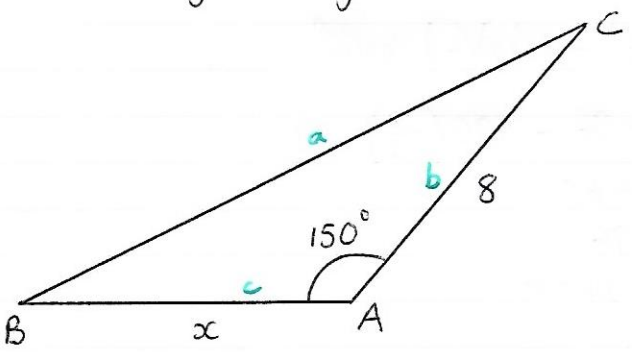
Triangle Trig : 1 : Answers

57)



a) Area = $10cm^2$

$A = \frac{1}{2}ab\sin C$

$10 = \frac{1}{2}bc\sin A$

$10 = \frac{1}{2}(8)(x)\sin 150^\circ$

$2 \cdot 5 = x \sin 150^\circ$

$2 \cdot 5 = 0 \cdot 5x$

$5\ cm = x$

b) $a^2 = b^2 + c^2 - 2bc\cos A$

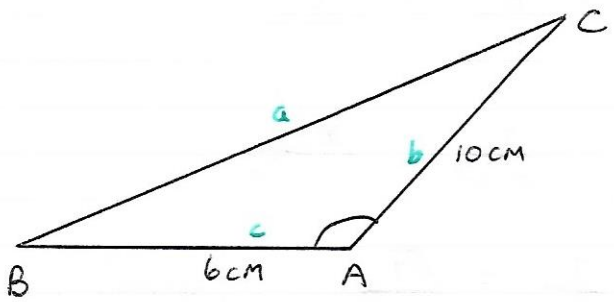
$BC^2 = 8^2 + 5^2 - 2(8)5\cos 150^\circ$

$BC^2 = 64 + 25 - 80\left(-\frac{\sqrt{3}}{2}\right)$

$BC^2 = 89 + 40\sqrt{3}$

$BC = 12 \cdot 58\ cm$

58)



Area = $15\sqrt{3}\ cm^2$

a) $Area = \frac{1}{2}bc\sin A$

$15\sqrt{3} = \frac{1}{2}(10)(6)\sin B\hat{A}C$

$15\sqrt{3} = 30\sin B\hat{A}C$

$\frac{\sqrt{3}}{2} = \sin B\hat{A}C$

$\alpha = 60^\circ$

Sin +ve 1st or 2nd

$\therefore \quad B\hat{A}C = 120^\circ$ (obtuse)

b) $a^2 = b^2 + c^2 - 2bc\cos A$

$BC^2 = 10^2 + 6^2 - 2(10)(6)\cos 120^\circ$

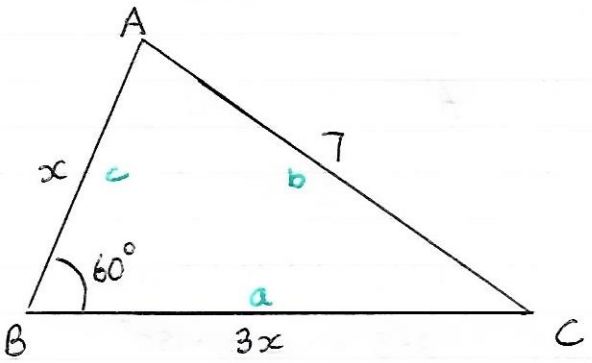
$BC^2 = 100 + 36 - 120\left(-\frac{1}{2}\right)$

$BC^2 = 136 + 60$

$BC^2 = 196$

$BC = 14\text{cm}$.

59)



a) $b^2 = a^2 + c^2 - 2ac\cos B$

$7^2 = (3x)^2 + x^2 - 2(3x)(x)\cos 60^\circ$

$49 = 9x^2 + x^2 - 6x^2\left(\frac{1}{2}\right)$

$49 = 10x^2 - 3x^2$

$49 = 7x^2$

$7 = x^2$

$\sqrt{7} = x$

b) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$\frac{3x}{\sin A} = \frac{7}{\sin 60^\circ} = \frac{x}{\sin \hat{ACB}}$

$\frac{7}{\sqrt{3}/2} = \frac{\sqrt{7}}{\sin \hat{ACB}}$

$\sin \hat{ACB} = \frac{\sqrt{7} \times \frac{\sqrt{3}}{2}}{7}$

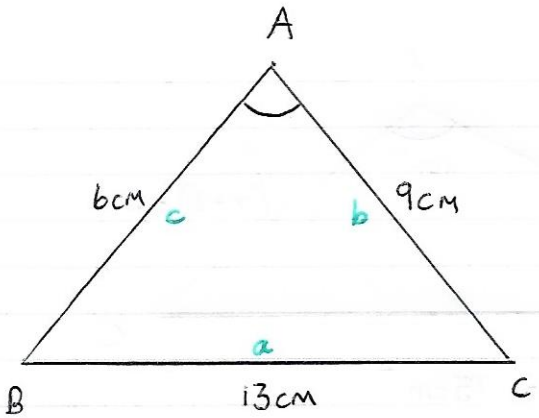
$\sin \hat{ACB} = \frac{\sqrt{21}}{14}$

$\alpha = 19.1^\circ$

sin +ve 1st + 2nd

$\therefore$ Acute angle $\hat{ACB} = 19.1^\circ$

60)



a) $a^2 = b^2 + c^2 - 2bc\cos A$

$13^2 = 9^2 + 6^2 - 2(9)(6)\cos B\hat{A}C$

$169 = 81 + 36 - 108\cos B\hat{A}C$

$169 = 117 - 108\cos B\hat{A}C$

$108\cos B\hat{A}C = 117 - 169$

$\cos B\hat{A}C = \frac{-52}{108}$

$\cos B\hat{A}C = \frac{-13}{27}$

$\alpha = 61.2^\circ$

Cos -ve 2nd + 3rd.

$B\hat{A}C = 118.8^\circ$

b) $\text{Area} = \frac{1}{2}bc\sin A$

$= \frac{1}{2}(9)(6)\sin 118.8^\circ$

$= 27\sin 118.8^\circ$

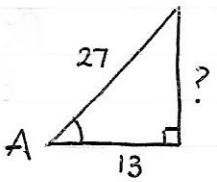
$= 23.7\text{ cm}^2$

Now $4\sqrt{35} = 23.7\text{cm}^2$

$\therefore \text{Area} = 4\sqrt{35}\text{ cm}^2$

b) BETTER METHOD BELOW

$\cos B\hat{A}C = \frac{-13}{27}$ (2nd quad)



$27^2 = 13^2 + ?^2$

$729 = 169 + ?^2$

$560 = ?^2$

$4\sqrt{35} = ?$

$\text{Area} = \frac{1}{2}bc\sin A$

$= \frac{1}{2}(9)\times(6)\sin B\hat{A}C$

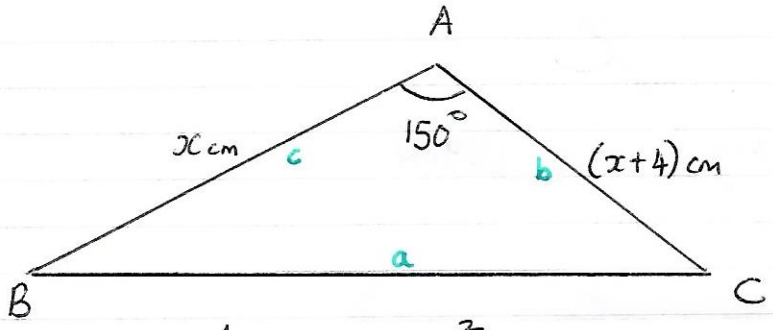
$= 27 \times \frac{4\sqrt{35}}{27}$

$= 4\sqrt{35}\text{ cm}^2$

$\therefore \sin B\hat{A}C = +\frac{4\sqrt{35}}{27}$

2nd Quad

61)



Area = $15cm^2$

a) $\text{Area} = \frac{1}{2}bc\sin A$

$15 = \frac{1}{2}(x+4)x\sin 150°$

×2

$2 \times 15 = x(x+4)\frac{1}{2}$

×2

$60 = x^2 + 4x$

$0 = x^2 + 4x - 60$

$0 = (x+10)(x-6)$

either $x+10=0$ or $x-6=0$

$x = -10$ $x = 6cm$

Can't be -ve

b) $x = 6cm$

$x+4 = 10cm$

$a^2 = b^2 + c^2 - 2bc\cos A$

$BC^2 = 10^2 + 6^2 - 2(10)(6)\cos 150°$

$BC^2 = 100 + 36 - 120\cos 150°$

$BC^2 = 136 - 120\left(-\frac{\sqrt{3}}{2}\right)$

$BC^2 = 136 + 60\sqrt{3}$

$BC^2 = 239.92$

$BC = 15.5cm$