

## LENGTH OF SIDE

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

1.

17	13.1	P1	for start of process to find the length of $BD$ , eg $\frac{BD}{\sin 34^\circ} = \frac{12.5}{\sin 109^\circ}$	Accept 7.4 for the award of the first two P marks  If an answer is given within the range and then incorrectly rounded to 3 sig figs award full marks.
		P1	for complete process to find the length of $BD$ , eg $BD = \frac{12.5}{\sin 109^\circ} \times \sin 34^\circ (= 7.39\dots)$	
		P1	for process to find the length of $AD$ , eg $AD^2 = 11.4^2 + 7.39^2 - 2 \times 11.4 \times 7.39 \times \cos 86^\circ$	
		P1	for process to use correct order of operations, eg $129.96 + 54.6(5\dots) - 11.7(5\dots) (= 172.85\dots)$	
		A1	for answer in the range 13.1 to 13.2	

### Pearson Edexcel - Thursday 8 June 2017 - Paper 2 (Calculator) Higher Tier

2.

5	(a)	3.9	M1	for a ratio of $\frac{8.1}{5.4} (=1.5)$ oe or $\frac{5.4}{8.1} (=0.66\dots)$ oe or $\frac{2.6}{5.4} (= 0.48\dots)$ oe or $\frac{5.4}{2.6} (= 2.07\dots)$ oe
			A1	cao
	(b)	2.05	M1	for $\frac{5.4}{8.1} \times 6.15$ oe ( $= 4.1$ ) or $\frac{2.7}{8.1} \times 6.15$ oe or fit "scale factor" from (a)
			A1	cao

### Pearson Edexcel - Tuesday 13 June 2017 - Paper 3 (Calculator) Higher Tier

3.

7		5.86	M1	for $\sin 23 = \frac{AB}{15}$ NB Allow any alternative equivalent method to form an equation in $AB$
			A1	5.8 to 5.9

### Pearson Edexcel - Tuesday 13 June 2017 - Paper 3 (Calculator) Higher Tier

4.

8		5.59	M1	For use of $\pi r^2 = 49$ , where $r$ is the radius or $r = 3.9(49\dots)$ or diameter $= 7.8(9865\dots)$	For use of trigonometry to set up an equation in $x$ eg $\sin 45 = x + d$  Rearrange to $(x=) "7.898\dots" \times \sin 45$ oe
			M1	For use of Pythagoras to set up an equation in $x^2$ e.g. $x^2 + x^2 = (d)^2$ or $x^2 = r^2 + r^2$	
			M1	(dep on M2) Rearrange to $(x^2 =) 2 \times "3.949\dots" ^2$	
			A1	5.5 to 5.6	

### Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier

5.

17	$\sqrt{8.35^2 - 6.05^2}$	5.754997828	B1	for finding bounds of one measurement, 8.25 8.35, 6.05 or 6.15
			P1	for process of choosing and using correct bounds
			P1	for process of Pythagoras' rule with correct bounds
			A1	for 5.754(997\dots)

**Pearson Edexcel - Specimen Papers Set 1 - Paper 2 (Calculator) Higher Tier**

6.

14	angle $BAD =$ angle $DCA = 22.62^\circ$ angle $DBA =$ angle $DAC = 67.38^\circ$	33.8	P1 for recognition of similar triangles or equal ratio of sides OR for a method to find angle $BAD$ or angle $DBA$ and state that this is the same as angle $DCA$ or angle $DAC$ P1 for process to find $CB$ , eg. $\frac{5}{13} = \frac{13}{CB}$ A1 for an answer rounding to 33.8
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**Pearson Edexcel - Specimen Papers Set 1 - Paper 3 (Calculator) Higher Tier**

7.

9	$1.5 \times 1.7 - 1.7$ Or $0.5 \times 1.7 = (0.85)$	0.664(09..)	P1 for finding the difference in height by ratio or multiplier P1 for use of tan ratio P1 (dep) for " $0.85^\circ \div \tan 52$ oe A1 0.664 to 0.6641
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**Pearson Edexcel - Sample Paper 2 - (Calculator) Higher Tier**

8.

6		9.54	P1 $10^2 - 5^2 (=75)$ P1 " $75$ " + $4^2 (=91)$ P1 $\sqrt{(10^2 - 5^2 + 4^2)}$ A1 $9.53 - 9.54$
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**Pearson Edexcel - Wednesday 4 November 2015 - Paper 1 (Non-Calculator) Higher Tier**

9.

16		13.75	5	M1 for finding perimeter of rectangle e.g. $5x + 5 + 5x + 5 + 4x + 4x (= 18x + 10)$ M1 for finding perimeter of trapezium e.g. $9x - 2 + 7x - 2 + 10x (=26x - 4)$ M1 for equation e.g. $26x - 4 = 18x + 10$ (or $8x = 14$ ) A1 for finding the value of $x$ as 1.75 B1 ft for subs of $x$ into $5x + 5$ and evaluated ( $=13.75$ )
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**Pearson Edexcel - Friday 6 November 2015 - Paper 2 (Calculator) Higher Tier**

10.

*15	(a)		1	C1 for a complete reason eg <u>Angles in a semicircle are <math>90^\circ</math></u> , <u>alternate segment theorem</u>
	(b)	2.75	4	M1 for $7 \times \sin 35$ M1 for $7 \times \sin 35 \times 2$ M1 (indep) for " $DB$ " $\times \cos 70$ A1 2.74 - 2.75

**Pearson Edexcel - Friday 6 November 2015 - Paper 2 (Calculator) Higher Tier**

11.

24		31.1	5	M1 for $\frac{1}{2} \times 8.4 \times x \times \sin 40 = 100$ M1 for $100 = (0.5 \times 8.4 \times \sin 40)$ ( $= 37.041\dots$ ) M1 (dep on 1 <sup>st</sup> M1) for substituting the appropriate figures into the cosine rule eg $8.4^2 + 37.041^2 - 2 \times 8.4 \times 37.041 \times \cos 40^\circ$ M1 (dep on previous M1) for correct order of evaluation or ( $c^2 =$ ) $965.897\dots$ A1 31.07 - 31.1
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Pearson Edexcel - Thursday 4 June 2015 - Paper 1 (Non-Calculator) Higher Tier

12.

5			12	3	<p>M1 for a method to find volume of a cuboid, eg. <math>2 \times 10 \times 15 (= 300)</math> or <math>5 \times 5 \times x (= 25x)</math>  M1 (dep) for "300" <math>\div</math> "25" oe  A1 cao</p> <p>OR</p> <p>M1 for <math>10 \div 5 (= 2)</math> and <math>15 \div 5 (= 3)</math> or <math>10 \div 5 (= 2)</math> and <math>2 \div 5 (= 0.4)</math>  M1 (dep) for <math>2 \times "2" \times "3"</math> or <math>15 \times "2" \times "0.4"</math>  A1 cao</p>
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Pearson Edexcel - Monday 8 June 2015 - Paper 2 (Calculator) Higher Tier

13.

19		$BC = \frac{12}{\tan 60} = 6.92(8\dots)$ $DE = 6.92(\dots) \times \tan 30 = 4$ $CE = 12 + 4$  $AC = \frac{12}{\sin 60} = 13.8(5\dots)$ $CE = \frac{13.8(5\dots)}{\cos 30}$	16 with supporting working	4	<p>M1 for a method to find BC or AC or AD  B1 for angle EAD = 30° or AED = 60° or ACD = 30° or CAD = 60°  M1 for a method to find CE  A1 for 15.9-16.1 with supporting working</p>
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Pearson Edexcel - Friday 7 November 2014 - Paper 2 (Calculator) Higher Tier

14.

16		$AC^2 = 5^2 + 3^2$ $AC = \sqrt{25 + 9} (= 5.83)$ $\frac{5}{5.83} = \frac{DB}{3}$ $DB = \frac{5}{5.83} \times 3 (= 2.57)$ $5 + 3 + 5.83 + 2.57 =$ <b>OR</b> $AC = \sqrt{25 + 9} (= 5.83)$ $\tan A = \frac{3}{5}$ $A = 30.96$ $\sin 30.96 = \frac{DB}{5}$ $DB = 5 \times \sin 30.96 (= 2.57)$ $5 + 3 + 5.83 + 2.57 =$	16.4	5	<p>M1 for <math>(AC^2) = 5^2 + 3^2 (= 34)</math>  M1 for <math>\sqrt{25 + 9}</math> or <math>\sqrt{34} (= 5.83)</math>  M1 for <math>\frac{5}{5.83} = \frac{DB}{3}</math> or <math>DB \times AC = 5 \times 3</math>  M1 for <math>(DB =) \frac{5}{5.83} \times 3</math>  A1 for 16.4 to 16.41  <b>OR</b>  M1 for <math>(AC^2) = 5^2 + 3^2 (= 34)</math>  M1 for <math>\sqrt{25 + 9}</math> or <math>\sqrt{34} (= 5.83)</math>  M1 for using a correct trig ratio in an attempt to find angle A or angle C, e.g. <math>\tan A = \frac{3}{5}</math>, <math>\sin A = \frac{3}{5.83}</math>, <math>\cos C = \frac{3}{5.83}</math>  M1 for using DB in a correct trig ratio, e.g. <math>\sin 30.96^\circ = \frac{DB}{5}</math>  A1 for 16.4 to 16.41</p>
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Pearson Edexcel - Friday 7 November 2014 - Paper 2 (Calculator) Higher Tier

15.

21			8.52	5	<p>M1 for <math>\frac{BD}{\sin 45} = \frac{7.4}{\sin 80}</math> oe</p> <p>M1 for <math>(BD) = \frac{7.4}{\sin 80} \times \sin 45 (= 5.3133..)</math></p> <p>M1 for <math>5.8^2 + '5.31'^2 - 2 \times 5.8 \times '5.31' \cos 100</math></p> <p>M1 (dep) for correct order of evaluation or 72.5(73...)</p> <p>A1 for 8.51 – 8.52</p> <p>OR</p> <p>M1 for <math>\frac{AD}{\sin(180 - 80 - 45)} = \frac{7.4}{\sin 80}</math> oe</p> <p>M1 for <math>(AD) = \frac{7.4}{\sin 80} \times \sin(180 - 80 - 45) (= 6.15...)</math></p> <p>M1 for <math>7.4^2 + ('6.15' + 5.8)^2 - 2 \times 7.4 \times ('6.15' + 5.8) \times \cos 45</math></p> <p>M1 (dep) for correct order of evaluation or 72.5(7398...)</p> <p>A1 for 8.51 – 8.52</p>
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**Pearson Edexcel - Friday 13 June 2014 - Paper 2 (Calculator) Higher Tier**

**16.**

17	(a)		7.5	2	<p>M1 for sight of <math>\frac{9}{6} (=1.5)</math> oe or <math>\frac{6}{9} (=0.66..)</math> oe or <math>\frac{5}{6} (=0.83..)</math> oe or <math>\frac{6}{5} (=1.2)</math> oe or a ratio, eg 6:9 oe or decimal, eg 1.5 oe</p> <p>A1 cao</p>
	(b)		8	2	<p>M1 for <math>12 \times \frac{6}{9}</math> oe or <math>12 \div \frac{9}{6}</math> oe or <math>\frac{12}{'7.5'}</math> <math>\times 5</math> oe</p> <p>A1 cao</p>

**Pearson Edexcel - Friday 8 November 2013 - Paper 2 (Calculator) Higher Tier**

**17.**

22	(a)		'show'	2	<p>M1 for <math>\frac{1}{2} \times (x - 4 + x + 5) \times 2x</math> or</p> <p><math>2x \times (x - 4) + \frac{1}{2} \times 2x \times 9</math></p> <p>A1 for completion with correct processes seen</p>
	(b)		13	3	<p>M1 for <math>\frac{-1 \pm \sqrt{1^2 - 4 \times 2 \times -351}}{2 \times 2}</math> condone incorrect sign for 351</p> <p>M1 for <math>\frac{-1 \pm \sqrt{2809}}{4}</math></p> <p>A1 for 13</p> <p>NB for either M mark accept + only in place of ±</p> <p><b>OR</b></p> <p>M2 for <math>(2x + 27)(x - 13)</math></p> <p>(M1 for <math>(2x \pm 27)(x \pm 13)</math>)</p> <p>A1 for 13</p>

**Pearson Edexcel - Friday 8 November 2013 - Paper 2 (Calculator) Higher Tier**

**18.**

24			14.4	3	<p>M1 for <math>\pi \times 6.5^2 \times 11.5 (=1526.42...)</math></p> <p>M1 (dep) for <math>\frac{'1526.42...'}{\pi \times 5.8^2}</math></p> <p>A1 for 14.4 - 14.5</p> <p><b>OR</b></p> <p>M1 for <math>\frac{5.8}{6.5}</math> or <math>\frac{6.5}{5.8}</math> or 0.89(23...) or 1.12(06896...)</p> <p>M1 for <math>11.5 \div \left(\frac{5.8}{6.5}\right)^2</math> or <math>11.5 \times \left(\frac{6.5}{5.8}\right)^2</math></p> <p>A1 for 14.4 - 14.5</p>
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**Pearson Edexcel - Friday 8 November 2013 - Paper 2 (Calculator) Higher Tier**

**19.**

26	180-136-'34.4' =9.504	3.73	5	<p>M1 for <math>\frac{\sin L}{12.8} = \frac{\sin 136}{15.7}</math></p> <p>M1 for <math>L = \sin^{-1}\left(\frac{\sin 136}{15.7} \times 12.8\right)</math> or <math>\sin^{-1}0.566\dots</math></p> <p>A1 for 34.4 - 34.5</p> <p>M1 for <math>\frac{LN}{\sin(180-136-'34.4')} = \frac{15.7}{\sin 136}</math> or <math>\frac{LN}{\sin(180-136-'34.4')} = \frac{12.8}{\sin '34.4'}</math> or  <math>(LN^2 =) 15.7^2 + 12.8^2 - 2 \times 15.7 \times 12.8 \times \cos(180 - 136 - '34.4')</math>  A1 for 3.73 - 3.74</p>
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**Pearson Edexcel - Monday 4 March 2013 - Paper 2 (Calculator) Higher Tier**

20.

20		15.0	3	<p>M1 for <math>8^2 + 8^2 - 2 \times 8 \times 8 \times \cos 140</math>  M1 (dep) for correct order of evaluation or 226.(05...)  A1 for answer in range 15.0 - 15.04</p> <p><b>OR</b></p> <p>M1 for <math>\frac{PR}{\sin 140} = \frac{8}{\sin\left(\frac{180-140}{2}\right)}</math>  M1 for <math>PR = \frac{8}{\sin\left(\frac{180-140}{2}\right)} \times \sin 140</math>  A1 for answer in range 15.0 - 15.04</p> <p><b>OR</b></p> <p>M1 for <math>8 \times \sin 70</math> or <math>8 \times \cos 20</math>  M1 for <math>2 \times 8 \times \sin 70</math> or <math>2 \times 8 \times \cos 20</math>  A1 for answer in range 15.0 - 15.04</p>
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**Pearson Edexcel - Monday 4 March 2013 - Paper 2 (Calculator) Higher Tier**

21.

25		$1 + \sqrt{5}$	5	<p>M1 for <math>\frac{1}{2} \times x \times x \times \sin 30^\circ</math> oe  M1 for <math>\frac{1}{2}(x-2)(x+1)</math> oe or <math>\frac{1}{2} \times (x-2) \times (x+1) \times \sin 90</math>  M1 (dep on at least one previous M1) for formation of equation from equating areas with <math>x</math> as the only variable</p> <p>A1 for <math>x^2 - 2x - 4 = 0</math> oe in the form <math>ax^2 + bx + c = 0</math> or <math>ax^2 + bx = c</math>  A1 cao</p>
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**Pearson Edexcel - Tuesday 6 November 2012 - Paper 1 (Non-Calculator) Higher Tier**

22.

23		7.5	4	<p>B1 for identifying A at 3 or D at 6 or A(3, 0) or D(0, 6) oe eg may be seen as labels on the diagram  M1 for <math>0 = \frac{-1}{2} \times 3 + c</math>  M1 (dep on previous M1) for 6 + '1.5'  A1 cao</p> <p><b>OR</b></p> <p>B1 for identifying A at 3 or D at 6 or A(3, 0) or D(0, 6) oe eg may be seen as labels on the diagram  M1 for <math>3/6 = OP/3</math> or 1.5 oe seen (from similar triangles)  M1 for 6 + '1.5'  A1 cao</p> <p><b>OR</b></p> <p>B1 for identifying A at 3 or D at 6 or A(3, 0) or D(0, 6) oe eg may be seen as labels on the diagram  M1 for <math>(6+OP)^2 = (6^2+3^2) + (3^2+OP^2)</math> oe (from Pythagoras)  M1 for 6 + '1.5'  A1 cao</p>
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Pearson Edexcel - Thursday 8 November 2012 - Paper 2 (Calculator) Higher Tier

23.

15	$9 - 3 = 6$ $10^2 - 6^2 = 64$ $BC = 8$ $AC^2 = 9^2 + 8^2 = 145$	12.0	5	M2 $10^2 - (9 - 3)^2 (=64)$ or $BC = 8$ (M1 $9 - 3 (=6)$ may be seen on diagram) M1 (indep) $9^2 + BC^2$ where $BC$ is a numerical value M1 (dep on previous M1) $\sqrt{81 + 64}$ A1 12.0 – 12.042
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Pearson Edexcel - Thursday 8 November 2012 - Paper 2 (Calculator) Higher Tier

24.

17	$\sin 60^\circ = \frac{x}{32}$ $x = 32 \times \sin 60 (=27.712\dots)$	27.7	3	M1 $\sin 60 = \frac{x}{32}$ or $\frac{x}{\sin 60} = \frac{32}{\sin 90}$ oe M1 $(x =) 32 \times \sin 60$ or $(x =) \frac{32}{\sin 90} \times \sin 60$ A1 27.7 – 27.72  <b>OR</b> M1 $\cos(90 - 60) = \frac{x}{32}$ M1 $(x =) 32 \times \cos(90 - 60)$ A1 27.7 – 27.72  Radians : - 9.7539398... Gradians : 25.888554... SC : B2 for an answer in the range (-) 9.75 to (-)9.754 or 25.8 to 25.9
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Pearson Edexcel - Wednesday 13 June 2012 - Paper 2 (Calculator) Higher Tier

25.

18	$BD^2 + 12^2 = 16^2$ oe $BD = \sqrt{256 - 144}$ $(=10.58\dots)$ $\sin 40 = \frac{10.58}{CD}$ $CD = \frac{10.58}{\sin 40}$	16.5	5	M1 for $BD^2 + 12^2 = 16^2$ oe or $16^2 - 12^2$ or 112 seen M1 for $\sqrt{256 - 144}$ or $\sqrt{112}$ (=10.58...) M1 for $\sin 40 = \frac{10.58}{CD}$ or $\cos 50 = \frac{10.58}{CD}$ M1 for $(CD =) \frac{10.58}{\sin 40}$ or $\frac{10.58}{\cos 50}$ A1 for 16.4 – 16.5  <b>OR</b> M1 for $BD^2 + 12^2 = 16^2$ oe or $16^2 - 12^2$ or 112 seen M1 for $\sqrt{256 - 144}$ or $\sqrt{112}$ (=10.58...) M1 for $(BC =) 10.58 \times \tan 50$ or $\frac{10.58}{\tan 40}$ (=12.6...) M1 for $\sqrt{12.6^2 + 10.58^2}$ A1 for 16.4 – 16.5
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Pearson Edexcel - Friday 2 March 2012 - Paper 3 (Non-Calculator) Higher Tier

26.

17	(a)	$\frac{ED}{8} = \frac{6}{4} \quad ED = 12$	12	2	M1 for $\frac{6}{4}$ oe or $\frac{4}{6}$ oe or $\frac{8}{4}$ oe or $\frac{4}{8}$ oe (accept all these written as ratios) A1 cao
	(b)	$\frac{2}{5} \times 25$  <b>OR</b> $4 : 6 = AC : CD$ $(25 \div (4 + 6)) \times 4$	10	2	M1 $\frac{2}{5} \times 25$ oe A1 cao  <b>OR</b> M1 $(25 \div (4 + 6)) \times 4$ A1 cao  <b>OR</b> M1 for $25 \div (1 + 1.5)$ A1 cao

**Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier**

**27.**

7		$16^2 - 8^2 = 192$ $\sqrt{192} = 13.85640646$	13.86	3	M1 for showing the intention to square and subtract or sight of $16^2 - 8^2$ or 192 M1 for $\sqrt{256 - 64}$ or $\sqrt{192}$ or $8\sqrt{3}$ A1 for answer in range 13.85 to 13.86  <b>OR</b> M2 for $16\cos 30$ or $16\sin 60$ (M1 for $\cos 30 = \frac{QR}{16}$ or $\sin 60 = \frac{QR}{16}$ ) A1 for answer in the range 13.85 to 13.86
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**Pearson Edexcel - Monday 14 November 2011 - Paper 4 (Calculator) Higher Tier**

**28.**

17		$\frac{15+6}{15} \times 12.5$	17.5	3	M1 for $\frac{DE}{12.5} = \frac{15+6}{15}$ oe or $\frac{15}{15+6}$ or $\frac{15+6}{15}$ or $\frac{7}{5}$ or $\frac{5}{7}$ or $\frac{2}{5}$ or $\frac{5}{2}$ (1.4 or 0.4 or 2.5 or 0.714...) M1 for $\frac{15+6}{15} \times 12.5$ or $\frac{7}{5} \times 12.5$ oe or $12.5 + \frac{2}{5} \times 12.5$ oe A1 cao
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**Pearson Edexcel - Monday 14 November 2011 - Paper 4 (Calculator) Higher Tier**

**29.**

20	(a)	$\frac{8}{\sin 62}$	9.06	3	<p>M1 for <math>\sin 62 = \frac{8}{PR}</math> or <math>\cos(90-62) = \frac{8}{PR}</math> or <math>\frac{\sin 90}{PR} = \frac{\sin 62}{8}</math> oe</p> <p>M1 for <math>(PR =) \frac{8}{\sin 62}</math> or <math>\frac{8}{\cos(90-62)}</math></p> <p>or <math>\sin 90 \times \frac{8}{\sin 62}</math></p> <p>A1 for 9.06 – 9.061</p> <p>SC: B2 for -10.82 to -10.83 using rad or 9.672 to 9.674 using grad</p> <p>or</p> <p>For methods involving trig or Pythagoras and then trig or Pythag</p> <p>No marks until a correct trig or pythag statement linking <math>SR = 4.25(36\dots)</math> and PR</p> <p>For example</p> <p>M1 for <math>(PR^2 =) 8^2 + 4.25(36\dots)^2</math> or <math>\cos 62 = \frac{4.25(36\dots)}{PR}</math></p> <p>M1 for <math>\sqrt{64+18.0(9\dots)}</math> or <math>\frac{4.25(36\dots)}{\cos 62}</math></p> <p>A1 9.06 – 9.061</p>
20	(b)	$QR^2 = 14^2 + 9.06^2 - 2 \cdot 14 \cdot 9.06 \cos 62$ $= 196 + 82.08 - 253.68 \cos 62$ $= 158.98\dots$	12.6	4	<p>B1 for angle <math>QPR = 62^\circ</math></p> <p>M1 for <math>QR^2 = 14^2 + 9.06^2 - 2 \times 14 \times 9.06 \times \cos 62</math></p> <p>M1 for correct order of evaluation or 158.9...</p> <p>A1 (ft PR) for 12.6 – 12.62</p> <p>or</p> <p>For methods using trigonometry and Pythagoras</p> <p>No marks until a correct Pythag statement with <math>QR</math> as only unknown</p> <p>(Let M be on <math>PQ</math> such that angle <math>RMQ</math> is <math>90^\circ</math>)</p> <p>For example</p> <p>B1 for angle <math>QPR = 62^\circ</math></p> <p>M1 for <math>(QR^2 =) 8^2 + (14 - PR \cos 62)^2</math></p> <p>M1 for <math>\sqrt{64+94.995\dots}</math> or 158.9...</p> <p>A1 (ft PR) for 12.6 – 12.62</p> <p>SC: B3 for 10.3(5511) or 10.4 using rad or 11.6(402014) using grad</p>

**Pearson Edexcel - Friday 10 June 2011 - Paper 4 (Calculator) Higher Tier**

**30.**

25	(a)	$BC = \sqrt{8^2 - 3^2} = \sqrt{55} =$ $7.416198\dots$ $CD = 7.416\dots \div \sin 50^\circ$ $= 9.6811\dots$	9.68	4	<p>M1 for <math>8^2 - 3^2</math> oe</p> <p>M1(dep) for <math>\sqrt{8^2 - 3^2}</math> or 7.41... or 7.42 seen</p> <p>Or</p> <p>M1 for <math>A = \cos^{-1}\left(\frac{3}{8}\right)</math> (=67.98°)</p> <p>M1(dep) for <math>3 \times \tan^{-1} 67.98'</math> or 7.41... or 7.42 seen</p> <p>M1 for '7.4.....' <math>\div \sin 50</math></p> <p>A1 for 9.67 – 9.69</p> <p>SC B3 for -28.2 to -28.3 using rad or 10.4 – 10.5 using grad</p>
	(b)	$CE^2 = 19^2 + 9.68^2 - 2(19)(9.68) \cos 40$ $= 361 + 93.7024 - 367.84(0.766)$ $= 172.920612$ $CE = 13.1499\dots$	13.1	3	<p>M1 for <math>(CE^2 =)</math>  <math>19^2 + (9.68)^2 - 2(19)(9.68) \cos 40</math></p> <p>M1(dep) for correct order of evaluation to reach <math>\sqrt{172.920612}</math></p> <p>A1 for 13.1 – 13.15</p> <p>SC B2 26.4(5805...) or 26.5 used radians or 12.5(3449...) used gradians</p>

**Pearson Edexcel - Friday 12 November 2010 - Paper 4 (Calculator) Higher Tier**

**31.**



21	$AB = 8 \cos 37^\circ = 8 (0.7986\dots)$ $= 6.389\dots$	6.39	3	<p>M1 for <math>\cos 37 = \frac{AB}{8}</math></p> <p>M1 for <math>AB = 8 \cos 37^\circ</math> or 6.4 seen (dep on 1<sup>st</sup> M1)</p> <p>A1 for 6.38 - 6.39</p> <p>OR</p> <p>M1 for <math>\frac{AB}{\sin 53} = \frac{8}{\sin 90}</math></p> <p>M1 for <math>AB = \frac{8 \sin 53}{\sin 90} AB</math></p> <p>or 6.4 seen (dep on 1<sup>st</sup> M1)</p> <p>A1 for for 6.38 - 6.39</p> <p>SC M2A0 for 6.12 (radians) or 6.69 (grad)</p>
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**Pearson Edexcel - Monday 7 June 2010 - Paper 3 (Non-Calculator) Higher Tier**

32.

18	(a)	$12 \times \frac{6}{4}$	18	2	<p>M1 for sight of <math>\frac{6}{4}</math> oe or <math>\frac{4}{6}</math> oe or <math>\frac{12}{4}</math> oe or <math>\frac{4}{12}</math> oe or a ratio eg. 6:4 oe or decimal eg. 1.5 oe</p> <p>A1 cao</p>
	(b)	$15 \times \frac{4}{6}$	10	2	<p>M1 for <math>15 \times \frac{4}{6}</math> oe or <math>\frac{15}{"18"} \times 12</math> oe</p> <p>A1 cao</p>

**Pearson Edexcel - Friday 11 June 2010 - Paper 4 (Calculator) Higher Tier**

33.

20	$\cos 58^\circ = \frac{AB}{16}$	8.48	3	<p>M1 for <math>\cos 58^\circ = \frac{AB}{16}</math></p> <p>M1 (dep) for <math>16 \times \cos 58^\circ</math></p> <p>A1 for 8.47- 8.48</p> <p>[SC:M2 A0 for 1.9-1.91 [RAD] or 9.8-9.81 [GRAD]]</p>
	$AB = 16 \times \cos 58^\circ = 8.4787$			

**Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier**

34.

22	(a)	$6 \times \frac{15}{10}$	9	2	<p>M1 for sight of <math>\frac{15}{10}</math> or <math>\frac{10}{15}</math> or <math>\frac{10}{6}</math> or <math>\frac{6}{10}</math> oe seen</p> <p>A1 cao</p> <p>NB ratios get M0 unless of the form 1:n</p>
	(b)	$12 \times \frac{10}{15}$ oe	8	2	<p>M1 for correct use of <math>\frac{15}{10}</math> or <math>\frac{10}{15}</math> or <math>\frac{15}{12}</math> or <math>\frac{12}{15}</math></p> <p>or <math>\frac{"9"}{6}</math> or <math>\frac{6}{"9"}</math> oe</p> <p>A1 for 8 or ft from <math>12 \times 6 \div '9'</math></p>

**OCR GCSE – Tuesday 3 November 2020 – Paper 4 (Calculator) Higher Tier**

35.

14		15.6[1..] with correct working	6	<p><b>M2</b> for <math>[\sin B = ] \frac{15 \times \sin 72}{18}</math> oe</p> <p>or <b>M1</b> for <math>\frac{\sin B}{15} = \frac{\sin 72}{18}</math> oe</p> <p>AND</p> <p><b>M1</b> for <math>180 - 72 - \text{their } 52.4</math> implied by 55.6 or 55.57...</p> <p>and</p> <p><b>M2</b> for <math>[AB = ] \frac{18 \times \sin \text{their } 55.57 \dots}{\sin 72}</math> oe</p> <p>or <b>M1</b> for <math>\frac{[...]}{\sin \text{their } 55.57 \dots} = \frac{18}{\sin 72}</math> oe</p> <p>If 0 scored award <b>SC2</b> for 15.6... with insufficient working</p>	<p>Correct working requires evidence of at least <b>M1</b> AND <b>M1</b></p> <p><b>M2</b> implied by 0.7925... or 52.4...</p> <p>Alternative cosine rule (<math>AB = x</math>)</p> <p><b>M3</b> for quadratic equation with coefficients evaluated</p> <p><b>M2</b> for <math>x^2 + (-2 \times 15 \times \cos 72)x + (15^2 - 18^2) [=0]</math> oe or</p> <p><b>M1</b> for <math>18^2 = x^2 + 15^2 - 2 \times x \times 15 \cos 72</math></p> <p>AND</p> <p><b>M2</b> for correct use of quadratic formula or <b>M1</b> for use of quadratic formula with at most two errors</p>
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### OCR GSCE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

36.

13	(a)	<p><math>AC = 40 \sin 30</math></p> <p>20 and evidence that <math>\sin 30 = 0.5</math></p>	<p><b>M2</b></p> <p><b>M1</b> for <math>\frac{AC}{40} = \sin 30</math> oe</p> <p><b>A1</b></p> <p>If 0 scored, <b>B1</b> for <math>\sin 30 = 0.5</math> oe</p>	
13	(b)	$20(\sqrt{3} - 1)$	<p><b>5</b></p> <p><b>B4</b> for <math>20\sqrt{3} - 20</math> or <math>\sqrt{1200} - 20</math></p> <p>or <b>B3</b> for <math>\sqrt{1200}</math> or <math>\frac{40\sqrt{3}}{2}</math></p> <p>or <b>M2</b> for <math>40 \cos 30</math> oe</p> <p>or <b>M1</b> for <math>\cos 30 = \frac{AB}{40}</math> oe</p>	<p>Other methods are possible e.g. Pythag</p> <p>e.g. <b>M2</b> for <math>[AB = ]\sqrt{40^2 - 20^2}</math></p> <p>e.g. <b>M1</b> for <math>AB^2 + 20^2 = 40^2</math></p>

### OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier

37.

11		8 nfw	6	<p><b>B1</b> for <math>\cos 60 = 0.5</math> oe soi</p> <p><b>M1</b> for <math>\frac{BD}{12} = \cos 60</math> oe</p> <p><b>A1</b> for <math>[BD = ] 6</math></p> <p>AND</p> <p><b>M2</b> for <math>\sqrt{10^2 - \text{their } BD^2}</math></p> <p>or <b>M1</b> for <math>\text{their } BD^2 + AB^2 = 10^2</math> oe</p> <p>or for <math>10^2 - \text{their } BD^2</math></p>	<p>nfw - must check method before giving 6 marks must not come from wrong working</p> <p>e.g. <math>\sin 30 = 0.5</math></p> <p>e.g. <math>\frac{BD}{12} = \sin 30</math></p> <p>For <b>M2</b> or <b>M1</b> <math>0 &lt; \text{their } BD &lt; 10</math> and <b>BD</b> must be identified first on diagram or in working</p>
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### OCR GSCE – Tuesday 2 November 2017 – Paper 4 (Calculator) Higher Tier

38.

17	(a)	<p>Attempt to use the cosine formula</p> $[\dots]^2 = 14^2 + 18^2 - 2 \times 14 \times 18 \cos 46$ <p>oe</p> <p>or</p> <p>cosine formula with at most 2 errors or correct cosine formula starting cos</p> $[\dots] = \frac{14^2 + 18^2 - [\dots]^2}{2 \times 18 \times 14}$ <p>13.03...</p>	<p><b>M1</b></p> <p><b>M2</b></p> <p>or</p> <p><b>M1</b></p> <p><b>A1</b></p>	<p>Evidenced by the formula e.g. <math>a^2 = b^2 + c^2 - 2bc \cos A</math> or better</p>	
	(b)	35.48 to 35.6	<p><b>3</b></p>	<p><b>B1</b> for 180 – 78 – 81 or 21</p> <p><b>M1</b> for <math>\frac{13.0\dots}{\sin 78} = \frac{[\dots]}{\sin 21}</math> oe or better</p>	<p>could be on diagram</p> <p>accept any correct method</p>

OCR GCSE – Thursday 25 May 2017 – Paper 4 (Calculator) Higher Tier

39.

14		92 or 92.28 to 92.6	<p><b>6</b></p> <p><b>M3</b> for correct explicit cos rule to find angle A in ADE with cos as subject.</p> $[\cos A =] \frac{28^2 + 41^2 - 22^2}{2 \times 28 \times 41}$ <p>oe soi</p> <p>or</p> <p><b>M2</b> for correct implicit form of the cos rule to find angle A</p> $22^2 = 28^2 + 41^2 - 2 \times 28 \times 41 \times \cos A$ <p>or</p> <p><b>M1</b> for either of the above forms with only one error</p> <p>AND</p> <p><b>M2</b> for correct sine rule e.g.</p> $\frac{64 \times \sin 72}{\sin \text{their } A}$ <p>oe soi</p> <p>or</p> <p><b>M1</b> for <math>\frac{64}{\sin \text{their } A} = \frac{[\dots]}{\sin 72}</math> oe</p> <p>if 0 scored <b>SC1</b> for explicit form of cos rule to find angle D or E in ADE e.g.</p> $[\cos D =] \frac{28^2 + 22^2 - 41^2}{2 \times 28 \times 22}$	<p>accept any correct method</p> <p>implied by [A=] 30.3 to 30.4</p>
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AQA GCSE – Tuesday 19 May 2020 – Paper 1 (Non - Calculator) Higher Tier

40.

<b>8</b>	<b>Alternative method 1</b>		
	6.5 × 9 or 58.5 or 6.5 × 7 or 45.5	M1	oe
	$\frac{6.5 \times 9 - 2 \times 6.5}{2}$ or $\frac{58.5 - 13}{2}$ or $\frac{6.5 \times 7}{2}$ or $\frac{45.5}{2}$	M1dep	oe division may be implied eg $\frac{7}{9} = 45.5$ , $\frac{3.5}{9} = 22.25$ scores M1M1
	22.75 or $\frac{91}{4}$ or $22\frac{3}{4}$	A1	oe
	<b>Alternative method 2</b>		
	6.5 × 9 or 58.5 or 6.5 × 4.5 or 29.25	M1	oe
	$\frac{6.5 \times 9}{2} - 6.5$ or 6.5 × 4.5 - 6.5	M1dep	oe eg 6.5 × (4.5 - 1) or 6.5 × 3.5
	22.75 or $\frac{91}{4}$ or $22\frac{3}{4}$	A1	oe
	<b>Additional Guidance</b>		
	Answer 22.8 or 23 with 22.75 in working	M1M1A1	
Answer 22.8 or 23 without 22.75 in working	A0		

AQA GCSE – Thursday 4 June 2020 – Paper 2 (Calculator) Higher Tier

41.

<b>13</b>	$\frac{1}{2} \times (2.8 + 2.1) \times h$ or $2.45(h)$	M1	oe eg $2.1(h) + 0.5(h) \times 0.7$ any letter may be implied
	$\frac{1}{2} \times (2.8 + 2.1) \times h = 39.2$ or $(2.8 + 2.1) \times h = 39.2 \times 2$ or $39.2 \div 2.45$ or $78.4 \div 4.9$	M1dep	oe equation or calculation
	16	A1	SC1 8
	<b>Additional Guidance</b>		
	Different letter used eg $2.1h + 0.5x \times 0.7$ is M0 unless recovered		

**AQA GSCE – Thursday 4 June 2020 – Paper 2 (Calculator) Higher Tier**

**42.**

<b>18</b>	<b>Alternative method 1</b>		
	$\tan 62 = \frac{h}{5}$	M1	oe eg $\tan (90 - 62) = \frac{5}{h}$ or $\frac{h}{\sin 62} = \frac{5}{\sin 28}$ any letter
	$5 \times \tan 62$ or 9.4(0...)	M1dep	oe eg $\frac{5}{\tan 28}$ or $\frac{5}{\sin 28} \times \sin 62$
	$\sin x = \frac{\text{their } 9.4(0\dots)}{12}$ or $\sin x = [0.78, 0.784]$	M1dep	oe eg $\sin x = \frac{5 \times \tan 62}{12}$ or $\cos x = \frac{\sqrt{12^2 - \text{their } 9.4^2}}{12}$
	[51.536, 51.63]	A1	accept 52 with M3 seen
	<b>Alternative method 2</b>		
	$\left(\frac{5}{\cos 62}\right)^2 - 5^2$ or [88.4, 88.43]	M1	oe
	$\sqrt{\left(\frac{5}{\cos 62}\right)^2 - 5^2}$ or 9.4(0...)	M1dep	oe
	$\sin x = \frac{\text{their } 9.4(0\dots)}{12}$ or $\sin x = [0.78, 0.784]$	M1dep	oe eg $\cos x = \frac{\sqrt{12^2 - \text{their } 9.4^2}}{12}$
	[51.536, 51.63]	A1	accept 52 with M3 seen
	<b>Additional Guidance</b>		
Answer in range with truncation to 51		M1M1M1A1	

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

43.

<b>13</b>	One of (102 →) 100 (8.14 →) 8	M1	
	their 100 = $0.5 \times x^2 \times$ their 8 or ( $x^2 =$ ) their $100 \div 8 \times 2$ or ( $x^2 =$ ) $100 \div$ their 8 $\times 2$ or 25 or their $8 \times 5 \times 5 \times 0.5 = 100$ or $8 \times 5 \times 5 \times 0.5 =$ their 100	M1dep	oe must have used at least one correct 1 sf value
	5 with M2 seen	A1	
	<b>Additional Guidance</b>		
	If working is done with approximations and with the given values ignore the working with the given values and mark the working with approximations		

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

**44.**

<b>23</b>	<b>Alternative method 1</b>		
	$48 \div 2 \times 3$ or 72	M1	oe
	their $72 \div 2$ or 36	M1dep	$\cos^{-1}\left(\frac{36}{141}\right)$ or 75.2
	$141^2 -$ their $36^2$ or 18 585	M1dep	ft their base $\div 2$ $\sin(\text{their } 75.2) = \frac{h}{141}$ or $\tan(\text{their } 75.2) = \frac{h}{\text{their } 36}$
	$\sqrt{141^2 - \text{their } 36^2}$ or $\sqrt{18\ 585}$	M1dep	$141 \times \sin(\text{their } 75.2)$ or their $36 \times \tan(\text{their } 75.2)$
	[136.2, 136.4] or 136	A1	

Continues on next page

23 cont	<b>Alternative method 2</b>		
	141 ÷ 3 or 47	M1	oe
	24 and their 47 × 2 or 24 and 94 or 12 and their 47	M1dep	$\cos^{-1}\left(\frac{24}{94}\right)$ or 75.2
	their $94^2 - 24^2$ or 8260 or $\sqrt{8260}$ or 90.88...  or their $47^2 - 12^2$ or 2065 or $\sqrt{2065}$ or 45.44...	M1dep	$\sin(\text{their } 75.2) = \frac{h}{\text{their } 94}$ or $\tan(\text{their } 75.2) = \frac{h}{24}$
	$\sqrt{\text{their } 94^2 - 24^2} \times 3 \div 2$ or $\sqrt{8260} \times 3 \div 2$ or $90.88... \times 3 \div 2$ or $\sqrt{\text{their } 47^2 - 12^2} \times 3$ or $\sqrt{2065} \times 3$ or $45.44... \times 3$	M1dep	their $94 \times \sin(\text{their } 75.2) \times 3 \div 2$ or $24 \times \tan(\text{their } 75.2) \times 3 \div 2$
	[136.2, 136.35] or 136	A1	
	<b>Additional Guidance</b>		
Values may be seen on diagram in correct positions			

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

**45.**



<b>19</b>	<b>Alternative method 1</b>		
	5w × w or 5w <sup>2</sup> or 1620 ÷ 5 or 324 or trials a value of w for 5w <sup>2</sup>	M1	oe Any letter eg 5 × 12 × 12 or 50 × 10
	$\sqrt{\frac{1620}{5}}$ or $\sqrt{324}$	M1dep	
	18	A1	A0 if –18 also given
	<b>Alternative method 2</b>		
	$l \times \frac{l}{5}$ or $\frac{l^2}{5}$ or 1620 × 5 or 8100 or trials a value of l for $\frac{l^2}{5}$	M1	oe Any letter eg $\frac{60 \times 60}{5}$ or 80 × 16
	$\sqrt{1620 \times 5}$ or $\sqrt{8100}$ or 90	M1dep	
	18	A1	A0 if –18 also given
	<b>Additional Guidance</b>		
	Answer 18		M2A1
18 in working with 90 on answer line		M2A0	
Trials for 5w <sup>2</sup> or $\frac{l^2}{5}$ without answer 18		M1M0A0	

**AQA GCSE – Sample Paper 3 (Calculator) Higher Tier**

**46.**

<b>15</b>	6.5 – 2.3 or 4.2 and 5 or 85 seen	M1	
	$\sin 5 = \frac{6.5 - 2.3}{AD}$ or $\cos 85 = \frac{6.5 - 2.3}{AD}$ or $\left(\frac{6.5 - 2.3}{\tan 5}\right)^2 + (6.5 - 4.2)^2$	M1	oe
	$\frac{6.5 - 2.3}{\sin 5}$ or $\frac{6.5 - 2.3}{\cos 85}$ or $\sqrt{\left(\frac{6.5 - 2.3}{\tan 5}\right)^2 + (6.5 - 4.2)^2}$	M1dep	oe
	[48, 48.2]	A1	