SIMILAR SHAPES

Pearson Edexcel – Thursday 4 June 2020 - Paper 2 (Calculator) Higher Tier

1.

14	116	P1	for setting up an equation, eg $(x + 4)^2 = x^2 + 70$	for setting up an equation, eg $x^2 - (x - 4)^2 = 70$	Equation must be in a single variable. If a candidate uses a trial and improvement method, it is either full marks or no marks.
		P1	for process to reduce equation down to a linear equation ready to solve eg $8x = 54$ oe	for process to reduce equation down to a linear equation ready to solve eg $8x = 86$ oe	Candidates must get as far as $ax = b$
		A1	for 6.75 oe	for 10.75 oe	
		B1	ft (dep P2) for finding the area of B **or** for answer in range 115 to 116		

Pearson Edexcel - Tuesday 21 May 2019 - Paper 1 (Non-Calculator) Higher Tier

2.

7	8.5	P1	for process to use the area of $PQRS$ to find the length of PQ, eg $10y = 45$ **or** $45 \div 10 (= 4.5)$	Sets up equation for area
		P1	for process to use the perimeter of $ABCD$, eg $2x + 2 \times$ "4.5" $= 26$ **or** $26 - 2 \times$ "4.5" $(= 17)$ **or** $26 \div 2 (= 13)$	Uses perimeter of $ABCD$
		P1	for process to use length of BC to find length of AB, eg solves $2x + 2 \times$ "4.5" $= 26$ **or** $(26 - 2 \times$ "4.5"$) \div 2$ **or** "13" $-$ "4.5"	
		A1	for 8.5 or $8\frac{1}{2}$	Accept $\frac{17}{2}$

Pearson Edexcel - Tuesday 12 June 2018 - Paper 3 (Calculator) Higher Tier

3.

13	6.50	M1	for method to find ratio or scale factor of lengths or volumes eg $\sqrt{3} : 2$ or $1 : 1.15(47....)$ or $0.86(60...) : 1$ or $\sqrt{27} : 8$ oe	Scale factors may just be seen as 1.15..., 0.86...etc
		M1	for complete method to find ratio of volumes and use to find required volume eg $10 \div$ ("1.15...")^3 or $10 \times$ ("0.86...")^3	
		A1	for answer in the range 6.49 to 6.53	If an answer is given within the range then incorrectly rounded to 3 sig figs, award full marks. Accept 6.5

Pearson Edexcel - Wednesday 4 November 2015 - Paper 1 (Non-Calculator) Higher Tier

4.

*22			Similarity and proof	5	B1 for method matching a pair of opposite angles, e.g. if $EAB = x$, $BDE = 180-x$, $EAB + BDE = 180$ B1 for linking angles between quad and triangle, e.g. if $BDE = 180-x$ then $BDC = x$ B1 for stating or implying $ACE = BCD$ (same angle) C1 for <u>Opposite angles</u> of a <u>cyclic quadrilateral</u> add up to <u>180°</u> or statement linking three angles for similarity C1 for complete proof

Pearson Edexcel - Monday 9 June 2014 - Paper 1 (Non-Calculator) Higher Tier

5.

20			6	3	M1 for $\dfrac{15}{10}$ (=1.5) or $\dfrac{10}{15}$ (=0.66..) or $\dfrac{16}{10}$ (=1.6) or $\dfrac{10}{16}$ (=0.625) M1 for $\dfrac{15}{10} \times 16$ (=24) oe A1 cao OR M1 for $\dfrac{15}{16}$ (=0.9375) or $\dfrac{16}{15}$ (=1.066…) or $\dfrac{16}{10}$ (=1.6) or $\dfrac{10}{16}$ (=0.625) M1 for $\dfrac{15}{16} \times 10$ (=9.375) oe A1 20.625 oe

Pearson Edexcel - Wednesday 6 November 2013 - Paper 1 (Non-Calculator) Higher Tier

6.

16		$120 \div 20 = 6$ $6^2 = 36$ $36 \times 300 = 10\ 800$	10 800	3	M1 $120 \div 20$ (= 6) oe, can be implied by $120^2 \div 20^2$ M1 '6'$^2 \times 300$ A1 cao

OCR GSCE – Thursday 6 June 2019 – Paper 5 (Non-Calculator) Higher Tier

7.

14			Angle BEA = angle CED and [vertically] opposite Angle DAB = angle ADC and alternate Angle ABC = angle DCB and alternate	**M2**	For **M2** only two of the three statements and reasons are required **M1** for one pair of angles with a reason	Allow any unambiguous labelling for angles e.g. ABC or ABE or B, but not E Accept 3rd angle in triangle oe for reason with final angle Condone spelling e.g. alternating but not alternative
			[Triangle ABE is similar to triangle CDE] [corresponding] angles are equal **oe**	**A1**	With no errors or incorrect statements seen If 0 scored, **SC1** for at least two correct pairs of angles identified with no / incorrect reasons	For oe allow e.g. AAA Condone identified on diagram for **SC1**

OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

8.

| 21 | | 2.625 nfww | 4 | **M3** for $2.1 \times \sqrt[3]{\frac{15.625}{8}}$ oe or $2.1 \div \sqrt[3]{\frac{8}{15.625}}$

 or

 M2 for $\sqrt[3]{\frac{15.625}{8}}$ soi by $\frac{5}{4}$ or 1.25 oe <br> or $\sqrt[3]{\frac{8}{15.625}}$ soi by $\frac{4}{5}$ or 0.8 oe

 or

 M1 for $\frac{15.625}{8}$ soi by $\frac{125}{64}$ oe or 1.95(31...)
 or $\frac{8}{15.625}$ soi by $\frac{64}{125}$ oe or 0.512

 If **0** scored then **SC1** for 4.1 to 4.11 as final answer | Accept 2.6, 2.62 or 2.63 as final answer after **M3**

 May be done in stages, including rounding to at least 3 sig figs of intermediate steps

 May see as length ratio, eg. **M2** for $\sqrt[3]{8} : \sqrt[3]{15.625}$ soi by 2 : 2.5 oe

 May see as volume ratio, eg. **M1** for 8 : 15.625 oe
 May also be seen as part of wrong approach <br> eg. $\frac{15.625}{8 \div 2.1}$ seen or done in stages scores **M1** |

OCR GSCE – Tuesday 12 June 2018 – Paper 6 (Calculator) Higher Tier

9.

| 12 | | $[QS =] \sqrt{80}$, $4\sqrt{5}$ oe or 8.9[4..] | 2 | **M2** for $[QS =] \sqrt{4^2 + 8^2}$ oe

 or

 M1 for $4^2 + 8^2$ | Accept QS on diagram
 First **M2** may be implied by
 $QP = 2\sqrt{5}$ oe or 4.47[...]

 Example values: <br> angle RSQ = $\tan^{-1}\left(\frac{4}{8}\right)$ = $\cos^{-1}\left(\frac{8}{\sqrt{80}}\right)$ |
| | | Best two from:
 (i) shows a pair of corresponding angles are equal
 (ii) shows a second pair of corrresponding angles are equal or states [angle] QRS = [angle] PQS
 (iii) shows two pairs of corresponding sides are in the same ratio
 (iv) shows the third pair of corresponding sides have the same ratio.
 Ratios of corresponding sides need to be seen in equiavlent form.

 Conclusion: <br> two (or three) equal angles oe after showing (i) and (ii)
 or <br> three pairs of corresponding sides in the same ratio after showing (iii) and (iv)
 or <br> two pairs of corresponding sides in the same ratio and an equal angle between them oe after showing relevant combination of (i)/(ii) and (iii) | 2

1 | **B1** for each to a max of 2
 For these marks, answers to calculations are sufficient, but corrresponding pairs must be either exact or the same when rot to 3sf.
 In (ii) accept QRS and PQS are both right angles oe
 (iii) and (iv) can be shown using scale factors eg QS = 1.118 × RS and PS = 1.118 × QS

 Note: there is no mark for just finding $QP = \sqrt{20}$

 In all cases, it must be clear which angles and ratios are being used to support the conclusion made, usually by using labels or from values on a diagram.
 If it is not clear, withold the final mark.
 Where more than two facts are shown, allow the final mark if the conclusion is fully supported. | $= \sin^{-1}\left(\frac{4}{\sqrt{80}}\right)$ = 26.5(...) or 26.6

 angle QSP = $\tan^{-1}\left(\frac{\sqrt{20}}{\sqrt{80}}\right)$ = $\cos^{-1}\left(\frac{\sqrt{80}}{10}\right)$

 $= \sin^{-1}\left(\frac{\sqrt{20}}{10}\right)$ = 26.5(...) or 26.6

 Accept as fractions or ratios.
 $\frac{PS}{QS} = \frac{10}{\sqrt{80}} = \frac{\sqrt{5}}{2}$ =1.118[...]
 $PS : QS = 10 : \sqrt{80}$ oe
 $\frac{QS}{RS} = \frac{\sqrt{80}}{8}$ with any of the above $\frac{PS}{QS}$ is insufficient for (iii) and (iv) as it is not clear that the ratios are the same. |

OCR GSCE – Sample Papers – Paper 6 (Calculator) Higher Tier

10.

| 12 | | | The area scale factor is $\frac{80}{180} = \frac{4}{9}$

 [So the length scale factor is $\sqrt{\frac{4}{9}} = \frac{2}{3}$]

 and the volume scale factor is $\left(\frac{2}{3}\right)^3 = \frac{8}{27}$

 So the volume of B is $810 \times \frac{8}{27} = 240$ | **5**
 1 AO1.3b
 4 AO2.2 | **M1** for finding area scale factor <br> and
 M1 for square root of area scale factor **soi**
 and
 M1 for cubing length scale factor <br> and
 M1 for 810 × *their* volume scale factor | Allow any equivalent argument, for example by ratios |

AQA GSCE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

11.

Q	Answer	Mark	Comments	
	9 : 25	B1	oe ratio	
	3 : 5	B1	oe ratio allow $\sqrt{9} : \sqrt{25}$	
27	**Additional Guidance**			
	25 : 9			B0
	5 : 3			B0
	Answers transposed			B0B0

AQA GSCE – Thursday 8 June 2020 – Paper 3 (Calculator) Higher Tier

12.

	Answer	Mark	Comments	
	$\frac{16}{20}$ or $\frac{20}{16}$ or $\frac{12}{20}$ or $\frac{20}{12}$ or 12 : 9.6 or 9.6 : 12 or 16 : 9.6 or 9.6 : 16	M1	oe eg 16 ÷ 20 eg $\frac{4}{5}$ or $\frac{5}{4}$ or $\frac{3}{5}$ or $\frac{5}{3}$ eg 0.8 or 1.25 or 0.6 or 1.66… or 1.67	
	9.6	A1	oe	
9	**Additional Guidance**			
	Award M1 work even if not subsequently used			
	Ignore further working in an attempt to round after answer 9.6 eg 9.6 in working with answer 10			M1A1
	12 × 20 ÷ 16			M1

AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

13.

23	64 : 125	B1	
	Additional Guidance		

AQA GSCE – Wednesday 25 May 2017 – Paper 1 (Non - Calculator) Higher Tier

14.

22	$\dfrac{QS}{PT}$	B1	

AQA GSCE – Sample Paper 2 (Calculator) Higher Tier

15.

26	144% or 1.44 seen	B1	
	$\sqrt{1.44}$ or 1.2	M1	oe
	their 1.2 × 32	M1dep	
	38.4	A1	