

Q1. (2017)

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 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 $a=2$)
	Additional Guidance		
$\frac{2 \times \frac{1}{\sqrt{2}} - 1}{4\sqrt{3}}$ 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

Q2. (2018)

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 $\sin 30^\circ = \frac{1}{2}$
	Additional Guidance		
	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 $\cos 30^\circ = \frac{\sqrt{3}}{2}$ $\sin 30^\circ = \frac{1}{2}$ $\tan 60^\circ = \frac{\sqrt{3}}{1}$		
	For B1 allow the trig value(s) given in a table unless contradicted in working		

Q3. (2021)

Question	Answer	Mark	Comments
12	Alternative method 1		
	$\sin 30 = \frac{x}{10}$ or $(x \Rightarrow) 10 \sin 30$	M1	oe eg $\frac{x}{\sin 30} = \frac{10}{\sin 90}$
	$\sin 30 = 0.5$	M1	oe may be seen in a table $0.5 = \frac{x}{10}$ oe scores M1M1
	5	A1	
	Alternative method 2		
	Correct trigonometric method to show that the length of the missing side is $5\sqrt{3}$	M1	oe
	$\sqrt{(5\sqrt{3})^2 + x^2} = 10$	M1dep	oe
	5	A1	
	Additional Guidance		
	Accept use of $\cos 60$ instead of $\sin 30$		

Q4. (2022)

Q	Answer	Mark	Comment
28	$(\cos 30 \Rightarrow) \frac{\sqrt{3}}{2}$ or $(\sin 45 \Rightarrow) \frac{\sqrt{2}}{2}$ or $\frac{1}{\sqrt{2}}$ or $(\tan 60 \Rightarrow) \sqrt{3}$	M1	oe correct trig function may be implied by position in multiplication string may be seen in a table
	$\left(\frac{\sqrt{3}}{2} \times \frac{\sqrt{2}}{2} \times \sqrt{3}\right)^2$ or $\left(\frac{\sqrt{3}}{2}\right)^2 \times \left(\frac{\sqrt{2}}{2}\right)^2 \times (\sqrt{3})^2$ or $\frac{3\sqrt{2}}{4}$ or $\frac{3}{2\sqrt{2}}$ or $\frac{\sqrt{18}}{4}$	M1dep	oe with all values correct oe single term not squared
	$\left(\frac{3\sqrt{2}}{4}\right)^2$ or $\left(\frac{3}{2\sqrt{2}}\right)^2$ or $\left(\frac{\sqrt{18}}{4}\right)^2$ or $\frac{3}{4} \times \frac{1}{2} \times 3$ or $\frac{\sqrt{324}}{16}$	M1dep	oe with all values correct oe single term squared oe multiplication string without surds oe single fraction with one surd
	$\frac{9}{8}$ or $1\frac{1}{8}$ or 1.125	A1	oe fraction, mixed number or decimal
	Additional Guidance		
	Ignore an incorrect attempt to simplify or convert a correct answer eg $\frac{9}{8} = 1.8$		M1M1M1A1

Q5. (2024)

Q	Answer	Mark	Comments
25	Alternative method 1: substitutes values		
	$(\sin 30^\circ =) \frac{1}{2}$ or $6 \sin 30^\circ = 3$ or $(\cos 30^\circ =) \frac{\sqrt{3}}{2}$ or $2 \cos 30^\circ = \sqrt{3}$ or $(\tan 30^\circ =) \frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$ or $4 \tan 30^\circ = \frac{4}{\sqrt{3}}$ or $\frac{4\sqrt{3}}{3}$	M1	may be seen beside the given expression or in a table
	$6\left(\frac{1}{2}\right)$ and $2\left(\frac{\sqrt{3}}{2}\right)$ and $4\left(\frac{1}{\sqrt{3}}\right)$ or $6\left(\frac{1}{2}\right)$ and $2\left(\frac{\sqrt{3}}{2}\right)$ and $4\left(\frac{\sqrt{3}}{3}\right)$ or $\frac{6}{2}$ and $\frac{2\sqrt{3}}{2}$ and $\frac{4\sqrt{3}}{3}$	M1dep	oe
	Processing at least as far as $\frac{6}{2} + \frac{8\sqrt{3}}{2\sqrt{3}}$ or $\frac{6}{2} + \frac{8\sqrt{3}\sqrt{3}}{6}$ or $\frac{6}{2} + \frac{24}{6}$	M1dep	oe
	7 from correct working	A1	SC2 $4 + 4\sqrt{3}$ oe
25 cont	Alternative method 2: uses a trig identity		
	$6 \sin 30^\circ + 2 \cos 30^\circ \times 4 \frac{\sin 30^\circ}{\cos 30^\circ}$	M1	oe
	$6 \sin 30^\circ + 8 \sin 30^\circ$ or $14 \sin 30^\circ$	M1dep	oe
	$14 \times \frac{1}{2}$	M1dep	oe
	7 from correct working	A1	SC2 $4 + 4\sqrt{3}$ oe
Additional Guidance			
Alt 2 is not on this specification, but may be seen if other qualifications have been studied, eg AQA Certificate – Level 2 Further Maths			
Incorrect order of operations gives $4 + 4\sqrt{3}$ oe			SC2
Allow $\sqrt{1}$ for 1 throughout			