

## SOHCAHTOA (TRIGONOMETRY)

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

1.

5	99.5	M1	for $\sin(34) = \frac{x}{178}$ oe or alternative method to find $x$	If an answer in the range 99.5 to 99.7 is given in the working space then incorrectly rounded, award full marks
		A1	for answer in range 99.5 to 99.7	

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

2.

13	15.4	M1	for $\frac{AB}{\sin 34} = \frac{23.8}{\sin 120}$ or $\frac{\sin 34}{AB} = \frac{\sin 120}{23.8}$	"120" comes from $180 - 26 - 34$
		M1	for $(AB) = \frac{23.8}{\sin 120} \times \sin 34$	
		A1	for answer in range 15.36 to 15.4	

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

3.

14	$\frac{1}{2}$	M1	for $\frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{2}$ or $\frac{\sqrt{3}}{3} \times \frac{\sqrt{3}}{2}$ or $(\frac{1}{2} \div \frac{\sqrt{3}}{2}) \times \frac{\sqrt{3}}{2}$ OR $\tan 30 = \frac{1}{\sqrt{3}}$ oe or $\sin 60 = \frac{\sqrt{3}}{2}$	
		A1	for $\frac{1}{2}$ or 0.5	

### Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

4.

5	9.85	M1	for $\sin(38) = \frac{AB}{16}$ oe or alternative method to find $AB$	
		A1	for an answer in the range 9.76 to 9.92	

### Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

5.

19	31.0	P1	for $\tan 35 = BE \div 15$ or $BE = 10.5(0\dots)$ <b>OR</b> finding the length $DM = \frac{2}{5} \times 15 (= 6)$ or $MA = \frac{3}{5} \times 15 (= 9)$ or 6:9 <b>OR</b> showing the required angle on a diagram eg with an arc	$MB = \sqrt{9^2 + 15^2} = \sqrt{306} (=17.4(9\dots))$ or 17.5 $BE = 15 \times \tan 35 (=10.5(0\dots))$ $AE = 15 \div \cos 35 (=18.3(1\dots))$ $ME = \sqrt{9^2 + 18.31\dots^2} = \sqrt{416. (3\dots)}$ $(=20.4(0\dots))$	
		P1	for $MB = \sqrt{15^2 + "9"}^2$ or $\sqrt{306}$ or 17.4(9\dots) <b>OR</b> $ME = \sqrt{"9"}^2 + "18.3(1\dots)"^2$ or $\sqrt{416. (3\dots)}$ or 20.4(0\dots)		Check diagram for working
		P1	for using appropriate trigonometry ratio to set up an equation in angle <i>EMB</i> eg $\tan \theta = "10.5(0\dots)" \div "17.4(9\dots)"$ <b>or</b> $\cos \theta = "17.4(9\dots)" \div "20.4(0\dots)"$ <b>or</b> $\sin \theta = "10.5(0\dots)" \div "20.4(0\dots)"$		
		A1	for answer in the range 30.9 to 31		If an answer is shown in the range in working and then incorrectly rounded award full marks.

**Pearson Edexcel - Tuesday 6 November 2018 - Paper 1 (Non-Calculator) Higher Tier**

6.

8	(a)	1	B1	cao	All three elements of $\cos, 4, x$ must be present in an equation. eg $\cos = 4/x$ is acceptable but $\cos(4/x)$ is insufficient
		8	M1	starts process, eg $\cos(60) = \frac{4}{x}$ or $0.5 = \frac{4}{x}$ or $\sin 30 = \frac{4}{x}$ or $\frac{\sin 30}{4} = \frac{\sin 90}{x}$ or	
			A1	cao	

**Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Higher Tier**

7.

6	17.3	P1	for full process to find either angle eg $(180 - 90) \div (2+3) \times 2 (=36)$ <b>or</b> for 36 or 54 seen as an angle	May be seen on diagram Condone correct values if incorrectly placed.  This must be shown as an equation with all four elements (eg $\cos, [A], 14, AB$ ) present. $[A]$ could be 36 or any angle clearly and unambiguously identified as $A$ . This also applies to $[B]$ with Sine.  If an answer is shown in the range in working and then incorrectly rounded award full marks.
		P1	for a correct equation using trigonometry eg $\cos [A] = 14 \div AB$	
		P1	(dep previous P mark) for rearranging their trigonometry equation to make $AB$ the subject eg $(AB =) "14 \div \cos 36"$	
		A1	for an answer in the range 17.3 to 17.4	

**Pearson Edexcel - Thursday 7 June 2018 - Paper 2 (Calculator) Higher Tier**

8.

18	39.5	P1	for a start to a process eg, for a correct trigonometric statement, eg $\sin 48 = \frac{7.3}{AC}$ or $\cos 42 = \frac{7.3}{AC}$ or $\frac{AC}{\sin 90} = \frac{7.3}{\sin 48}$ <b>OR</b> angle $CAH$ unambiguously identified on a diagram	Must include correct values
		P1	for a complete correct process to find $AC$ , eg $(AC) = \frac{7.3}{\sin(48)}$ (=9.8..) or $(AC) = \frac{7.3}{\cos(42)}$ (=9.8..) or $(AC) = \sin 90 \times \frac{7.3}{\sin 48}$ (=9.8..)	
		P1	for a correct statement using angle $CAH$ , eg $\tan(CAH) = \frac{8.1}{9.8...}$ <b>OR</b> $\sqrt{8.1^2 + "9.8"'^2}$ (=12.7...) and $\frac{\sin CAH}{8.1} = \frac{\sin 90}{"12.7"}$	
		A1	for answer in the range 39.5 – 39.51	
				If an answer is given in the range but then incorrectly rounded award full marks.

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

9.

19	$\frac{5}{3}$	P1	for process to derive an equation in $x$ , eg $\frac{x}{4x-1} = \frac{6x+5}{12x+31}$	Must be correct use of brackets
		P1	for complete process to remove fractions, eg $x(12x+31) = (6x+5)(4x-1)$	
		P1	for process to reduce to a quadratic equation, eg $12x^2 - 17x - 5 = 0$	
		P1	for process to solve the quadratic equation by factorisation or use of quadratic formula, eg $(4x+1)(3x-5) = 0$	
		A1	for $\frac{5}{3}$ oe	Award for correct LHS only. Award for correct LHS only. Accept substitution into the formula; $\frac{-(-17) \pm \sqrt{(-17)^2 - 4 \times 12 \times -5}}{2 \times 12}$ Accept answers in the range 1.66 to 1.67 as equivalent

### Pearson Edexcel - Monday 6 November 2017 - Paper 2 (Calculator) Higher Tier

10.

7		32.3	P1	for using Pythagoras to find length of third side of triangle, eg $7.5^2 - 6^2$ or $6^2 + x^2 = 7.5^2$ or uses trigonometry to find angle in triangle, eg $\sin A = \frac{6}{7.5}$ or $\cos B = \frac{6}{7.5}$
			P1	(dep P1) for complete process to find length of third side of triangle eg $\sqrt{7.5^2 - 6^2}$ or $\sqrt{56.25 - 36}$ or $\sqrt{20.25}$ (= 4.5) or uses trigonometry to find base length of triangle, eg $7.5 \times \cos "A"$ or $7.5 \times \sin "B"$ or $\frac{6}{\tan "A"}$
			P1	(dep P2) for $24 - 10 - "4.5"$ (= 9.5)
			P1	(indep) for process to find angle $CDA$ , eg $\tan CDA = \frac{6}{\text{base}}$ from right-angled triangle
			A1	for answer in the range 32.2 to 32.3

**Pearson Edexcel - Wednesday 8 November 2017 - Paper 3 (Calculator) Higher Tier**

**11.**

17		14.4	P1	for start of process, eg $0.5 \times 11 \times CD \times \sin 105 = 56$
			P1	for complete process to find $CD$ , eg ( $CD =$ ) $\frac{56}{0.5 \times 11 \times \sin 105}$ oe (= 10.54)
			P1	for process to find $AC$ , eg ( $AC^2 =$ ) $11^2 + [CD]^2 - 2 \times 11 \times [CD] \times \cos 105$ ( $AC = 17.09$ )
			P1	for process to find $AB$ , eg $\frac{AB}{\sin 48} = \frac{[AC]}{\sin 118}$
			A1	answer in range 14.3 to 14.4

**Pearson Edexcel - Sample Paper 2 - (Calculator) Higher Tier**

**12.**

2		20.9	M1	correct recall of appropriate formula eg $\sin x = \frac{5}{14}$
			A1	for 20.9(248...)

**Pearson Edexcel - Specimen Papers Set 1 - Paper 1 (Non-Calculator) Higher Tier**

**13.**

7	(a)	$\frac{\sqrt{3}}{2}$	B1	
	(b)	6	M1	starts process eg $\sin 30 = \frac{x}{12}$
			A1	answer given

**Pearson Edexcel - Thursday 9 June 2016 - Paper 2 (Calculator) Higher Tier**

**14.**

17		30.1	4	<p>M1 for a correct trigonometric statement to find an unknown angle, eg. <math>\sin(30+x)</math> or <math>\cos A = \frac{10.4 + 5.2}{18}</math> or <math>\frac{\sin ADC}{18} = \frac{\sin 30}{10.4}</math></p> <p>M1 for a complete method to find the angle, eg. <math>\sin^{-1}\left(\frac{10.4+5.2}{18}\right)</math> (= 60.07...) or <math>\cos^{-1}\left(\frac{10.4+5.2}{18}\right)</math> (= 29.92..) or <math>\sin^{-1}\left(\frac{18 \times \sin 30}{10.4}\right)</math> (= 59.92.. or 180 - 59.92.. = 120.07.. )</p> <p>M1 (dep on M2) for a fully complete method to find angle <math>x</math>, eg. "60.07.. - 30 or 60 - "29.92.." or 90 - "59.92.."</p> <p>A1 for answer in the range 30.07 to 30.1</p> <p>OR</p> <p>M1 for (<math>BC^2 =</math>) <math>18^2 - (10.4 + 5.2)^2</math> or <math>BC^2 + (10.4 + 5.2)^2 = 18^2</math> M1 for (<math>BC =</math>) <math>\sqrt{18^2 - (10.4 + 5.2)^2}</math> (= 8.97...) M1 (dep on M2) for a fully complete method to find angle <math>x</math>, eg. <math>\tan^{-1}\left(\frac{5.2}{8.97...}\right)</math></p> <p>A1 for answer in the range 30.07 to 30.1</p>
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**Pearson Edexcel - Thursday 9 June 2016 - Paper 2 (Calculator) Higher Tier**

15.

25		80.4	6	<p>M1 for <math>0.5 \times 7 \times 8 \times \sin x = 18</math></p> <p>M1 (dep) for <math>(x =) \sin^{-1}\left(\frac{18}{0.5 \times 7 \times 8}\right)</math> oe (= 40)</p> <p>M1 (dep on at least M1) for <math>(AC^2 =) 7^2 + 8^2 - 2 \times 7 \times 8 \times \cos "40"</math></p> <p>M1 (dep on previous M1) for correct order of evaluation or 27.2(03...) or 5.2(15...)</p> <p>M1 (dep) for <math>\sin A = \frac{8 \times \sin "40"}{5.2(15.)}</math> or <math>\sin A = \frac{18}{0.5 \times 7 \times 5.2(15.)}</math></p> <p>or <math>\cos A = \frac{5.2(15.)^2 + 7^2 - 8^2}{2 \times 5.2(15.) \times 7}</math></p> <p>A1 for answer in the range 80.3 to 80.4 from correct working</p> <p>OR</p> <p>(with perpendicular from A meeting BC at a point X)</p> <p>M1 for <math>0.5 \times 8 \times h = 18</math></p> <p>M1 (dep) for <math>(h =) \frac{18}{0.5 \times 8}</math> (= 4.5)</p> <p>M1 (dep on at least M1) for <math>BAX = \cos^{-1} \frac{4.5}{7}</math> (= 49.99 ...)</p> <p>M1 (dep) for <math>(BX =) \sqrt{7^2 - 4.5^2}</math> (= 5.3619...)</p> <p>M1 (dep) for <math>CAX = \tan^{-1} \frac{8 - 5.3619}{4.5}</math> (= 30.38 ...)</p> <p>A1 for answer in the range 80.3 to 80.4 from correct working</p> <p>NB Similar method applies for use of perpendicular from C to AB</p>
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Pearson Edexcel - Friday 14 June 2013 - Paper 2 (Calculator) Higher Tier

16.

20	<p><math>\cos y = 2.25 \div 6</math> <math>y = \cos^{-1}(2.25 \div 6)</math></p> <p>OR</p> <p><math>6 \cos 75 = 1.55...</math></p>	The ladder is not safe because y is not near to 75	3	<p>M1 for <math>\cos y = 2.25 \div 6</math> oe</p> <p>M1 for <math>\cos^{-1}(2.25 \div 6)</math></p> <p>C1 for sight of 67-68 and a statement eg this angle is NOT (near to) 75° and so the ladder is not steep enough and so not safe.</p> <p>OR</p> <p>M1 for <math>\cos 75 = x \div 6</math></p> <p>M1 for <math>6 \cos 75</math></p> <p>C1 for sight of 1.55(29...) and a statement eg that 2.25 NOT (near to) 1.55 and so the ladder is not steep enough and so not safe.</p>
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Pearson Edexcel - Wednesday 13 June 2012 - Paper 2 (Calculator) Higher Tier

17.

16		$\cos x = \frac{6.4}{9.6}$ $x = \cos^{-1} \frac{6.4}{9.6} =$	48.2	3	<p>M1 for <math>\cos x = \frac{6.4}{9.6}</math> or <math>\cos x = 0.66(6\dots)</math> or <math>\cos x = 0.67</math></p> <p>M1 for <math>\cos^{-1} \frac{6.4}{9.6}</math> or <math>\cos^{-1} 0.66(6\dots)</math> or <math>\cos^{-1} 0.67</math></p> <p>A1 for 48.1 – 48.2</p> <p><b>OR</b></p> <p>Correct use of Pythagoras and then trigonometry, no marks until</p> <p>M1 for <math>\sin x = \frac{7.155}{9.6}</math> or <math>\tan x = \frac{7.155}{6.4}</math></p> <p>or <math>\sin x = \frac{7.155}{9.6} \times \sin 90</math></p> <p>or <math>\cos x = \frac{6.4^2 + 9.6^2 - 7.155^2}{2 \times 6.4 \times 9.6}</math></p> <p>M1 for <math>\sin^{-1} \frac{7.155}{9.6}</math> or <math>\tan^{-1} \frac{7.155}{6.4}</math></p> <p>or <math>\sin^{-1} \left( \frac{7.155}{9.6} \times \sin 90 \right)</math></p> <p>or <math>\cos^{-1} \left( \frac{6.4^2 + 9.6^2 - 7.155^2}{2 \times 6.4 \times 9.6} \right)</math></p> <p>A1 for 48.1 – 48.2</p> <p>SC B2 for 0.841... (using rad) or 53.5... (using grad)</p>
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Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

18.

14	(a)	$\tan x = \frac{8}{12} = 0.666\dots$ $x = \tan^{-1} 0.6666\dots =$	33.7	3	<p>M1 for <math>\tan x = \frac{8}{12}</math> or <math>\tan x = 0.66(6\dots)</math> or <math>\tan x = 0.67</math></p> <p>M1 for <math>\tan^{-1} \left( \frac{8}{12} \right)</math> or <math>\tan^{-1} 0.66(6\dots)</math> or <math>\tan^{-1} 0.67</math></p> <p>A1 for answer in range 33.6 to 33.7</p> <p><b>OR</b></p> <p>If using Pythagoras and trigonometry, then no marks until</p> <p>M1 for <math>\sin x = \frac{8}{14.4\dots}</math> or <math>\cos x = \frac{12}{14.4\dots}</math></p> <p>or <math>\sin x = \frac{8}{14.4\dots} \times \sin 90</math></p> <p>M1 for <math>\sin^{-1} \frac{8}{14.4\dots}</math> or <math>\cos^{-1} \frac{12}{14.4\dots}</math></p> <p>or <math>\sin^{-1} \left( \frac{8}{14.4\dots} \times \sin 90 \right)</math></p> <p>A1 for answer in range 33.6 to 33.7</p> <p>(SC B2 for 0.588...(using rad) or 37.4...(using grad))</p>
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14	(b)	$\sin 32 = \frac{5}{YZ}$ $YZ = \frac{5}{\sin 32} = 9.435\ 399\ 57$	9.44	3	<p>M1 for <math>\sin 32 = \frac{5}{YZ}</math> or <math>\cos 58 = \frac{5}{YZ}</math></p> <p>M1 for <math>(YZ) = \frac{5}{\sin 32}</math> or <math>(YZ) = \frac{5}{\cos 58}</math></p> <p>A1 for answer in range 9.43 to 9.44</p> <p><b>OR</b></p> <p>M1 for <math>\frac{5}{\sin 32} = \frac{YZ}{\sin 90}</math> or <math>\frac{\sin 32}{5} = \frac{\sin 90}{YZ}</math></p> <p>M1 for <math>(YZ) = \frac{5}{\sin 32} \times \sin 90</math></p> <p>A1 for answer in range 9.43 to 9.44</p> <p><b>OR</b></p> <p>M1 for <math>(YZ)^2 = 5^2 + \left(\frac{5}{\tan 32}\right)^2</math> or <math>5^2 + 8(00\dots)^2</math> seen or <math>89(0\dots)</math> seen</p> <p>M1 for <math>(YZ) = \sqrt{5^2 + \left(\frac{5}{\tan 32}\right)^2}</math></p> <p>or <math>\sqrt{5^2 + 8(00\dots)^2}</math> seen or <math>\sqrt{89(0\dots)}</math> seen</p> <p>A1 for answer in range 9.43 to 9.44</p> <p>( SC B2 for 9.06...(using rad) or 10.3...(using grad))</p> <p>NB: Equivalent methods using <math>58^\circ</math> should be credited accordingly</p>
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**Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier**

19.

23		$\cos x = \frac{8.2}{10.6} = 0.77358\dots$ $x = \cos^{-1} \frac{8.2}{10.6} = 39.323\dots$	39.3	3	<p>M1 for <math>\cos x = \frac{8.2}{10.6}</math> or <math>\cos \frac{8.2}{10.6}</math></p> <p>M1 for <math>\cos^{-1} \frac{8.2}{10.6}</math></p> <p>A1 for 39.3 – 39.33</p> <p>SC: M2A0 for 0.686 or 43.69 or 39.2 or 39.37... or 39.4</p>
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**OCR GCSE – Thursday 7 November 2019 – Paper 5 (Non-Calculator) Higher Tier**

20.

19	(a)	$\frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$ final answer	1		
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19	(b)	10 nfw	6	<p><b>B3</b> for <math>BD = 10\sqrt{2}</math> oe</p> <p>or <b>M2</b> for <math>10\sqrt{6} \times \tan 30</math> oe</p> <p>or <b>M1</b> for <math>\frac{BD}{10\sqrt{6}} = \tan 30</math> oe</p> <p><b>AND</b></p> <p><b>M2</b> for <math>BC = \sqrt{\frac{\text{their } BD^2}{2}}</math> oe</p> <p>or <b>their</b> <math>BD \times \text{their } \sin 45</math> oe</p> <p>or <b>M1</b> for <math>BC^2 + CD^2 = (\text{their } BD)^2</math></p> <p>or for <math>\frac{BC}{\text{their } BD} = \text{their } \sin 45</math></p>	<p>Allow use of other variables for BC and CD (possibly different)</p>
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OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

21.

5		Answer which rounds to 61.6 nfw	3	<p><b>M2</b> for <math>\tan^{-1}\left(\frac{37}{20}\right)</math> oe or <b>M1</b> for <math>\tan[x =] \frac{37}{20}</math> oe</p> <p>If <b>M0</b> scored then <b>SC1</b> for answers 28.4, 28 or angles that round to 28.4 if correct working seen.</p>	<p>Condone answer of 62 only if correct working seen</p> <p>Answers of 68.5 or 68.4(5..) [grads] or 1.08 or 1.07(5..) [rads] imply <b>M2</b></p> <p><b>Alternative method</b> After correct method for Pythagoras soi by 42.0 to 42.1 <b>M2</b> for <math>\sin^{-1}\left(\frac{37}{\text{their } \sqrt{20^2+37^2}}\right)</math> or <math>\cos^{-1}\left(\frac{20}{\text{their } \sqrt{20^2+37^2}}\right)</math> or <b>M1</b> for <math>\sin[x =] \frac{37}{\text{their } \sqrt{20^2+37^2}}</math> or <math>\cos[x =] \frac{20}{\text{their } \sqrt{20^2+37^2}}</math> or <b>M0</b> for just Pythagoras reaching AC = 42.0 to 42.1 Do not condone answer of 62 following an interim answer seen that does not round to 61.6</p> <p><b>0</b> for scale drawing</p>
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OCR GSCE – Sample Papers – Paper 5 (Non - Calculator) Higher Tier

22.

17	(a)	$\sqrt{3}$	1 1 AO1.1		
	(b)	$24\sqrt{3}$	4 4 AO1.3b	<p><b>M1*</b> for <math>\frac{\text{height}}{4\sqrt{3}} = \text{their } \tan 60^\circ</math></p> <p><b>A1</b> for 12 or <math>4\sqrt{3} \times \sqrt{3}</math></p> <p><b>*M1 Dep</b> for <math>\frac{1}{2} \times 4\sqrt{3} \times \text{their '12'}</math></p>	

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

23.

13		9.2(0)	5 3 AO1.3b 2 AO3.1b	<p><b>M1</b> for <math>\frac{6.3}{\sin 33}</math></p> <p><b>A1</b> for 11.567(...) soi</p> <p><b>M1 dep</b> *for evidence of cosine rule used</p> <p><b>M1</b> for <math>\text{their '11.6'}^2 + 8.4^2</math> <math>- 2 \times \text{their '11.6'} \times 8.4 \times \cos 52</math></p>	<p>rot to 3 or more sf</p> <p>*Dep on 1st M1</p> <p>84.7(...) seen implies 4</p>
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AQA GSCE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

24.



<b>5</b>	<b>Alternative method 1</b>		
	cos and $\frac{9}{18}$ oe identified	M1	
	60	A1	
	<b>Alternative method 2</b>		
	sin and $\frac{\sqrt{18^2 - 9^2}}{18}$ identified or tan and $\frac{\sqrt{18^2 - 9^2}}{9}$ identified	M1	
	60	A1	
	<b>Additional Guidance</b>		
	Accept an embedded answer, eg $\cos 60 = \frac{9}{18}$ with no further working		M1A1
	$180 \div 3 = 60$		M0A0

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

25.

Q	Answer	Mark	Comments
24	$\sin y > 0$ and $\cos y < 0$	B1	

AQA GCSE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier

26.

<b>27</b>	$\sin 60^\circ = \frac{\sqrt{3}}{2}$ or $\tan 30^\circ = \frac{\sqrt{3}}{3}$ or $\frac{1}{\sqrt{3}}$ or $\tan 30^\circ (= \frac{\sin 30}{\cos 30}) = \frac{1/2}{\sqrt{3}/2}$	M1	oe may be in a table may be implied by position in multiplication
	$\frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{3}} = \frac{1}{2}$ or $\cos x = \frac{1}{2}$ or $(x =) \cos^{-1} \frac{1}{2}$	M1dep	oe works out the value of $\cos x$ as a fraction or decimal with no surd values
	60 with M2 awarded	A1	
	<b>Additional Guidance</b>		
	cos $x = 60$ does not score the final mark		

**AQA GCSE – Tuesday 6 November 2018 – Paper 1 (Non - Calculator) Higher Tier**

27.

<b>4</b>	$\frac{\sqrt{3}}{2}$	B1	
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**AQA GCSE – Tuesday 6 November 2018 – Paper 1 (Non - Calculator) Higher Tier**

28.

<b>27(a)</b>	$-k$	B1	
<b>27(b)</b>	$k$	B1	

**AQA GCSE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier**

29.

<b>25</b>	$\tan 49 = \frac{AC}{16}$	M1	oe eg $\tan (90 - 49) = \frac{16}{AC}$ or $AC^2 + 16^2 = \left(\frac{16}{\cos 49}\right)^2$
	$\tan 49 \times 16$ or [18.4, 18.41]	M1dep	oe eg $\frac{16}{\tan (90 - 49)}$ or $\sqrt{\left(\frac{16}{\cos 49}\right)^2 - 16^2}$
	$\frac{\sin x}{\text{their [18.4, 18.41]}} = \frac{\sin 35}{20}$ or $\frac{\text{their [18.4, 18.41]}}{\sin x} = \frac{20}{\sin 35}$	M1dep	oe eg $\frac{\sin x}{16 \tan 49} = \frac{\sin 35}{20}$ dep on 1st M1
	$\sin x = \frac{\sin 35}{20} \times \text{their [18.4, 18.41]}$	M1dep	oe eg $\sin x = \frac{16 \tan 49 \sin 35}{20}$ or $\sin^{-1}\left(\frac{\sin 35}{20} \times \text{their [18.4, 18.41]}\right)$ or $\sin^{-1} [0.527, 0.528]$ dep on 1st and 3rd M1
	[31.8, 31.9]	A1	allow 32 with full method seen
	<b>Additional Guidance</b>		
Answer [31.8, 31.9] possibly from scale drawing		5 marks	
Answer 32 possibly from scale drawing		Zero	

AQA GCSE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

30.

11	$\cos x = \frac{9}{10}$	M1	oe eg $\sin x = \frac{\sqrt{10^2 - 9^2}}{10}$ $\tan x = \frac{\sqrt{10^2 - 9^2}}{9}$
	25.8... or 26	A1	
	<b>Additional Guidance</b>		
	$\cos = \frac{9}{10} \quad x = 25.8$ (recovered)		M1A1
	$\cos = \frac{9}{10}$		M0A0

AQA GCSE – Monday 24 May 2018 – Paper 1 (Non - Calculator) Higher Tier

31.

30	$\frac{\sqrt{3}}{2} \times \sqrt{3} + \frac{1}{2}$ $= \frac{3}{2} + \frac{1}{2}$ $= 2$	B3	B2 $\frac{\sqrt{3}}{2} \times \sqrt{3} + \frac{1}{2}$ B1 $\cos 30^\circ = \frac{\sqrt{3}}{2}$ or $\tan 60^\circ = \sqrt{3}$ or $\sin 30^\circ = \frac{1}{2}$
	<b>Additional Guidance</b>		
	For B3 all steps must be shown		
	Allow $\frac{\sqrt{3}}{2} \times \sqrt{3} + \frac{1}{2}$ given as $\frac{\sqrt{3}}{2} \times \sqrt{3}$ , followed by their $\frac{3}{2} + \frac{1}{2}$		
	Allow equivalent expressions for all trig values eg $\cos 30^\circ = \frac{\sqrt{3}}{2}$ $\sin 30^\circ = \frac{1}{2}$ $\tan 60^\circ = \sqrt{3}$		
For B1 allow the trig value(s) given in a table unless contradicted in working			

AQA GCSE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

32.

<b>29(a)</b>	$(180, 0)$	B1	
	<b>Additional Guidance</b>		
	Condone degrees symbol on 180		
	Condone $(\pi, 0)$		B1

<b>29(b)</b>	$(-270, 1)$	B1	
	<b>Additional Guidance</b>		
	Condone degrees symbol on 270		
	Condone $(\frac{-3\pi}{2}, 1)$		B1

AQA GCSE – Thursday 6 November 2017 – Paper 2 (Calculator) Higher Tier

33.

9	$\tan x = \frac{3}{7}$ or $\tan^{-1} \frac{3}{7}$ or $\sin x = \frac{3(\sin 90)}{\sqrt{3^2 + 7^2}}$ or $\sin x = \frac{3(\sin 90)}{\sqrt{58}}$ or $\cos x = \frac{7}{\sqrt{3^2 + 7^2}}$ or $\cos x = \frac{7}{\sqrt{58}}$ or $90 - \tan^{-1} \frac{7}{3}$ or $90 - [66.7, 66.81]$ or $90 - 67$	M1	oe eg $\cos x = \frac{7^2 + (\sqrt{7^2 + 3^2})^2 - 3^2}{2 \times \sqrt{3^2 + 7^2} \times 7}$ Any letter
	[23, 23.3]	A1	
	<b>Additional Guidance</b>		
	$\tan = \frac{3}{7}$ or $\tan \frac{3}{7}$ or $\tan^{-1} = \frac{3}{7}$ (unless recovered)		M0
	Answer [23, 23.3] (possibly coming from scale drawing)		M1A1
	If using sine rule must rearrange to $\sin x =$ for M1		
	If using cosine rule must rearrange to $\cos x =$ for M1		
	Allow [0.42, 0.43] for $\frac{3}{7}$		
Allow 2.33... for $\frac{7}{3}$			
Allow [7.6, 7.62] for $\sqrt{3^2 + 7^2}$			

29	$\sin 45 = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$ or $\tan 45 = 1$ or $\frac{1}{1}$ or $\tan 60 = \sqrt{3}$ or $\frac{\sqrt{3}}{1}$	B1	oe stated or in correct place in expression or implied by multiplier of 2 or 4
	$\sin 45 = \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$ and $\tan 45 = 1$ or $\frac{1}{1}$ and $\tan 60 = \sqrt{3}$ or $\frac{\sqrt{3}}{1}$	B1	oe stated or in correct place in expression or implied by multiplier of 2 or 4  $2 \times \frac{1}{\sqrt{2}} - 1$ eg $\frac{2 \times \frac{1}{\sqrt{2}} - 1}{4 \times \frac{\sqrt{3}}{1}}$
	$\frac{\sqrt{2}-1}{4\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$	M1	oe rationalisation of their denominator  eg $\frac{2}{\sqrt{2}-1} \times \frac{4\sqrt{3}}{4\sqrt{3}}$
	$\frac{\sqrt{6}-\sqrt{3}}{12}$	A1	oe in the form $\frac{\sqrt{6a^2}-\sqrt{3a^2}}{12a}$ where $a$ is a positive integer  eg $\frac{\sqrt{24}-\sqrt{12}}{24}$ (when $a = 2$ )
	<b>Additional Guidance</b>		
	$\frac{2 \times \frac{1}{\sqrt{2}} - 1}{4\sqrt{3}}$ or $\frac{\sqrt{2}-1}{4\sqrt{3}}$ or $\frac{\sqrt{2}-1}{\sqrt{48}}$		B1B1
	$\frac{\sqrt{48}(\sqrt{2}-1)}{\sqrt{48}\sqrt{48}}$ or $\frac{\sqrt{48}(\sqrt{2}-1)}{48}$		B1B1M1
$\frac{\sqrt{96}-\sqrt{48}}{48}$		B1B1M1A1	
B1B1 awarded, incorrect simplification, then correct method to rationalise			B1B1M1

AQA GCSE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier

<b>7</b>	$\sin 72 = \frac{x}{8}$ or $8 \times \sin 72$ or $\cos (90 - 72) = \frac{x}{8}$ or $8 \times \cos (90 - 72)$ or $\frac{x}{\sin 72} = \frac{8}{\sin 90}$ or $\frac{\sin 72}{x} = \frac{\sin 90}{8}$	M1	oe eg $8 \cos 72$ or 2.47... or 2.5 <b>and</b> $\sqrt{8^2 - (8\cos 72)^2}$
	[7.6, 7.61]	A1	
	<b>Additional Guidance</b>		
	If trigonometry and Pythagoras are used it must be a fully correct method that would lead to the correct value of $x$		
	Accept $\sin 72 \times 8$		M1
	Accept opp or o for $x$ eg $\sin 72 = \frac{\text{opp}}{8}$		M1
	$\sin = \frac{x}{8}$ or $\sin \theta = \frac{x}{8}$ (unless recovered)		M0
	Answer coming from scale drawing		M0A0
Answer in range seen followed by 7 or 8		M1A1	

**AQA GCSE – Sample Paper 1 (Non - Calculator) Higher Tier**

**36.**

<b>13(a)</b>	0.64	B1	
<b>13(b)</b>	$\frac{x}{4} = \cos 50^\circ$ or $\frac{x}{4} = \text{their } 0.64$ or $4 \times \text{their } 0.64$	M1	oe their 0.64 from (a)
	2.6	A1ft	oe ft their 0.64 from (a)



AQA GCSE – Sample Paper 1 (Non - Calculator) Higher Tier

37.

<b>19</b>	$\cos 30^\circ = \frac{\sqrt{3}}{2}$ or $\tan 60^\circ = \sqrt{3}$	M1	
	$4\sqrt{3}$	A1	
	$\sqrt{48}$ or $k = 48$	B1ft	ft value seen in the form $a\sqrt{b}$ where $a$ and $b$ are integers $> 1$