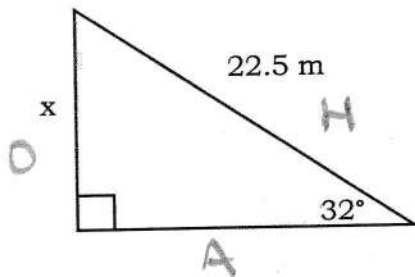


MISCELLANEOUS TRIANGLES (HIGHER)
CALCULATOR ALLOWED

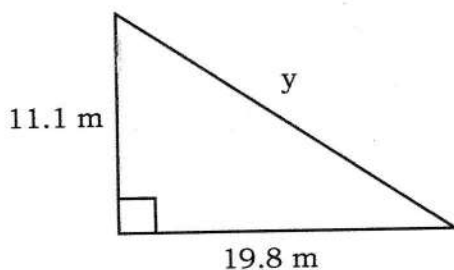
1.
Find x to 1 decimal place.



S^OH

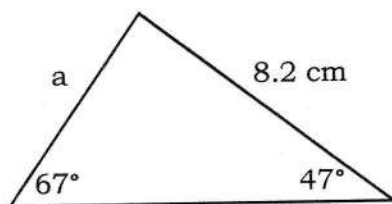
$$\begin{aligned}x &= \sin 32 \times 22.5 \\ &= 11.9231\dots \\ &= \underline{11.9\text{ m}}\end{aligned}$$

2.
Find y to 1 decimal place.



$$\begin{aligned}11.1^2 &= 123.21 \\ 19.8^2 &= 392.04 \\ + &= 515.25 \\ \sqrt{515.25} &= 22.6991\dots \\ &= \underline{22.7\text{ m}}\end{aligned}$$

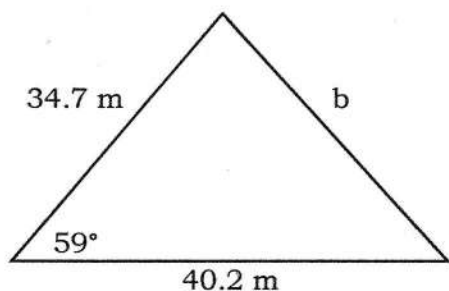
3.
Find a to 2 significant figures.



$$\frac{a}{\sin 47} = \frac{8.2}{\sin 67}$$

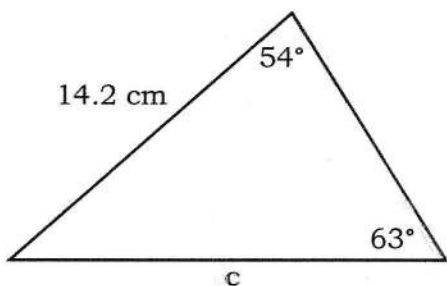
$$\begin{aligned}a &= \frac{8.2 \times \sin 47}{\sin 67} \\ &= 6.5150\dots \\ &= \underline{6.5\text{ cm}}\end{aligned}$$

4.
Find b to 3 significant figures.



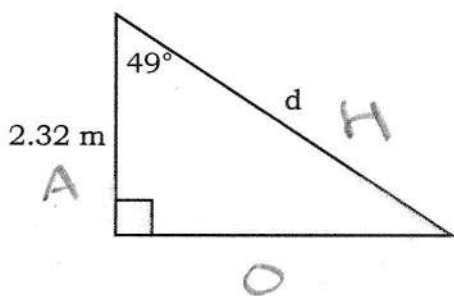
$$\begin{aligned}
 b^2 &= 34.7^2 + 40.2^2 - 2 \times 34.7 \times 40.2 \times \cos 59 \\
 &= 1383.235576 \\
 b &= \sqrt{1383.235576} \\
 &= 37.1918\dots \\
 &= \underline{\underline{37.2\text{ m}}}
 \end{aligned}$$

5.
Find c to 3 significant figures.



$$\begin{aligned}
 \frac{c}{\sin 54} &= \frac{14.2}{\sin 63} \\
 c &= \frac{14.2 \times \sin 54}{\sin 63} \\
 &= 12.893\dots \\
 &= \underline{\underline{12.9\text{ cm}}}
 \end{aligned}$$

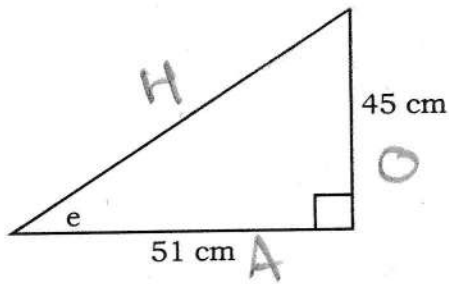
6.
Find d to 3 significant figures.



$$\begin{aligned}
 c^A H \\
 d &= \frac{2.32}{\cos 49} \\
 &= 3.5362\dots \\
 &= \underline{\underline{3.54\text{ m}}}
 \end{aligned}$$

7.

Find e to 2 significant figures.



T^o A

$$\tan(e) = \frac{45}{51}$$

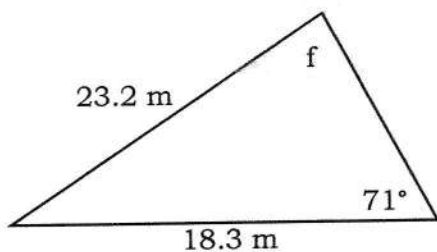
$$e = \tan^{-1}\left(\frac{45}{51}\right)$$

$$= 41.42\dots$$

$$= \underline{41^\circ}$$

8.

Find f to 2 significant figures.



$$\frac{\sin(F)}{18.3} = \frac{\sin 71}{23.2}$$

$$\sin(F) = \frac{\sin 71 \times 18.3}{23.2}$$

$$= 0.745\dots$$

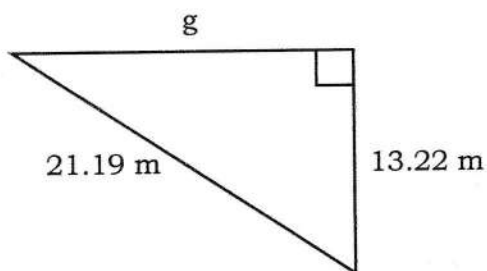
$$F = \sin^{-1}(0.745\dots)$$

$$= 48.229\dots$$

$$= \underline{48^\circ}$$

9.

Find g to 2 decimal places.



$$21.19^2 = 449.0161$$

$$13.22^2 = 174.7684$$

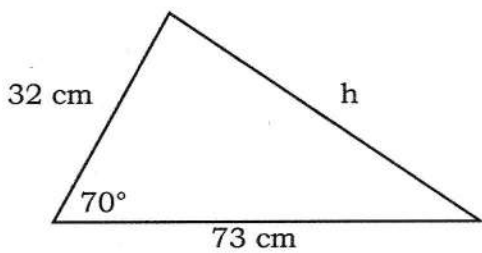
$$- = 274.2477$$

$$\sqrt{274.2477} = 16.5604\dots$$

$$= \underline{16.56 \text{ m}}$$

10.

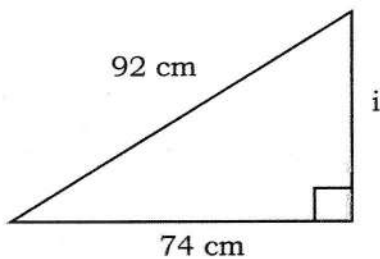
Find h to 2 significant figures.



$$\begin{aligned}h^2 &= 32^2 + 73^2 - 2 \times 32 \times 73 \times \cos 70 \\&= 4755.08189 \\h &= \sqrt{4755.08189} \\&= 68.957 \dots \\&= \underline{69 \text{ cm}}\end{aligned}$$

11.

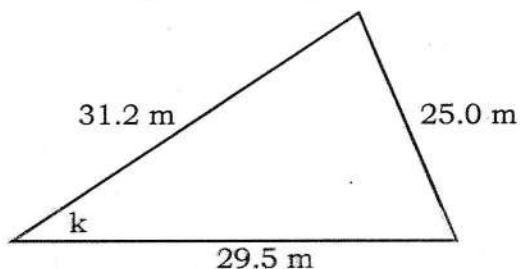
Find i to 2 significant figures.



$$\begin{aligned}92^2 &= 8464 \\74^2 &= 5476 \\- &= 2988 \\\sqrt{2988} &= 54.662 \dots \\&= \underline{55 \text{ cm}}\end{aligned}$$

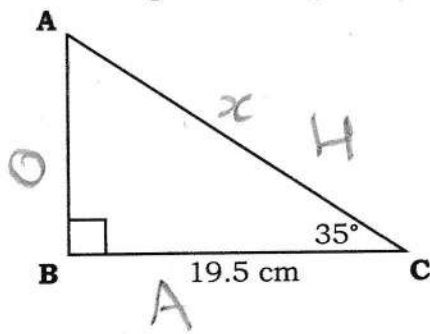
12.

Find k to 2 significant figures.



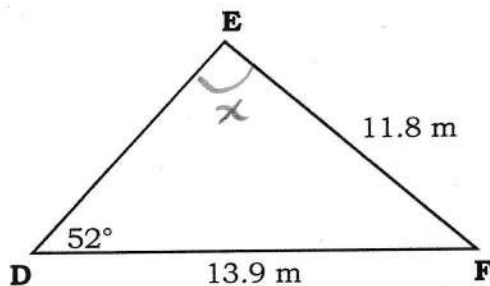
$$\begin{aligned}25^2 &= 31.2^2 + 29.5^2 - 2 \times 31.2 \times \\&\quad 29.5 \times \cos(k) \\625 &= 1843.69 - 1840.8 \cos(k) \\-1218.69 &= -1840.8 \cos(k) \\0.6620 \dots &= \cos(k) \\k &= \cos^{-1}(0.6620 \dots) \\&= 48.5440 \dots \\&= \underline{49^\circ}\end{aligned}$$

13.
Find AC to 3 significant figures.



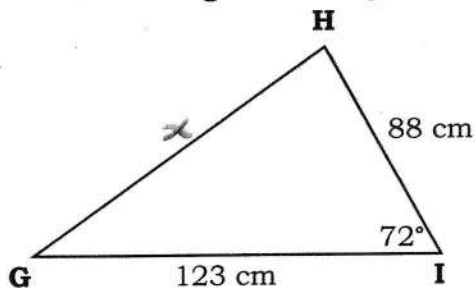
$$\begin{aligned}
 & \text{C A H} \\
 x &= \frac{19.5}{\cos 35} \\
 &= 23.8051\dots \\
 &= \underline{\underline{23.8 \text{ cm}}}
 \end{aligned}$$

14.
Find the size of angle DEF to 3 significant figures.



$$\begin{aligned}
 \frac{\sin x}{13.9} &= \frac{\sin 52}{11.8} \\
 \sin x &= \frac{\sin 52 \times 13.9}{11.8} \\
 &= 0.9282\dots \\
 x &= \sin^{-1}(0.9282\dots) \\
 &= 68.163\dots \\
 &= \underline{\underline{68.2^\circ}}
 \end{aligned}$$

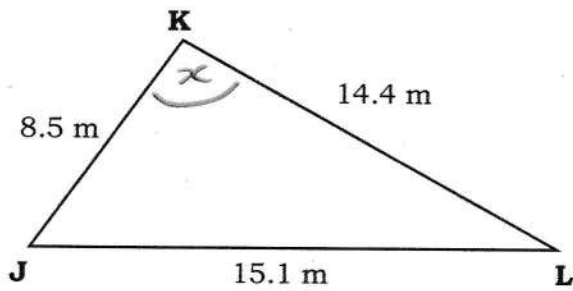
15.
Find GH to 3 significant figures.



$$\begin{aligned}
 x^2 &= 88^2 + 123^2 - 2 \times 88 \times 123 \times \cos 72 \\
 &= 16183.40011 \\
 x &= \sqrt{16183.40011} \\
 &= 127.2139\dots \\
 &= \underline{\underline{127 \text{ cm}}}
 \end{aligned}$$

16.

Find the size of angle JKL to 2 significant figures.



$$15.1^2 = 8.5^2 + 14.4^2 - 2 \times 8.5 \times 14.4 \times \cos(x)$$

$$228.01 = 279.61 - 244.8 \cos(x)$$

$$-51.6 = -244.8 \cos(x)$$

$$\cos(x) = 0.2107...$$

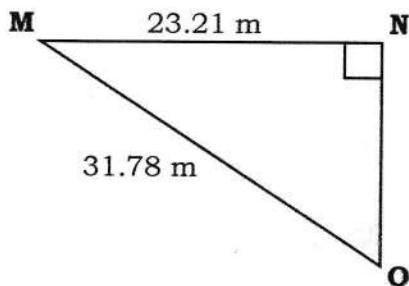
$$x = \cos^{-1}(0.2107...)$$

$$= 77.8316...$$

$$= \underline{78^\circ}$$

17.

Find NO to 2 decimal places.



$$31.78^2 = 1009.9684$$

$$23.21^2 = 538.7041$$

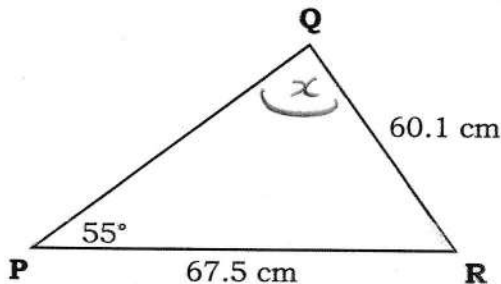
$$- = 471.2643$$

$$\sqrt{471.2643} = 21.7086...$$

$$= \underline{21.71 \text{ m}}$$

18.

Find the size of angle PQR to 2 significant figures.



$$\frac{\sin x}{67.5} = \frac{\sin 55}{60.1}$$

$$\sin x = \frac{\sin 55 \times 67.5}{60.1}$$

$$\sin x = 0.9200...$$

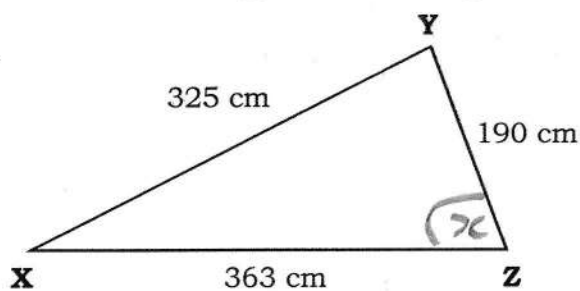
$$x = \sin^{-1}(0.9200...)$$

$$= 66.9279...$$

$$= \underline{67^\circ}$$

19.

Find the size of angle YZX to 2 significant figures.



$$325^2 = 363^2 + 190^2 - 2 \times 363 \times 190 \times \cos(x)$$

$$105625 = 167869 - 137940 \cos(x)$$

$$-62244 = -137940 \cos(x)$$

$$0.45123... = \cos(x)$$

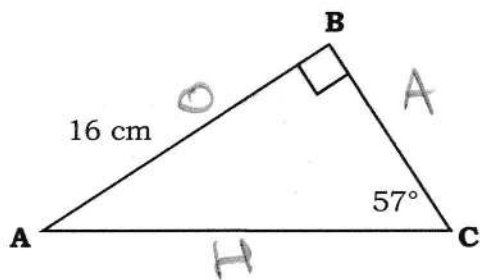
$$x = \cos^{-1}(0.45123...)$$

$$= 63.176...$$

$$= \underline{63^\circ}$$

20.

Find the area of the triangle ABC, to the nearest square centimetre.



BC: $\tan 57^\circ = \frac{BC}{16}$

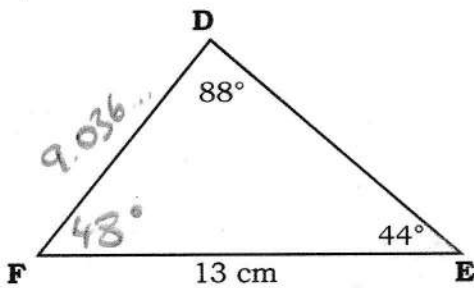
$$BC = \frac{16}{\tan 57} = 10.390...$$

$$\text{Area} = \frac{16 \times BC}{2} = 83.1241...$$

$$= \underline{83 \text{ cm}^2}$$

21.

Find the area of the triangle DEF, to the nearest square centimetre.



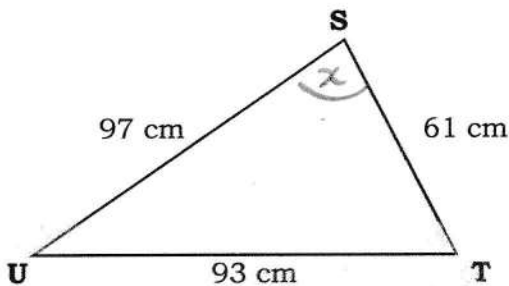
$$\begin{aligned} \text{DF: } \frac{DF}{\sin 44} &= \frac{13}{\sin 88} \\ \text{DF} &= \frac{13 \times \sin 44}{\sin 88} \\ &= 9.036 \dots \end{aligned}$$

$$\text{DFE} = 180 - 88 - 44 = 48^\circ$$

$$\begin{aligned} \text{Area} &= \frac{1}{2} \times 9.036 \dots \times 13 \times \sin 48 \\ &= 43.648 \dots \\ &= \underline{\underline{44 \text{ cm}^2}} \end{aligned}$$

22.

Find the area of the triangle STU, to 3 significant figures.

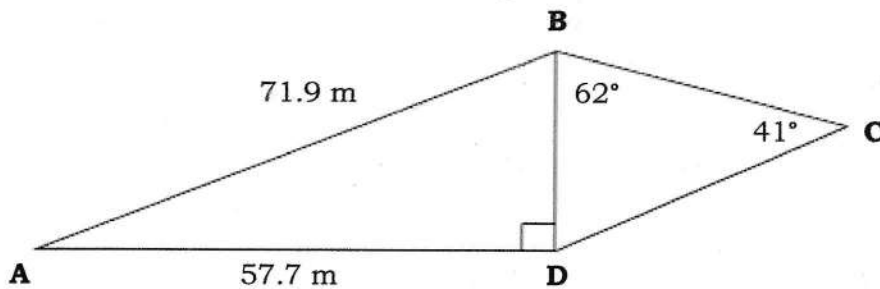


$$\begin{aligned} \text{Find } \angle \text{S:} \\ 93^2 &= 97^2 + 61^2 - 2 \times 97 \times 61 \times \cos(x) \\ 8649 &= 13130 - 11834 \cos(x) \\ -4481 &= -11834 \cos(x) \\ 0.3786 \dots &= \cos(x) \\ x &= \cos^{-1}(0.3786 \dots) \\ x &= 67.749 \dots \end{aligned}$$

$$\begin{aligned} \text{Area} &= \frac{1}{2} \times 97 \times 61 \times \sin(67.749 \dots) \\ &= 2738.20419 \\ &= \underline{\underline{2740 \text{ cm}^2}} \end{aligned}$$

23.

ABCD is a quadrilateral formed of two triangles.



Find CD to 3 significant figures.

Find BD:

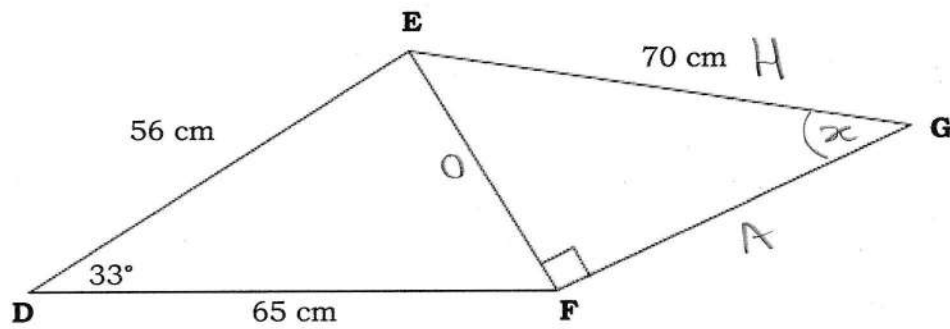
$$71.9^2 = 5169.61$$
$$57.7^2 = 3329.29$$
$$- = 1840.32$$
$$\sqrt{1840.32} = 42.898\dots$$

Find CD:

$$\frac{CD}{\sin 62} = \frac{42.898\dots}{\sin 41}$$
$$CD = \frac{42.898\dots \times \sin 62}{\sin 41}$$
$$= 57.7349\dots$$
$$= \underline{57.7 \text{ m}}$$

24.

DEGF is a quadrilateral formed of two triangles.



Find the size of angle EGF, to 2 significant figures.

Find EF: $EF^2 = 56^2 + 65^2 - 2 \times 56 \times 65 \times \cos(33)$
 $= 1255.47\dots$
 $EF = \sqrt{1255.47\dots}$
 $= 35.432\dots$

Find EGF: $S^{\circ}H$

$$\sin(x) = \frac{35.432\dots}{70}$$

$$x = \sin^{-1}\left(\frac{35.432\dots}{70}\right)$$

$$= 30.4098\dots$$

$$= \underline{\underline{30^\circ}}$$