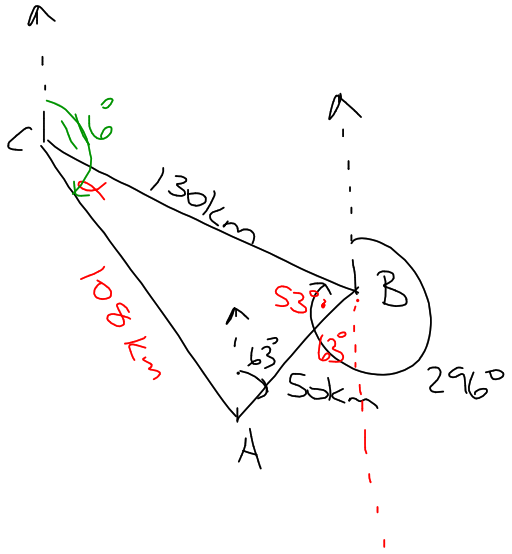
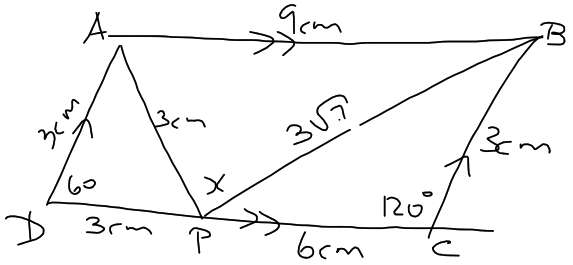
12 a)



$\cos\alpha = \dfrac{130^2 + 108^2 - 50^2}{2 \times 130 \times 108}$

$\alpha =$

13b)



$BP^2 = 3^2 + 6^2 - 2\times3\times6\cos120°$

$= 45 - 36\times -\frac{1}{2}$

$= 63$

$BP = \sqrt{63}$

$= 3\sqrt{7}$ cm

c)

$\cos x = -\frac{1}{14}\sqrt{7}$

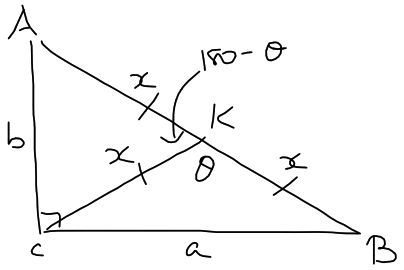
$\cos x = \frac{3^2 + (3\sqrt{7})^2 - 9^2}{2\times3\times3\sqrt{7}}$

$= \frac{-9}{18\sqrt{7}}$

$= -\frac{1}{2\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$

$= -\frac{\sqrt{7}}{14}$

14



Prove $\cos\theta = \frac{b^2-a^2}{b^2+a^2}$

$$\cos\theta = \frac{2x^2-a^2}{2x^2}$$

$$2x^2\cos\theta = 2x^2 - a^2$$

$$2x^2(1-\cos\theta) = a^2$$

$$2x^2 = \frac{a^2}{1-\cos\theta}$$

$$\cos(180-\theta) = \frac{2x^2-b^2}{2x^2}$$

$$-\cos\theta = \frac{2x^2-b^2}{2x^2}$$

$$-\cos\theta = \frac{\frac{a^2}{1-\cos\theta} - b^2}{\frac{a^2}{1-\cos\theta}}$$

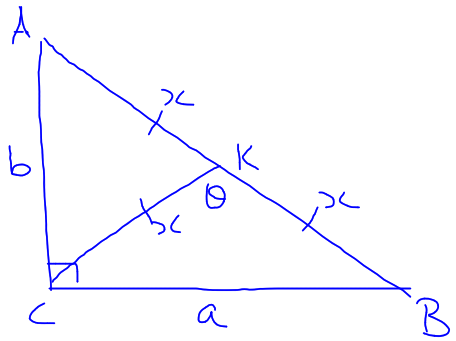
$$-\cos\theta = \frac{a^2 - b^2 + b^2\cos\theta}{a^2}$$

$$-a^2\cos\theta = a^2 - b^2 + b^2\cos\theta$$

$$(a^2+b^2)\cos\theta = b^2 - a^2$$

$$\cos\theta = \frac{b^2-a^2}{a^2+b^2}$$

14



$$\cos\theta = \frac{b^2 - a^2}{b^2 + a^2}$$

$$4x^2 = a^2 + b^2$$

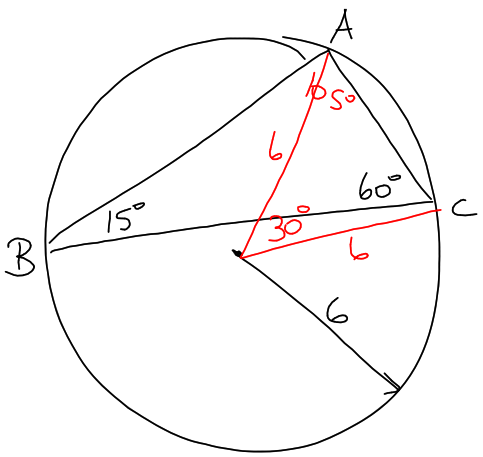
$$\cos\theta = \frac{2x^2 - a^2}{2x^2}$$

$$= \frac{4x^2 - 2a^2}{4x^2}$$

$$= \frac{a^2 + b^2 - 2a^2}{a^2 + b^2}$$

$$= \frac{b^2 - a^2}{b^2 + a^2}$$

15a)



$AC^2 = 6^2 + 6^2 - 2 \times 6 \times 6 \cos 30°$

$= 72 - 72 \times \frac{\sqrt{3}}{2}$

$= 36(2 - \sqrt{3})$