

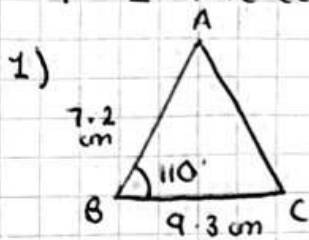
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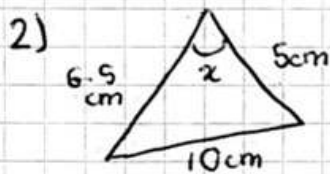
9. 1 The cosine rule



$$a^2 = (9.3)^2 + (7.2)^2 - 2(9.3)(7.2) \times \cos(110)$$

$$\sqrt{a^2} = \sqrt{184.1333376}$$

$$a = 13.56957397 \rightarrow 13.6 \text{ cm (1dp)}$$



$$\cos A = \frac{(6.5)^2 + (5)^2 - (10)^2}{2(6.5)(5)}$$

cos A = Ans

$$\cos^{-1}(\text{Ans}) = 120.2547874$$

$$\rightarrow 120.3^\circ \text{ (1dp)} \rightarrow 120.3$$

3a) $a^2 = (3.6)^2 + (5.2)^2 - 2(3.6)(5.2) \times \cos(30)$

$$\sqrt{a^2} = \sqrt{7.576008882}$$

$$a = 2.752455065 \rightarrow 2.8 \text{ cm (1dp)} \rightarrow 2.75 \text{ (3sf)}$$

3b) $a^2 = (1.8)^2 + (3.1)^2 - 2(1.8)(3.1) \cos(110)$

$$\sqrt{a^2} = \sqrt{16.6669448}$$

$$a = 4.082516969 \rightarrow 4 \text{ cm (1sf)} \rightarrow 4.08 \text{ (3sf)}$$

3c) $a^2 = (5.8)^2 + (6.2)^2 - 2(5.8)(6.2) \times \cos(50)$

$$\sqrt{a^2} = \sqrt{25.85071911}$$

$$a = 5.084359853 \rightarrow 5.08 \text{ (3sf)}$$

3d) $\cos A = \frac{(5)^2 + (9)^2 - (12)^2}{2(5)(9)}$

cos A = Ans

$$\cos^{-1}(\text{Ans}) = 114.9749654 \rightarrow 115^\circ \text{ (3sf)}$$

$$3e) 4.9^2 = 7.1^2 + 7.1^2 - 2(7.1)(7.1) \cos A \quad 6) 600^2 + 800^2 - 2(600)(800) \cos(20)$$

$$24.01 \cdot 50.41 + 50.41 - 100.82 \cos x \quad 160000 + 640000 - 960000 \cos 20$$

$$100.82 \cos x = 76.81$$

↳ ~~982~~ Th

$$\cos x = \frac{76.81}{100.82} = 0.7618$$

$$751.8 = 800 \times \cos(20)$$

$$\cos^{-1}(0.7618) = 40.3768 \dots$$

$$751.8 - 600 = 151.8$$

$$x = 40.4 \text{ (3sf)}$$

$$273.6^2 + 151.8^2 - \sqrt{97928.2} = 313$$

$$3f) 9.3^2 + 10.4^2 + 18.2^2 - 2(10.4)(18.2) \cos A \quad 7) 12^2 = 10^2 + 7^2 - 2(10)(7) \cos A$$

$$86.49 + 108.16 + 331.24 - 378.56 \cos A \quad 144 = 100 + 49 - 140 \cos A$$

$$378.56 \cos A = 352.91$$

$$140 \cos A = 100 + 49 - 144 = 5$$

$$\cos A = \frac{352.91}{378.56} = 0.9324 \dots$$

$$\cos A = \frac{5}{140} = \frac{1}{28} \text{ (acute)}$$

$$x = 21.1879 \dots$$

$$7^2 + 10^2 + 12^2 - 2(10)(12) \cos B$$

$$x = 21.2 \text{ (3sf)}$$

$$49 = 100 + 144 - 240 \cos B$$

4) Bearing of C from A = 135
Angle between AB + BC =

$$240 \cos B = 100 + 144 - 49 = 195$$

$$135 - 105 = 30^\circ \text{ (} \hat{BAC} \text{)}$$

$$\cos B = \frac{195}{240} = \frac{13}{16} \text{ (acute)}$$

↳ cosine rule

$$10^2 = 7^2 + 12^2 - 2(7)(12) \cos C$$

$$a^2 = 48^2 + 40^2 - 2(48)(40) \cos 30 \quad 100 = 49 + 144 - 168 \cos C = \frac{93}{168} = \frac{31}{56} \text{ (acute)}$$

$$\frac{2304 + 1600 - 3840 \times \frac{\sqrt{3}}{2}}$$

$$3904 - 3325.54 = 578.46$$

$$\sqrt{578.46} = 24.05 = 24.1 \text{ (1dp)}$$

$$8) \frac{AC}{\sin(80)} = \frac{8}{\sin C} = 11.67 \quad AC^2 = 8^2 + 10^2 - 2(8)(10) \cos 80$$

$$AC = \sqrt{136.3} = 11.67$$

$$\sqrt{136.3 - 81} = \sqrt{55.3} = 7.44$$

5) BC = a, AC = b, AB = c

$$P = 8 + 10 + 7.44 + 9 = 34.44 \text{ cm}$$

$$5^2 = 8^2 + 6^2 - 2(8)(6) \cos B$$

$$9) x^2 = (x+2)^2 + (x+1)^2 - 2(x+2)(x+1) \cos \frac{3}{4}$$

$$25 = 64 + 36 - 96 \cos B$$

$$96 \cos B = 75$$

$$x^2 - 2x^2 + 16x + 5 - \frac{3}{2}x^2 - \frac{9}{2}x - 3$$

$$2x^2 + 12x + 10 - \frac{3}{2}x^2 + 9x + 6$$

$$\cos B = \frac{75}{96} = -\frac{1}{20}$$

$$x^2 - 3x - 4 = 0$$

$$\Rightarrow x = \underline{4} \text{ or } -1 \text{ (rej.)}$$