AddvanceMaths.com

Year 10

Topics 1 - 6

Practice Exam

Mark Scheme and revision:
www.addvancemaths.com/year10

Name:		
Teacher:		
Score:	/72	%

1 Hour 15 min

Instructions

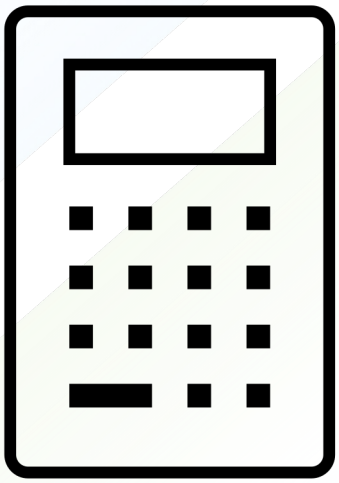
- Use black or blue ball-point pen.
- Answer all the questions in the spaces provided.
- You will need: **ruler, protractor, pencil, compass, calculator**

Information

- The marks for each question are shown in brackets.
- The total marks available for this exam is 66.

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.



Calculators are allowed in this paper.
AddvanceMaths recommends the Casio Classwiz fx-991

Designed by: Imad Raheel

Year 10 Topics 1-6 exam

Addvance

1. Solve inequalities, expressing your answer in its simplest form, as a fraction if needed.

(a) $6-(1-2q) \geq 3(5q-2)$

$6-1+2q \geqslant 15q-6$

$5+2q \geqslant 15q-6$ ✓

$11 \geqslant 13q$

$\frac{11}{13} \geqslant q$ or $q \leqslant \frac{11}{13}$ ✓

2

(b) $4\left(\frac{h}{3}+\frac{3}{4}\right) < 3\left(\frac{h}{2}-5\right)$

$\frac{4h}{3}+3 < \frac{3h}{2}-15$ ✓

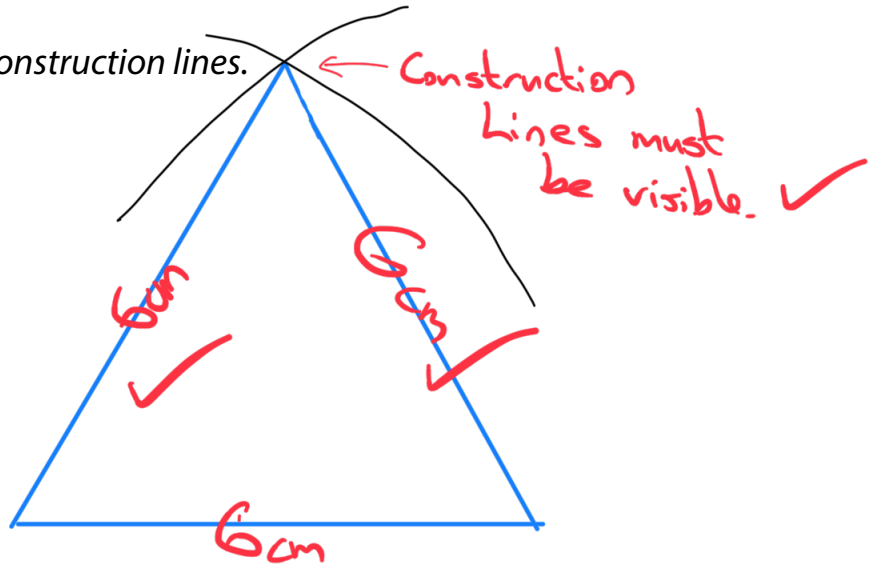
$18 < \frac{3h}{2}-\frac{4h}{3}$ ✓

$18 < \frac{h}{6}$

$108 < h$ or $h > 108$ ✓

3

2. Construct an equilateral triangle with sides of length 5 cm, labelling all the features.
Show all of your construction lines.



3

3. (a) Patel wants to invest \$3200 at the beginning of 2016.
He uses HBL bank, which offers an interest rate of 7% in the first year, followed by 2% every following year.
How much interest does he receive by the end of 2020?

$3200 \times 1.07 \times 1.02^4 = 3706.25$

\$ 3706.25 3

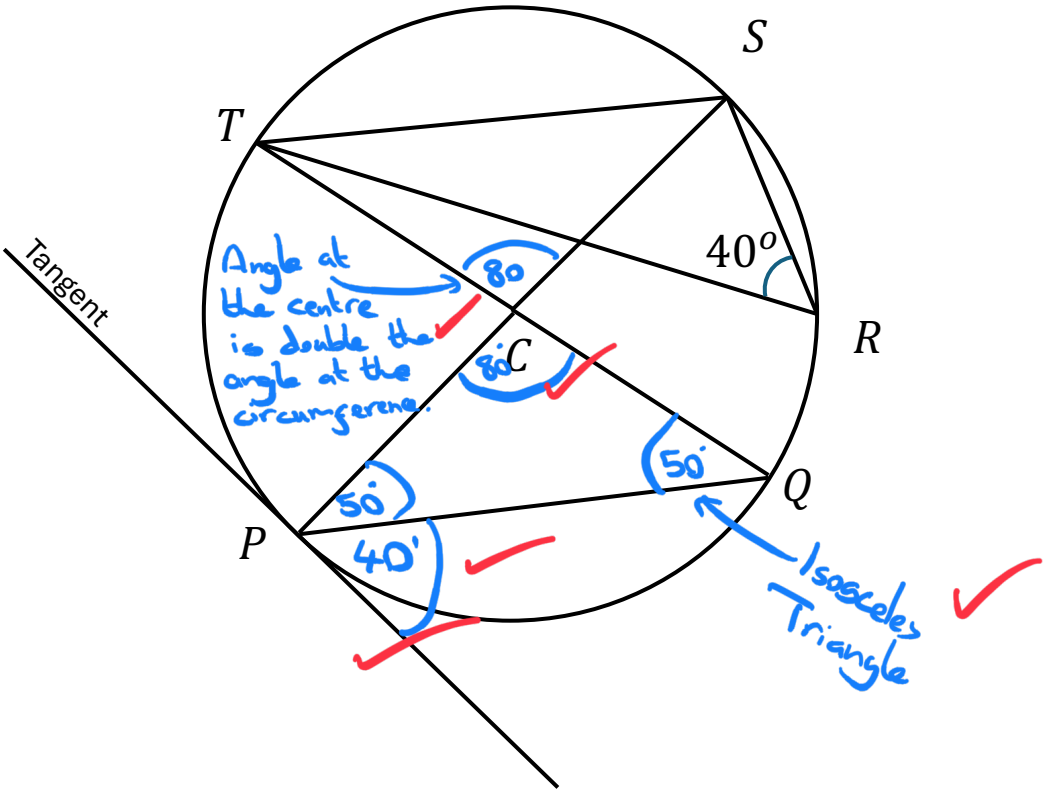
(b) Moaz invests \$800 more than Patel at the beginning of 2016
He uses the same bank, but due to his premium membership, his interest rate is 1% higher each year.
How much **more** does Moaz have than Patel at the end of 2020?

$4000 \times 1.08 \times 1.02^4 = 4862.29$

$4862.29 - 3706.25 = 1155.95$

\$ 1155.95 4

4. (a) The below diagram shows a circle, centre C.
Angle TRS is 40 degrees, and that QCT and PCS are straight lines that touch the circumference.
Find the angle QP makes with the drawn tangent.
Give reasons for each stage of your working.



40 ..... o 5

5

5. Kyran opened his money box to find 50 pieces of currency, consisting of only £2 coins and £5 notes.
If the total value of all the coins and notes is more than £132, what is the smallest number of £5 notes he could have.

$c + n = 50$

$c = 50 - n$

$2c + 5n > 132$ ✓

$2(50 - n) + 5n > 132$

$100 - 2n + 5n > 132$

$100 + 3n > 132$

$3n > 32$ ✓

$n > \frac{32}{3} = 10.6\ldots$

$n = 11$ ✓

11 4

6. People at a cricket academy in Abu Dhabi and Karachi were questioned about the number of wickets they took in their debut match.
The results are shown below:

Abu Dhabi

Wickets	Frequency
0	5
1	9
2	7
3	5
4	8
5	1

Karachi

Wickets	Frequency
0	2
1	7
2	6
3	10
4	11
5	4

(a) Find the median, mode and range of the results from the Abu Dhabi academy.

Median ..... 7 .....

Mode ..... 1 .....

Range ..... 5 .....

3

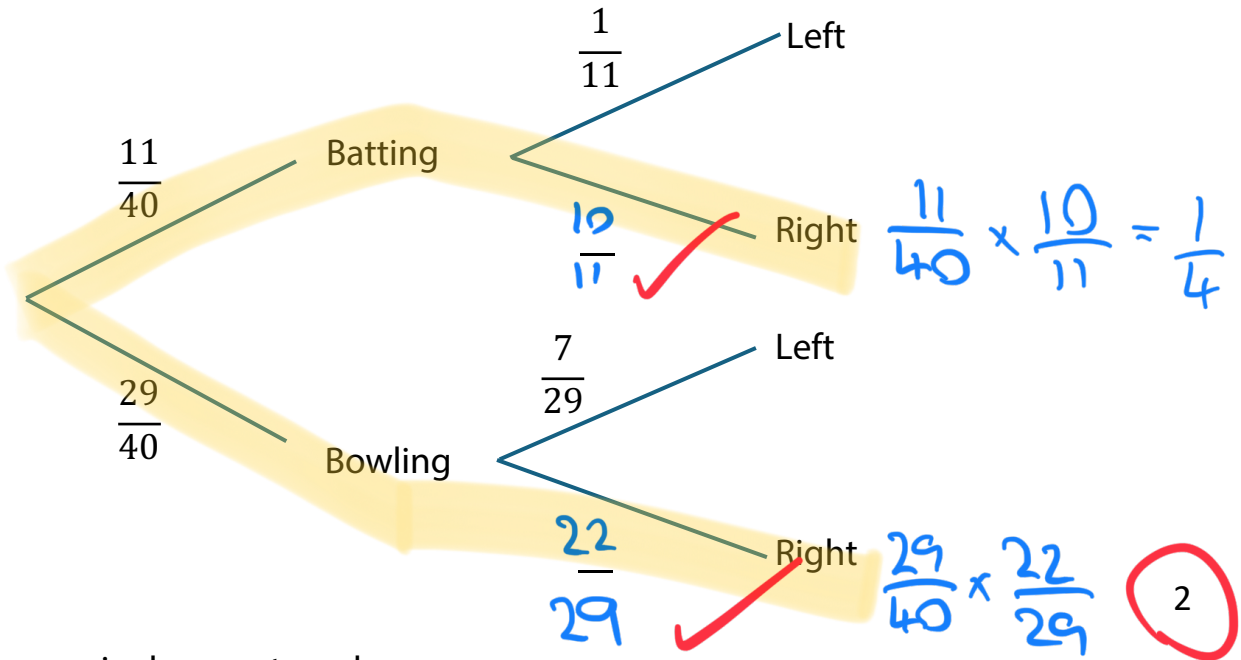
(b) Find the mean number of wickets taken by the people from the academy in Karachi.
Give your answer to 3 significant figures.

$\text{Mean} = \frac{113}{40} = 28.25 = 28.3$

28.3 ..... wickets

4

(c) The main strengths of the people were questioned, as well as what their strong hand was.
None of the people were equally strong with both hands.
Fill in the probability tree diagram for the Karachi academy.



$\frac{11}{40} \times \frac{10}{11} = \frac{1}{4}$

$\frac{29}{40} \times \frac{22}{29}$ 2

(d) A person is chosen at random.
Find the probability that they are right-handed.

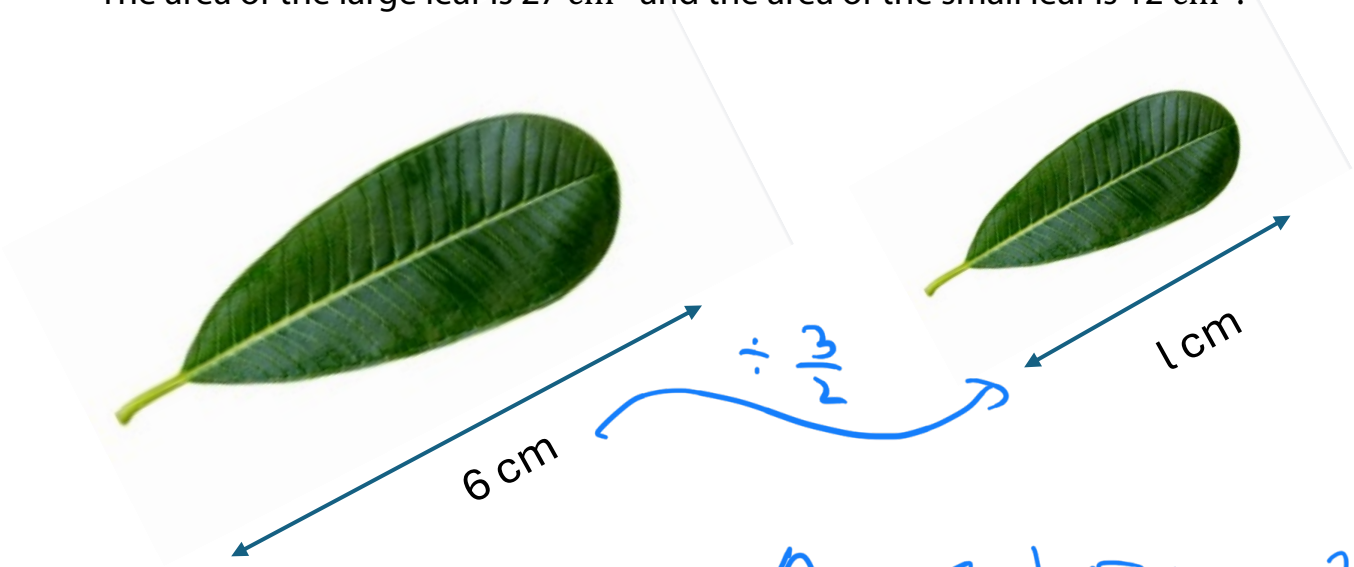
$= \frac{22}{40} = \frac{11}{20}$

$\frac{1}{4} + \frac{11}{20} = \frac{5}{20} + \frac{11}{20} = \frac{16}{20} = \frac{4}{5}$

$\frac{4}{5}$ .....

4

7. Find the unknown length, given the that both leaves are mathematically similar.
The area of the large leaf is 27 cm^2 and the area of the small leaf is 12 cm^2.



Area Scale Factor $= \frac{27}{12} = \frac{9}{4}$

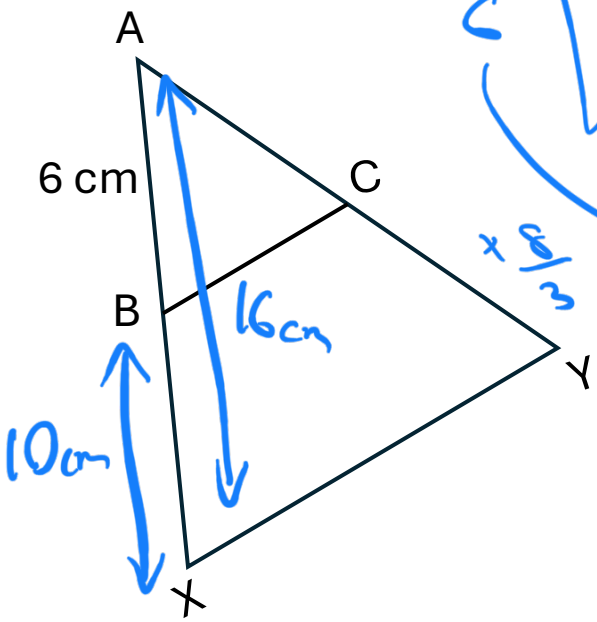
Length Scale Factor $= \sqrt{\frac{9}{4}} = \frac{3}{2}$

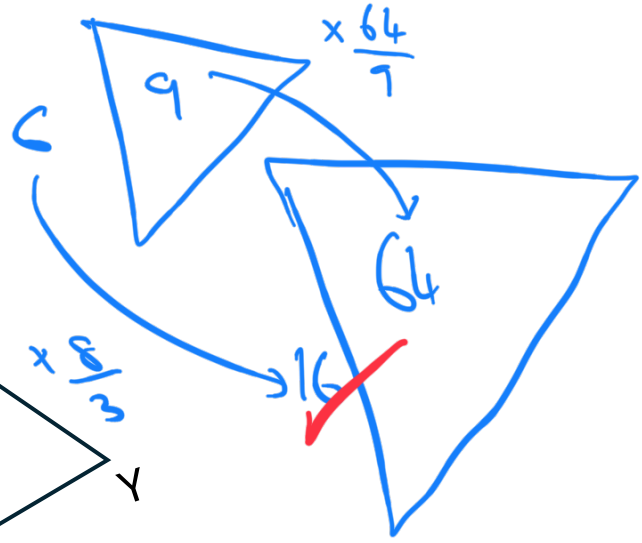
$6 \div \frac{3}{2} = 4$

$l = 4$ cm

..... cm 3

8. In the figure, BC is parallel to XY, AB = 6cm and the areas of triangle ABC and trapezium BCYX are 9 cm^2 and 55 cm^2 respectively.
Find the length of BX.





Area SF = $\frac{64}{9}$ ✓

Length SF = $\frac{8}{3}$ ✓

10cm ✓ 0

..... cm 4

9. The coordinates of three points are A(-1,-3), B(2,3) and C(6,k).
AB is perpendicular to BC.

a) What is the value of k?

Consider AB: (-1,-3) (2,3)

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - -3}{2 - -1} = \frac{6}{3} = 2$ ✓

BC is perpendicular (2,3) (6,k)

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

$-\frac{1}{2} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{k-3}{6-2} = \frac{k-3}{4} = -\frac{1}{2}$ ✓

$2k - 6 = -4$

$2k = 2$

$k = 1$ ✓

..... 1 3

b) What is the equation of the line AC?

(-1,-3) (6,1)

$m = \frac{1 - -3}{6 - -1} = \frac{4}{7}$ ✓

$y = \frac{4}{7}x + c$

$1 = \frac{4}{7}(6) + c$ ✓

$\frac{7}{7} = \frac{24}{7} + c$

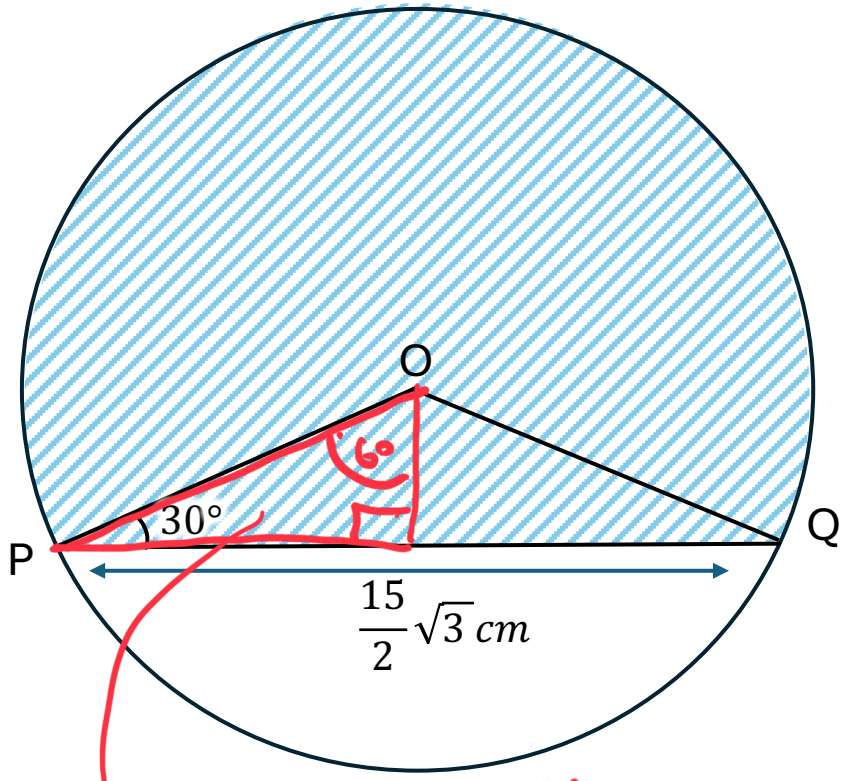
$-\frac{17}{7} = c$

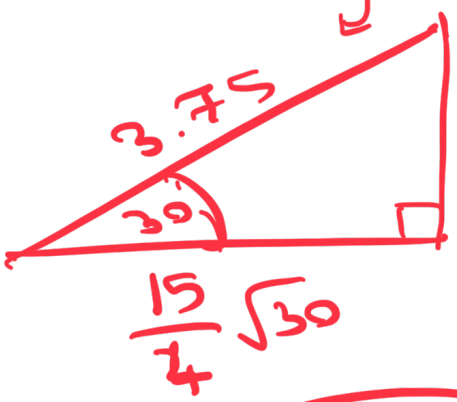
$y = \frac{4}{7}x - \frac{17}{7}$ ✓

$7y = 4x - 17$

..... 5

10. In the figure, O is the center of the circle, and points P and Q are on the circumference such that PQ = $\frac{15}{2}\sqrt{3}$ cm and ∠OPQ = 30°.
Find the perimeter of the shaded region.





$hyp = \frac{adj}{\cos(30)}$

$hyp = \frac{\frac{15}{4}\sqrt{30}}{\cos(30)} = \frac{15}{4} = 3.75$

$L + \frac{15}{2}\sqrt{3}$

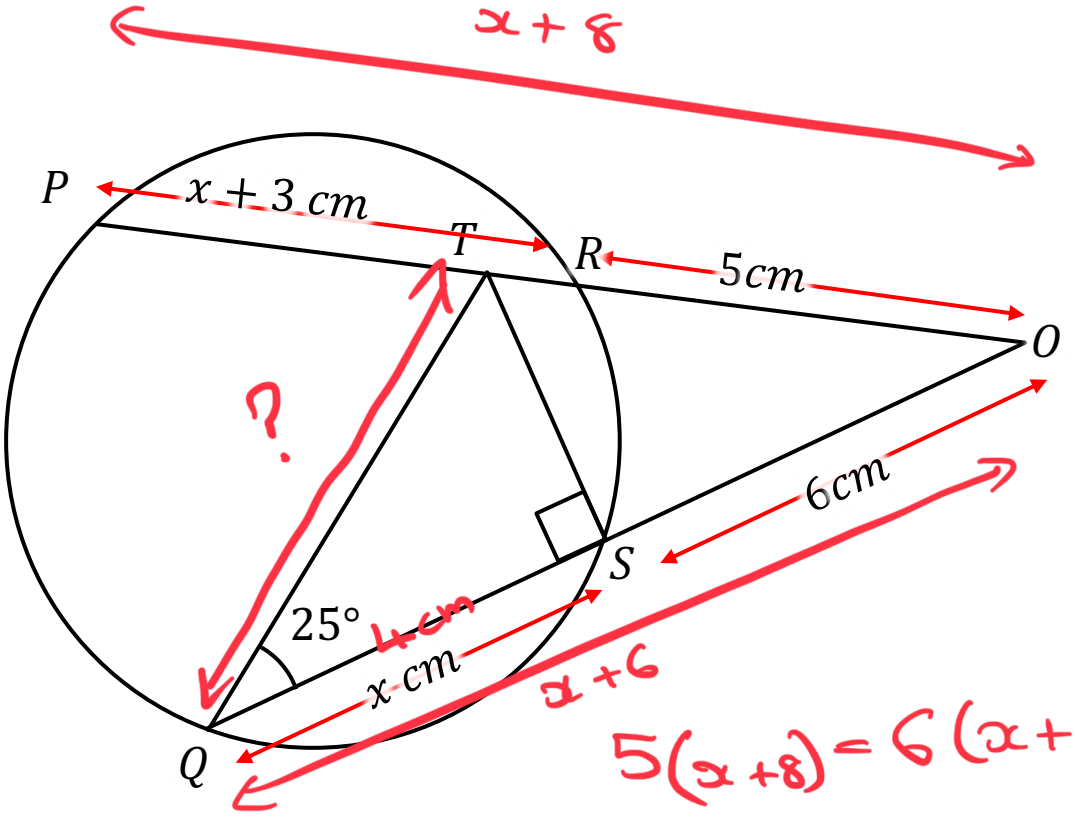
$15.7079\ldots + \frac{15}{2}\sqrt{3}$

$= 28.7\ cm$

$\frac{240}{360}\,2\pi(3.75) = 15.70\ldots$

Note: This question is from the intersecting chords topic.
IGCSE only.

11. In the figure, P, Q, R and S are points on the circle.
PRO and QSO are straight lines.
Given that $\angle TQS$ is 25°, $PR = x + 3$, $RO = 5\ cm$, $OS = 6\ cm$, $SQ = x$, find the length of TQ.



$5(x+8) = 6(x+6)$ ✓

$5x + 40 = 6x + 36$

$4cm = x$ ✓

$\cos(\theta) = \frac{adj}{hyp}$

$\cos(25) = \frac{4}{TQ}$ ✓

$TQ = \frac{4}{\cos(25)} = 4.4135...$

4.41 cm /3

12. The price of a 3-day trip to Finland is reduced by 4% in a sale.
When booking the trip during the sale, Jasper pays $600 as down payment.
He pays the remainder of the sale price in 4 equal monthly payments of $180
Calculate the price of the trip before the sale.

$600 + 4 \times 180 = 1320$

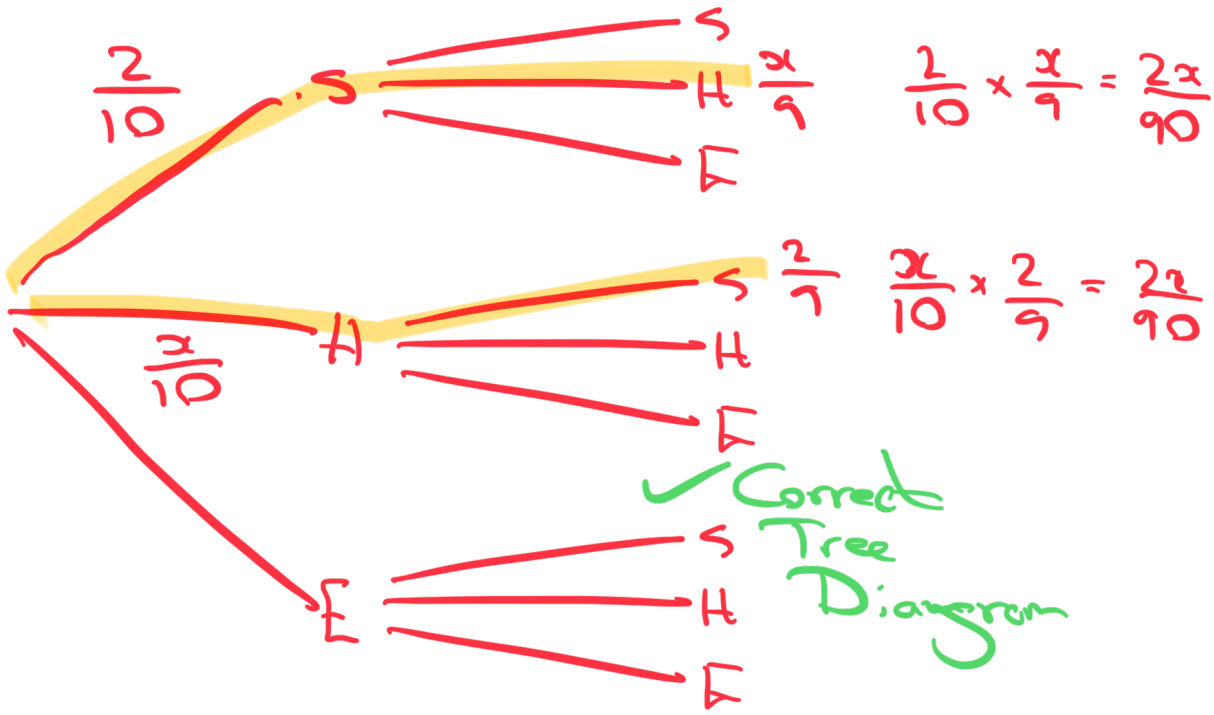
$1320 \div 0.8 = \$1650$

$1650 3

13. Out of 10 students in a group, 2 study Spanish, x students study History and y students study Economics.
Each student only studies one of these subjects.

If 2 students are chosen at random from this group, the probability that one student studies Spanish and the other studies History is $\frac{14}{45}$.

How many students are studying Economics?



Correct Tree Diagram

$\frac{2x}{90} + \frac{2x}{90} = \frac{4x}{90} = \frac{14}{45} = \frac{28}{90}$

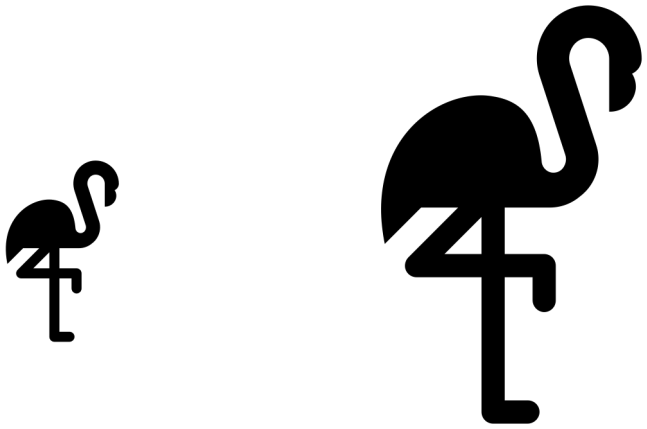
$4x = 28$

$x = 7$

10 Student
2 Spanish
7 History
1 Economics

1

14. Two mathematically similar ornaments are shown below.



The difference between their volumes is d.
The volume of the larger ornament is V.

$V - V_s = d$ (V_s: small volume)

$V \div x^3 = V_s$

The surface area of the larger ornament is $1562.5\ cm^2$.

Given that $\frac{d}{V} = \frac{117}{125}$, calculate that surface area of the smaller ornament.

$\frac{d}{V} = \frac{117}{225} = \frac{V - V_s}{V} = \frac{V - V \div x^3}{V}$ ✓

$= \frac{V - \frac{V}{x^3}}{V} = \frac{1 - \frac{1}{x^3}}{1} = 1 - \frac{1}{x^3}$ ✓

$1 - \frac{1}{x^3} = \frac{117}{225}$

$1 - \frac{117}{125} = \frac{1}{x^3}$

$\frac{8}{125} = \frac{1}{x^3}$

$\frac{125}{8} = x^3$

$\sqrt[3]{\frac{125}{8}} = x$

$x = 2.5$ ✓

SA Scale Factor $= 2.5^2$
$= 6.25$

$1562.5 \div 6.25 = 250\ cm^2$ ✓

..... 4

---------- END OF EXAM ----------

Post-exam reflection sheet

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Q	Marks	What Went Well?	Even better if
1	/5		
2	/3		
3	/7		
4	/5		
5	/4		
6	/13		
7	/3		
8	/4		
9	/8		
10	/5		
11	/4		
12	/3		
13	/4		
14	/4		

Self-reflection

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How did you revise for the exam? *(tick all that you did)*

- Reading class notes
- Online practice
- Doing practice questions
- Getting help from your teacher
- Recapping the previous exam
- Study group (with friends)
- Reading textbooks
- Watching videos

Were these revision techniques useful? *(circle your answer)*

 Yes

 A bit

 No

How could you revise more effectively next time?

_____

_____

List three topics from this test that you are good at, and three that need more work.

1.

2.

3.

4.

5.

6.

"Failure is the stepping stone to success"

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