

$$1. \quad a^2 = 10^2 + 12^2 - 2(10)(12)\cos 120^\circ$$

$$a^2 = 364$$

$$a = 19.08 \text{ cm}$$

$$2.$$

$$a^2 = 5^2 + 7^2 - 2(5)(7)\cos 82^\circ$$

$$a^2 = 64.26$$

$$a = 8.02 \text{ m}$$

$$3.$$

$$\angle A = \cos^{-1} \left( \frac{300^2 + 420^2 - 250^2}{2(300)(420)} \right)$$

$$\angle A = \cos^{-1} \left( \frac{203\ 900}{252\ 000} \right)$$

$$\angle A = 35.99^\circ \approx 36^\circ$$

$$4. \quad q^2 = 136^2 + 200^2 - 2(136)(200)\cos 110^\circ$$

$$q^2 = 77\ 101.9$$

$$q = 277.67 \text{ m}$$

$$5.$$

$$c^2 = 24^2 + 32^2$$

$$c^2 = 1600$$

$$c = 40$$

$$\angle A = \cos^{-1} \left( \frac{30^2 + 35^2 - 40^2}{2(30)(35)} \right)$$

$$\angle A = \cos^{-1} \left( \frac{525}{2100} \right)$$

$$\angle A = 75.52^\circ$$

$$6. \quad m \overrightarrow{HC} = 12 \text{ km/h} \times 2 \text{ h}$$

$$= 24 \text{ km}$$

$$m \overrightarrow{HB} = 160 \text{ km/h} \times 2 \text{ h}$$

$$= 32 \text{ km}$$

$$\angle H = \cos^{-1} \left( \frac{24^2 + 32^2 - 25^2}{2(24)(32)} \right)$$

$$\angle H = \cos^{-1} \left( \frac{975}{1536} \right)$$

$$\angle H = 50.6^\circ$$

$$7. \quad a^2 = 6^2 + 7^2 - 2(6)(7)\cos 80^\circ$$

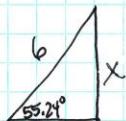
$$a^2 = 70.41$$

$$a = 8.39$$

$$\frac{8.39}{\sin 80^\circ} = \frac{7}{\sin X}$$

$$\sin X = 0.82153$$

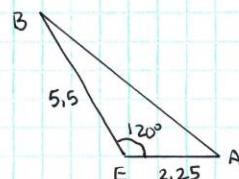
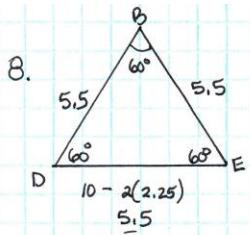
$$\angle X = \sin^{-1}(0.82153) = 55.24^\circ$$



$$\sin 55.24^\circ = \frac{X}{6}$$

$$X = 6 \cdot \sin 55.24^\circ$$

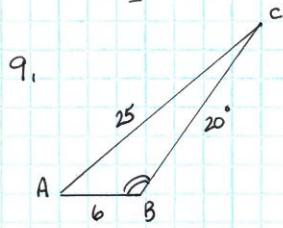
$$X = 4.93 \text{ units}$$



$$e^2 = 5.5^2 + 2.25^2 - 2(5.5)(2.25)\cos 120^\circ$$

$$e^2 = 47.6875$$

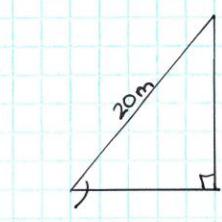
$$e = \sqrt{47.6875} = 6.91 \text{ m}$$



$$\angle B = \cos^{-1} \left( \frac{6^2 + 20^2 - 25^2}{2(6)(20)} \right)$$

$$\angle B = \cos^{-1} \left( \frac{-189}{240} \right)$$

$$\angle B = 141.95^\circ$$



$$\sin 38.05^\circ = \frac{x}{20}$$

$$x = 20 \sin 38.05^\circ$$

$$180^\circ - 141.95^\circ$$

$$38.05^\circ$$

$$x = 12.33 \text{ m}$$

$$\therefore h = 12.33 \text{ m} + 8 \text{ m}$$

$$= 20.33 \text{ m}$$

10.  $d(A, B) = \sqrt{11^2 + (-11)^2} = \sqrt{242} \text{ m}$

$$d(A, C) = \sqrt{8^2 + (-15)^2} = \sqrt{289} = 17$$

$$d(B, C) = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$$

$$\angle C = \cos^{-1} \left( \frac{17^2 + 5^2 - (\sqrt{242})^2}{2(17)(5)} \right)$$

$$\angle C = \cos^{-1} \left( \frac{72}{170} \right)$$

$$\angle C = 64.94^\circ$$