Unit 1 Revision Sheet E Pythagoras and Trig Foundation & Higher

Questions

Q1.

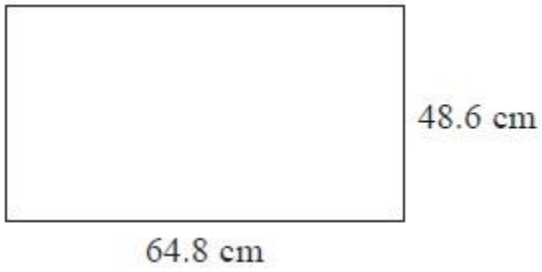

Diagram **NOT** accurately drawn

A TV screen is rectangular.

The width of the rectangle is 64.8 cm and the height is 48.6 cm.

(a) Calculate the area of the rectangle.
Give your answer correct to 3 significant figures.

(3)

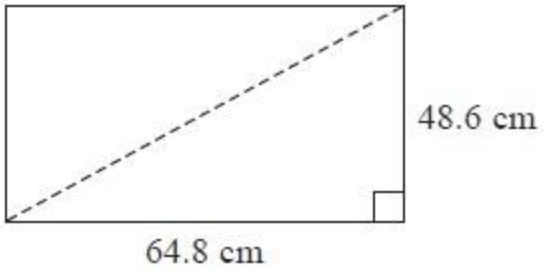

Diagram **NOT** accurately drawn

The length of a diagonal of the rectangle gives the 'size' of the TV screen.

(b) Calculate the 'size' of the TV screen.

(3)

(Total for Question is 6 marks)

Q2.

Here is an isosceles triangle.

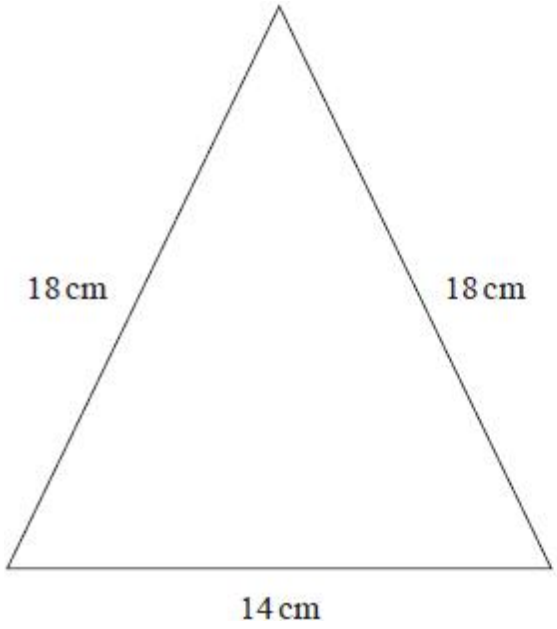

Diagram **NOT** accurately drawn

Work out the area of the triangle.
Give your answer correct to 3 significant figures.

(1)

(Total for question = 4 marks)

Q3.

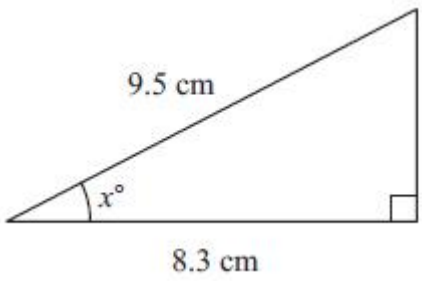

Diagram **NOT** accurately drawn

Work out the value of x.
Give your answer correct to 1 decimal place.

(Total for question = 3 marks)

Q4.

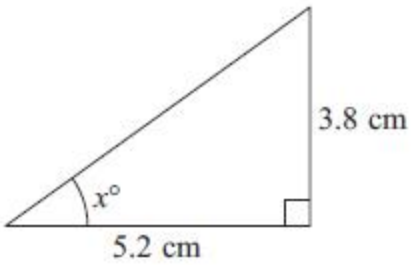

Diagram **NOT** accurately drawn

Calculate the value of x.
Give your answer correct to 1 decimal place.

(Total for question = 3 marks)

Q5.

The diagram shows an isosceles triangle.

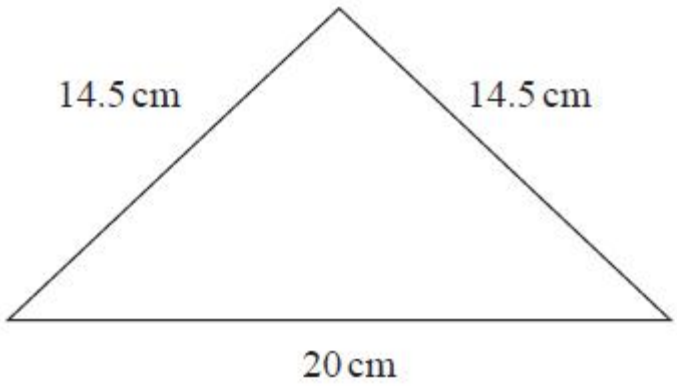

Diagram **NOT** accurately drawn

Work out the area of the triangle.

(Total for question = 4 marks)

Q6.

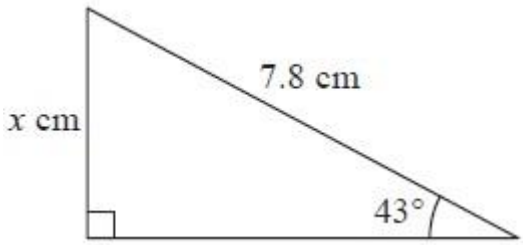

Diagram **NOT** accurately drawn

Work out the value of x.

Give your answer correct to 3 significant figures.

(Total for Question is 3 marks)

Q7.

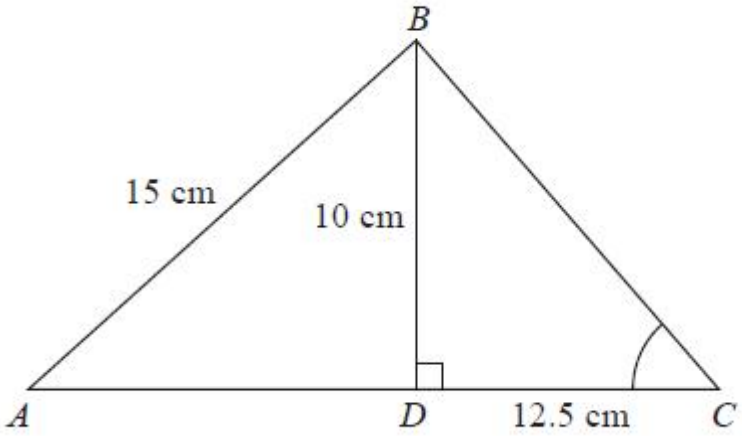

Diagram **NOT** accurately drawn

ABC is a triangle.
The point *D* lies on *AC*.
Angle *BDC* = 90°
BD = 10 cm, *AB* = 15 cm and *DC* = 12.5 cm.

(a) Calculate the length of *AD*.
Give your answer correct to 3 significant figures.

(3)

(b) Calculate the size of angle *BCD*.
Give your answer correct to 1 decimal place.

(3)

(Total for question = 6 marks)

Q8.

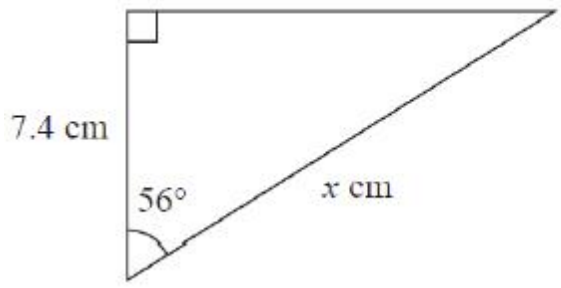

Diagram **NOT** accurately drawn

Work out the value of *x*.
Give your answer correct to 3 significant figures.

(Total for question = 3 marks)

Q9.

The diagram shows a shaded shape *ABCD* made from a semicircle *ABC* and a right-angled triangle *ACD*.

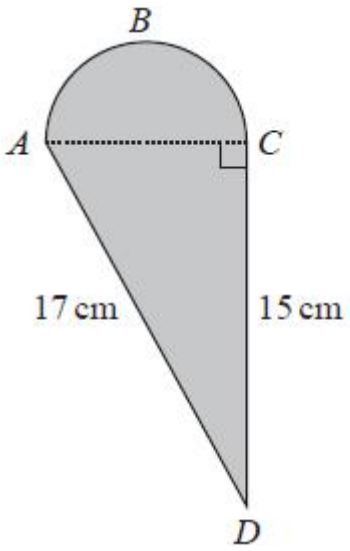

Diagram **NOT** accurately drawn

AC is the diameter of the semicircle *ABC*.

Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

(Total for question = 5 marks)

Q10.

Here is a right-angled triangle.

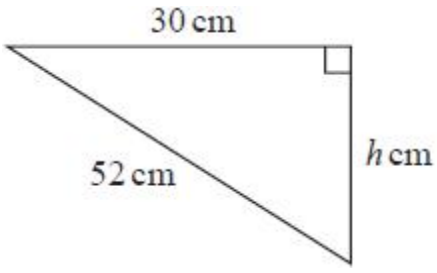

Diagram **NOT** accurately drawn

Calculate the value of *h*.
Give your answer correct to 3 significant figures.

(Total for question = 3 marks)

Q11.

Here is a right-angled triangle.

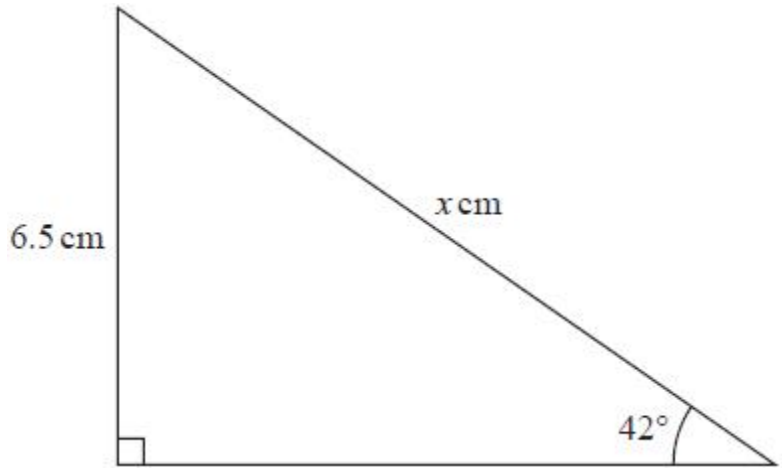

Diagram **NOT** accurately drawn

Work out the value of x.
Give your answer correct to one decimal place.

(Total for question = 3 marks)

Q12.

Write your answers in the spaces provided.

You must write down all the stages in your working.

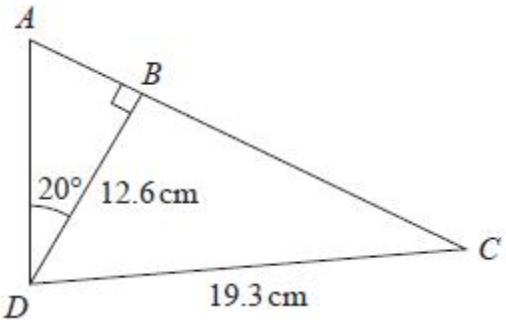

Diagram **NOT** accurately drawn

ABC is a straight line.

Work out the length of AC.
Give your answer correct to 1 decimal place.

(Total for question = 5 marks)

Q13.

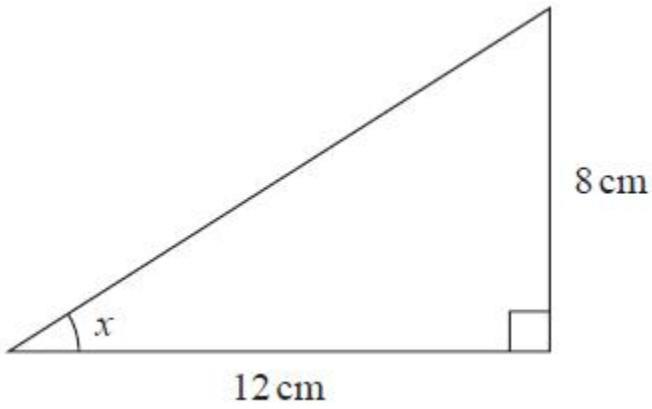

Diagram **NOT** accurately drawn

Calculate the size of angle *x*.
Give your answer correct to 1 decimal place.

(Total for question = 3 marks)

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
(a)	64.8×48.6		3	M1
		3150		A2 A1 for 3149.28 or this value rounded or truncated to 4 or 5 sig figs ie 3149, 3149.2, 3149
(b)	$64.8^2 + 48.6^2$ or 4199.04 + 2361.96 or 6561		3	M1 for squaring and adding
	$\sqrt{64.8^2 + 48.6^2}$			M1 (dep) for square root
		81		A1
				Total 6 marks

Q2.

Question	Working	Answer	Mark	Notes
	$18^2 - (14 \div 2)^2$ (=275)		4	M1 or M1 for $\cos x = \frac{7}{18}$ or $\sin y = \frac{7}{18}$ or $\cos z = \frac{18^2 + 18^2 - 14^2}{2 \times 18 \times 18}$
	$\sqrt{18^2 - (14 \div 2)^2}$ or $\sqrt{275}$ or $5\sqrt{11}$ or 16.5… or 16.6			M1 or M1 for $x = \cos^{-1}\left(\frac{7}{18}\right)$ or $x = 67.1\ldots$ or $y = \sin^{-1}\left(\frac{7}{18}\right)$ or $y = 22.8\ldots$ or $z = \cos^{-1}\left(\frac{18^2 + 18^2 - 14^2}{2 \times 18 \times 18}\right)$ or $z = 45.77\ldots$
	$0.5 \times 14 \times$ "16.5…" or $35\sqrt{11}$			M1 or M1 for $0.5 \times 14 \times 18 \times \sin(\text{"}67.1\ldots\text{"})$ or $0.5 \times 18 \times 18 \times \sin(2 \times \text{"}22.8\ldots\text{"})$ or $0.5 \times 18 \times 18 \times \sin(\text{"}45.77\ldots\text{"})$
		116		A1 116 – 116.1 NB Allow use of Hero's formula
				Total 4 marks
	Alternative scheme			

	$25(25-18)(25-18)(25-14)(=13475)$ oe		4	M2
	$\sqrt{13475}$ oe			M1
		116		A1
				Total 4 marks

Q3.

	use of cos		3	M1	cos must be selected for use in trig ratio **NOT** Cosine Rule	**or** M2 for sin and $\frac{\sqrt{"21.36"}}{9.5}$ following correct Pythagoras **or** M2 for tan and $\frac{\sqrt{"21.36"}}{8.3}$ following correct Pythagoras **or** correct Pythag and then correct use of sine or cosine rule with "21.36"
	$\cos("x") = \frac{8.3}{9.5}$ $(=0.87\ldots)$ **or** $("x" =) \cos^{-1}(\frac{8.3}{9.5})$			M1		
		29.1		A1	for ans rounding to 29.1 $(29.1103\ldots)$	
						Total 3 marks

Q4.

Question Number	Working	Answer	Mark	Notes	
	tan chosen		3	M1 for tan chosen	M1 for sin and $\frac{3.8}{\sqrt{"41.48"}}$ following correct Pythagoras and A1 for 0.5900...
	$\frac{3.8}{5.2}$ or 0.7307...			A1 for $\frac{3.8}{5.2}$ or 0.7307... oe	
		36.2		A1 for answer rounding to 36.2	
					Total 3 marks

Q5.

Q	Working	Answer	Mark	Notes	
	e.g. $(h^2 =)\ 14.5^2 - 10^2$ **or** $\cos x = \frac{10}{14.5}$			M1	start to find height or angle
	e.g. $(h =)\ \sqrt{14.5^2 - 10^2}$ (=10.5) **or** $(x =)\ \cos^{-1}\left(\frac{10}{14.5}\right)$ (=46.3…)			M1	complete method to find height or angle
	e.g. $\frac{1}{2} \times 20 \times "10.5"$ **or** $\frac{1}{2} \times 20 \times 14.5 \times \sin("46.3...")$			M1	(dep on M1) method to find area
		105	4	A1	cao
					Total 4 marks

Q6.

Question	Working	Answer	Mark	Notes		
	sin 43 used		3	M1	or M1 for $7.8\cos 43°$ (5.704...) **and** $7.8^2 - "5.704"^2$ (28.298) M1 for $\sqrt{"28.298"}$	or M1 for correct statement of Sine Rule eg $\frac{7.8}{\sin 90°} = \frac{x}{\sin 43°}$ M1 for correct expression for x eg $x = \frac{7.8 \sin 43°}{\sin 90°}$
	$7.8 \sin 43°$			M1		
		5.32		A1	for awrt 5.32 (5.319587...)	
						Total 3 marks

Q7.

Question	Working	Answer	Mark	Notes		
(a)	$15^2 - 10^2$ or $225 - 100$ or 125		3	M1		M2 for any complete and correct method
	$\sqrt{"125"}$ or $5\sqrt{5}$			M1	dep on M1	
		11.2		A1	awrt 11.2	
(b)	$\tan C = \frac{10}{12.5}$ or $\tan C = 0.8$		3	M1		M2 for any complete and correct method
	$\tan^{-1}\left(\frac{10}{12.5}\right)$ oe			M1		
		38.7		A1	Accept 38.6(5980825.....) rounded or truncated to at least 3 SF.	
						Total 6 marks

Q8.

The correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

Question	Working	Answer	Mark	Notes
	$\cos 56^\circ = \frac{7.4}{x}$ or $7.4 = x\cos 56$ or $\sin(90 - 56) = \frac{7.4}{x}$ or $7.4 = x\sin(90 - 56)$		3	M1 Correct equation for x. e.g. $x^2 = 7.4^2 + (7.4\tan 56^\circ)^2$
	$(x =)\ \frac{7.4}{\cos 56}$ or $\frac{7.4}{\sin(90-56)}$			M1 Correct expression for x. e.g. $x = \sqrt{7.4^2 + (7.4\tan 56^\circ)^2}$
		13.2		A1 awrt 13.2
				Total 3 marks

Q9.

Question	Working	Answer	Mark	Notes
	$(AC^2 =)\ 17^2 - 15^2$		5	M1
	$(AC =)\sqrt{17^2 - 15^2}\ (= \sqrt{64} = 8)$			M1
	$\frac{\pi \times '8'}{2} (= 4\pi = 12.566...)$			M1 dep on M2 for $\frac{\pi \times '8'}{2}$ oe or 4π 12.5663…
	'12.566…' + 15 + 17			M1 for '12.566' + 15 + 17 and no additional values
		44.6		A1 for awrt 44.6
				Total 5 marks

Q10.

Q	Working	Answer	Mark	Notes
	$30^2 + h^2 = 52^2$ oe or $900 + h^2 = 2704$ $(h^2 =)\ 52^2 - 30^2\ (= 1804)$ or $(h^2 =)\ 2704 - 900\ (= 1804)$		3	M1 for applying Pythagoras theorem correctly
	$(h =)\ \sqrt{52^2 - 30^2}\ (= \sqrt{1804})\ (= 42.47352..)$ or $(h =)\ \sqrt{2704 - 900}\ (= \sqrt{1804})\ (= 42.47352..)$			M1 for square rooting
	Correct answer scores full marks (unless from obvious incorrect working)	42.5		A1 awrt 42.5 or allow $2\sqrt{451}$
				Total 3 marks

Q11.

Q	Working	Answer	Mark	Notes
	$\sin 42 = \frac{6.5}{x}$ **or** $\frac{x}{\sin 90} = \frac{6.5}{\sin 42}$ oe **or** $\cos 48 = \frac{6.5}{x}$ [where 48 = 180 – 90 – 42]		3	M1 or use of tan to find the horizontal side **and** then a correct first step in Pythagoras' theorem ie [base =] $\frac{6.5}{\tan 42}$ (= 7.21...) and [x^2 =] 6.5^2 +"7.21…"^{2}
	[x =] $\frac{6.5}{\sin 42}$ **or** $\frac{6.5 \sin 90}{\sin 42}$ **or** [x =] $\frac{6.5}{\cos 48}$ [where 48 = 180 – 90 – 42]			M1 or complete method using Pythagoras [x =] $\sqrt{6.5^2 + "7.21..."}$ (If students give this statement with nothing before it they gain M2)
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	9.7		A1 accept 9.7 – 9.72
				Total 3 marks

Q12.

Question	Working	Answer	Mark	Notes
	$\tan 20^\circ = \frac{AB}{12.6}$			M1 or for AD = 12.6/cos20 (=13.4..) **and** $12.6^2 + AB^2 = 13.4^2$
	(AB =)12.6 tan 20 **or** 4.58(602...) **or** 4.6			M1 or for (AB =)$\sqrt{13.4^2 - 12.6^2}$
	(BC^2 =)$19.3^2 - 12.6^2$ **or** 372.49 – 158.76 **or** 213(.73)			M1
	(BC =)$\sqrt{19.3^2 - 12.6^2}$ **or** $\sqrt{"213.73"}$ **or** 14.6(195...)			M1
		19.2	5	A1 for 19.19 – 19.21

Q13.

Q	Working	Answer	Mark	Notes	
	$\tan x = \frac{8}{12}$ or $\sin x = \frac{8}{\sqrt{208}}$ or $\cos x = \frac{12}{\sqrt{208}}$		3	M1	A correct trig ratio for angle x
				M1	A complete method to find angle x
	$x = \tan^{-1}\left(\frac{8}{12}\right)$ or $\sin^{-1}\left(\frac{8}{\sqrt{208}}\right)$ or $\cos^{-1}\left(\frac{12}{\sqrt{208}}\right)$	33.7		A1	Accept answers rounding to 33.7
					Total 3 marks