

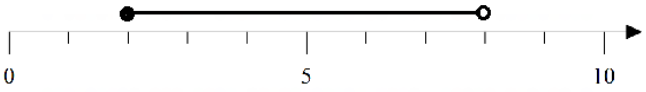
Question	Working	Answer	Mark	Notes
12	$\frac{4(x-6)-3(8x+2)}{12}$ oe			M1 Correct method to reduce to a single fraction. Condone invisible brackets if multiplied out correctly with one sign error only. Implied by next M1
	$\frac{4x-24-24x-6}{12}$ oe			M1 Multiplying out correctly (allow one sign error if 4 terms given - if incorrect answer this line must be seen) If M1 has already been awarded this can be implied by a correct answer
		$\frac{-10x-15}{6}$	3	A1 oe with denominator of 6 or -6 Dependent on both M marks being awarded.
Total 3 marks				

13	$\angle BAE = \angle CDE$ angles in the same segment OR angles at the circumference subtend from the same arc of the circle			Allow BAC and CDB Do not accept other notations such as \hat{A} and \hat{D}
	$\angle ABE = \angle DCE$ angles in the same segment OR angles at the circumference subtend from the same arc of the circle			Allow ABD and DCA Do not accept other notations such as \hat{B} and \hat{C}
	$\angle BEA = \angle CED$ vertically opposite angle OR vertically opposite angle			M2 For two correct corresponding pairs of angles with at least one correct reason. Words in bold needed. Allow \angle for angles (Allow M1 for 2 correct corresponding pair of angles)
		Two/Three angles are equal therefore ABE is similar to DCE	3	A1 A correct conclusion and 2 corresponding angles stated equal with correct reason for both angles. Ignore a third angle given even if incorrect. Allow Two/Three angles are equal therefore similar
Total 3 marks				

Question	Working	Answer	Mark	Notes
14	$[AX =] \sqrt{4^2 + 4^2} [= \sqrt{32} \text{ or } 5.656\dots] \text{ oe}$			M1 Allow $[AX =] \frac{1}{2} \sqrt{8^2 + 8^2}$
	$\tan(\angle EAX) = \frac{15}{\sqrt{4^2 + 4^2}}$			M1 dep on previous M mark being awarded. A correct method to find $\angle EAX$ eg using $\tan(\angle AEX) = \frac{\sqrt{4^2 + 4^2}}{15}$ and $\angle EAX = 90 - \angle AEX$
		69.3	3	A1 awrt 69.3 Working not required, so correct answer scores full marks (unless from obvious incorrect working)
Alternatives for the 2nd M1				
$[AE =] \sqrt{\sqrt{(4^2 + 4^2)^2} + 15^2} [= \sqrt{257}]$ and $\sin EAX = \frac{15}{\sqrt{257}}$ or $\sin EAX = \frac{15 \sin 90}{\sqrt{257}}$ or $\cos EAX = \frac{\sqrt{32}}{\sqrt{257}}$				
$[AE =] \sqrt{\sqrt{(4^2 + 4^2)^2} + 15^2} [= \sqrt{257}]$ and $\angle EAX = 90 - \angle AEX$ and $\sin AEX = \frac{\sqrt{32}}{\sqrt{257}}$ or $\sin AEX = \frac{\sqrt{32} \sin 90}{\sqrt{257}}$ or $\cos AEX = \frac{15}{\sqrt{257}}$				
$[AE =] \sqrt{\sqrt{(4^2 + 4^2)^2} + 15^2} [= \sqrt{257}]$ and $\cos(\angle EAX) = \left(\frac{257 + 32 - 15^2}{2 \times \sqrt{257} \times \sqrt{32}} \right)$				
$[AE =] \sqrt{\sqrt{(4^2 + 4^2)^2} + 15^2} [= \sqrt{257}]$ and $\cos(\angle AEX) = \frac{257 + 15^2 - 32}{2 \times \sqrt{257} \times 15}$ and $\angle EAX = 90 - \angle AEX$				
Alternative for M1M1 -Finding EA from triangle EAD				
M1 $[AE =] \sqrt{\sqrt{(4^2 + 15^2)^2} + 4^2} [= \sqrt{257}]$ M1dep $\sin EAX = \frac{15}{\sqrt{257}}$ or $\sin EAX = \frac{15 \sin 90}{\sqrt{257}}$ or another correct method to find EAX				
Total 3 marks				

Question	Working	Answer	Mark	Notes
15	$\frac{4-\sqrt{12}}{4+\sqrt{12}} \times \frac{4-\sqrt{12}}{4-\sqrt{12}}$ oe			M1 multiplying by $\frac{4-\sqrt{12}}{4-\sqrt{12}}$ or $\frac{2-\sqrt{3}}{2+\sqrt{3}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}}$ or $\frac{4-\sqrt{12}}{4-\sqrt{12}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}}$ oe
	$\frac{16+12-8\sqrt{12}}{16-12}$ or $\frac{28-8\sqrt{12}}{4}$ oe			M1 multiplies out correctly but need not be simplified. Allow $\frac{4+3-4\sqrt{3}}{4-3}$ or $\frac{7-4\sqrt{3}}{1}$ or $7-4\sqrt{3}$ or $\frac{14-2\sqrt{12}-4\sqrt{3}}{2+2\sqrt{12}-4\sqrt{3}}$ oe
		$7-\sqrt{48}$	3	A1 dep on both the previous method marks being awarded. Correct answer with no working is no marks. Allow $a=7$ and $b=48$ ISW once $7-\sqrt{48}$ seen NB Do not allow for $7-4\sqrt{3}$ unless $7-\sqrt{48}$ seen in working
Total 3 marks				

16(a)	$25a^4b^6$			M1 Any 2 terms correct $25a^4 \dots$ or $\dots a^4b^6$ or $25 \dots b^6$
		$25a^4b^6$	2	A1
(b)	$\frac{3x^2y^1}{3x^2y^{-4}}$ or $\frac{y^1}{y^{-4}}$			M1 Allow y for y^1
		y^5	2	A1 Working not required, so correct answer scores full marks (unless from obvious incorrect working)
Total 4 marks				

17(a)	$10 \leq 5x$ or $x < 8$ oe			M1 Condone $10 < 5x$ and $x \leq 8$
	$10 \leq 5x$ and $x < 8$ oe			M1 Correct inequality signs must be used.
		$2 \leq x < 8$	3	A1 oe ISW Working not required, so correct answer scores full marks (unless from obvious incorrect working) Allow $[2,8)$ or other notation eg $\{x : 2 \leq x < 8\}$
(b)			1	B1 ft their inequality if answer to (a) is in the form $a \leq x < b$ or $a < x \leq b$ (one closed dot one open dot – do not accept alternative notation)

Total 4 marks

Question	Working	Answer	Mark	Notes
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