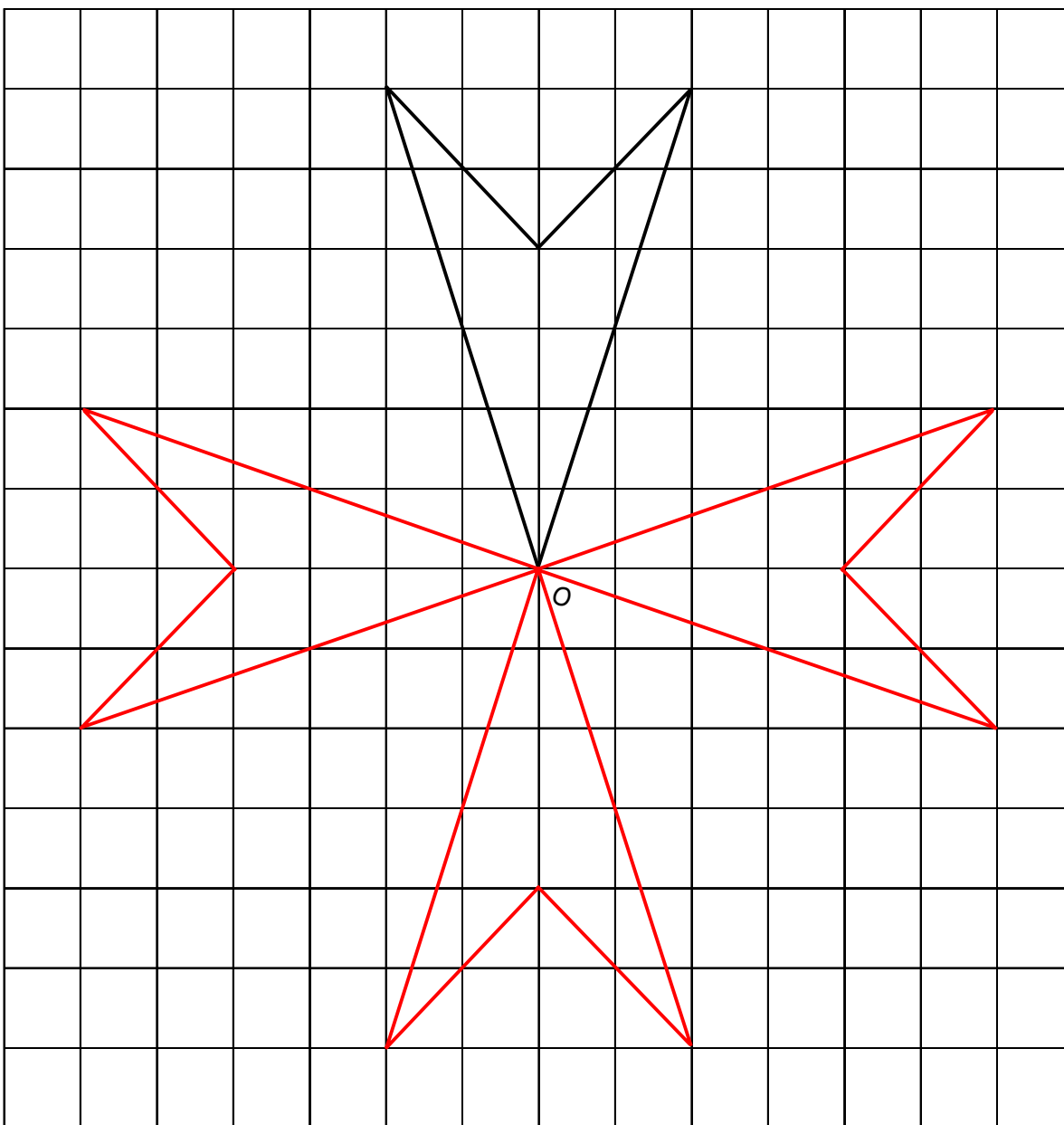
$$P(\text{pink}) = \frac{\text{number of pink}}{\text{total number of sweets}} = \frac{6}{14} = \frac{3}{7}$$

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3. Completing the shape so it has quarter-turn symmetry we have:



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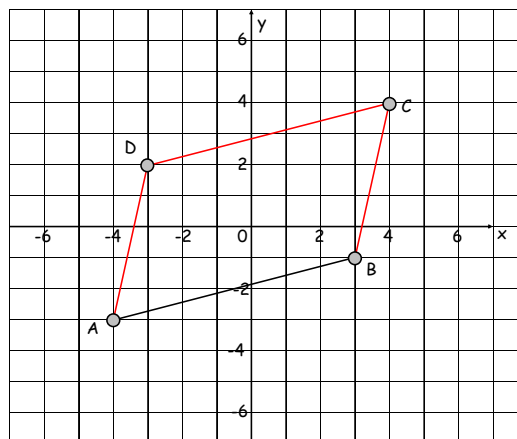
4. Given 30% of 5 million people aged 15-19 watch cartoons. This is:

$$\frac{3}{10} \text{ of } 5\,000\,000$$

Step 1 : Divide by 10: 500 000

Step 2 : Multiply by 3: 1 500 000

5. (a) Plotting the points A (-4, -3), B (3, -1), C (4, 4) on the graph we get:



(b)
$$\text{gradient} = \frac{\text{Vertical height}}{\text{horizontal Distance}} = \frac{2}{7}$$

- (c) To make a parallelogram we add the point D (-3, 2)

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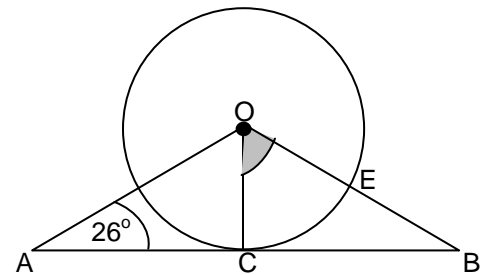
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6. Given the various values, rearranging in order smallest first we get:

0.404	$\frac{1}{4}$	41%	0.04	$\frac{4}{10}$
0.04	$\frac{1}{4}$	$\frac{4}{10}$	0.404	41%

7. Given

- Centre O
- Triangle AOB is isosceles
- AC is a tangent line to the circle at C
- Angle DBA = 70°



Angle COB is given by:

AOB is an isosceles triangle so angle CBO = 26° and angle AOB = 128° .

Since AB is a tangent to the circle, angle BCO is right-angled.

Angle COB is $180^\circ - 90^\circ - 26^\circ = 64^\circ$

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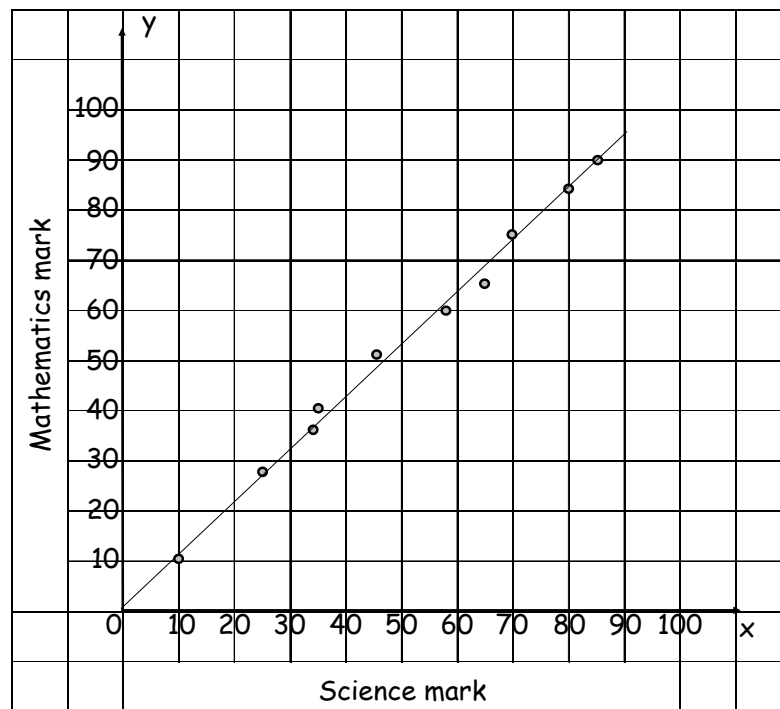
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8. Given the Science and Mathematics marks in the table below.

Student	A	B	C	D	E	F	G	H	I	J
Science mark	35	45	65	70	57	25	80	85	10	34
Mathematics mark	41	52	65	75	60	28	84	90	11	37

- (a) We can draw a Scattergraph.



- (b) See graph
- (c) A student who scores 50 in Science would be expected to score approximately 52 in Mathematics.

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9. Given the heights of Plant A and Plant B for one week and then their heights again the next week. The plant that has grown the most is:

$$\text{Plant A } 57\text{cm} - 29\text{cm} = 28\text{cm}$$

$$\text{Plant B } 71\text{cm} - 46\text{cm} = 25\text{cm}$$

Plant A has grown the most by 3cm.

10. Given that Mr. Anderson switches his five tyres on his car in such a way that they are used equally. If he travelled 20 000 miles last year then each tyre must have been used for:

Each tyre must cover:

$$\frac{4}{5} \text{ of } 2000$$

$$\text{Step 1: } 20\,000 \div 5 = 4\,000$$

$$\text{Step 2: } 4\,000 \times 4 = 16\,000 \text{ miles}$$

Each tyre does 16 000 miles

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1. Given John drives from Edinburgh to Inverness at an average speed of 76km/hr and this takes 3 hours 45 minutes. To calculate the distance we have:

Changing 3 hours 45 mins to hours only

$$3 + \frac{45}{60} = 3 + 0.75 = 3.75 \text{ hours}$$

$$\begin{aligned} \text{Distance} &= \text{speed} \times \text{time} \\ &= 76 \times 3.75 \\ &= 285\text{km} \end{aligned}$$

2. (a) Given the special offer for the computer is £779 + VAT @17.5%. To calculate the total cost we have:

$$\begin{aligned} 1.175 \times 779 &= £915.325 \\ &= £915.325 \text{ (to the nearest penny)} \end{aligned}$$

- (b) Given Andrea see a deal at £900 including VAT and the special offer in part (a) says they "will refund double the difference if you see it cheaper within a month". She will get back:

$$\begin{aligned} 915.33 - 900 &= £15.33 \\ 15.33 \times 2 &= £30.66 \end{aligned}$$

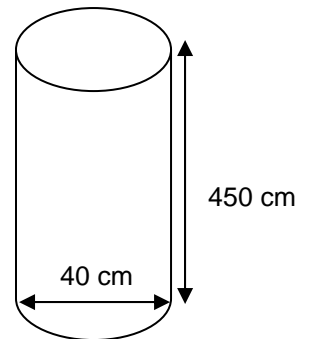
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- 3 (a) Given the diagram of the cylinder and the dimensions.
To calculate the volume we have:

$$\begin{aligned}\text{Volume} &= \pi \times r^2 \times h \\ &= \pi \times 20^2 \times 450 \\ &= 565487\text{cm}^3\end{aligned}$$



- (b) In scientific notation the answer in part (a) is:

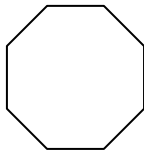
$$5.65487 \times 10^5 \text{cm}^3$$

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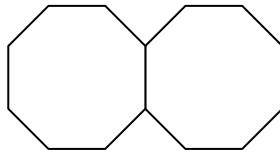
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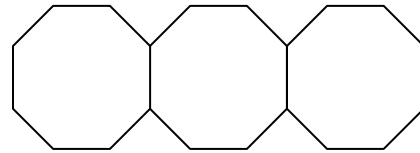
4. Given the patterns.



Section 1



Section 2



Section 3

(a) Completing the table we get:

Number of section (s)	1	2	3	4		12
Number of iron bars (b)	8	15	22	29		85

(b) Steps for working out the rule:

1. Difference is 7
2. Part of rule is $7s$
3. Correction factor, so that the rule works is, add on 1

$7 \times 1 + 1 = 20$

Full rule is: $b = 7s + 1$ = Check !!!!

(c) Given a fence has 176 iron bars. To calculate the number of sections we have:

$$176 = 7s + 1$$

$$7s = 176 - 1$$

$$7s = 175$$

$$s = \frac{175}{7} = 25$$

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5. Given the sum of £1640 invested in a bank at simple interest of 4.5%.
After 9 months it will be worth:

4.5% of 1640

1% → 16.40

0.5% → £8.20

4% → £65.60

4.5% → £73.80

Since 9 months is $\frac{3}{4}$ of a year we have:

$$\frac{3}{4} \times 73.80 = 73.80 \div 4 \times 3 = 55.35$$

Total interest is £55.35

6. Given that PQRS is a rhombus and the dimensions.
To calculate the shaded angle we have:

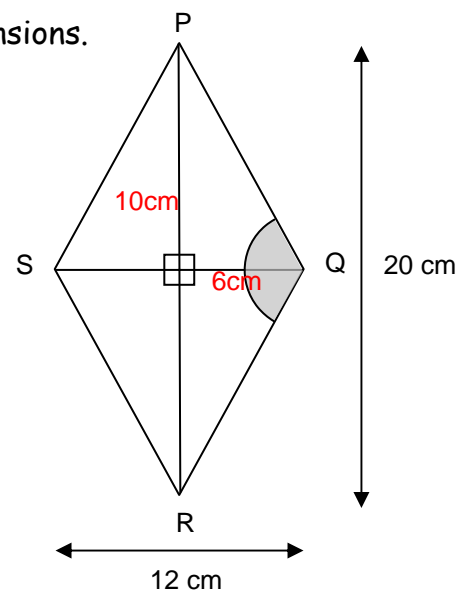
Knowing the properties of a rhombus and

using (S°H)(C^H)(T°A)

$$\angle PQS = \tan^{-1}\left(\frac{10}{6}\right) = 59^\circ$$

Hence shaded area PQR has angle

$$59^\circ \times 2 = 118^\circ$$



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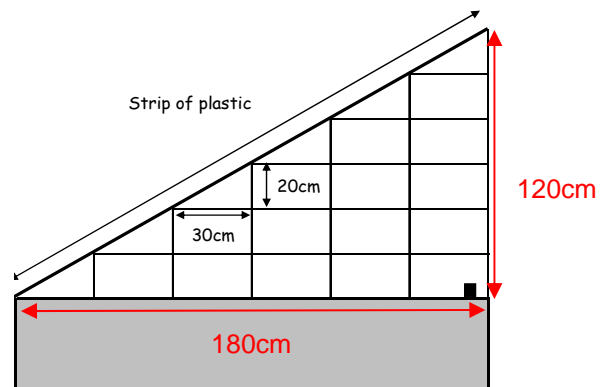
7. Given the diagram and measurements, the total goal height is:

Using Pythagoras
the length of the strip (s) is:

$$s = \sqrt{180^2 + 120^2}$$

$$s = \sqrt{46800}$$

$$s = 216.3 \text{ cm}$$



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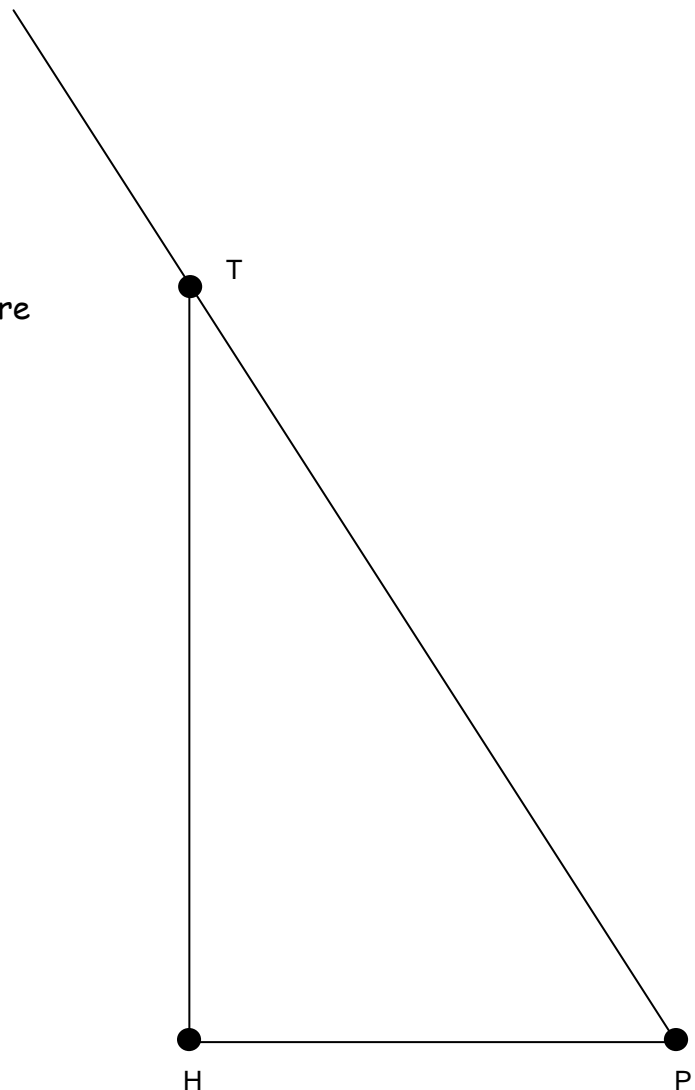
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8. (a) Drawing the diagram using the scale of 1:2 we get:

- (b) Measuring the length of PT we get 12.5cm.

The real length therefore is:

$$12.5 \times 2 = 25\text{cm}$$



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9. (a) Solving the equation we get:
(Remember change side change sign)

$$\begin{aligned} 4(3x + 2) &= 68 \\ 12x + 8 &= 68 \\ 12x &= 68 - 8 \\ 12x &= 60 \\ x &= \frac{60}{12} \\ x &= 5 \end{aligned}$$

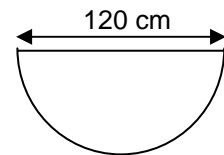
- (b) Factorising we get:

$$10y + 15 = 5(2y + 3)$$

10. Given the semi-circle table diagram and dimensions.

- (a) To calculate the length of the metal trim round the perimeter we have:

$$\begin{aligned} P &= \frac{1}{2} \times \pi \times D + D \\ &= \frac{1}{2} \times \pi \times 120 + 120 \\ &= 308.4 \text{ cm} \end{aligned}$$



- (b) Given 16 tables need metal trim and the joiner has 50m of trim.

$$50\text{m} \rightarrow 5000\text{cm}$$

$$16 \overline{) 5000} \begin{array}{r} 49.36 \end{array} \text{ the joiner has enough material}$$

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11. Given the hire purchase price is 22% greater than the cash price of £6300. The hire purchase agreement requires a deposit of 15% of the cash price, followed by 60 equal instalments.

To calculate the cost of each instalment:

$$\text{H.P.} = 6300 + 6300 \times 0.22 = \text{£}7686$$

$$\text{Deposit} = 6300 \times 0.15 = \text{£}945$$

$$\text{Still to pay } \text{£}7686 - \text{£}945 = \text{£}6741$$

Instalments are :

$$60 \overline{) 6741.00} \quad \text{£}112.35$$