

SAS: Law of Cosines

$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$c^2 = 5^2 + 7^2 - 2(5)(7) \cos 80^\circ$$

$$c = \sqrt{25 + 49 - 70 \cos 80^\circ}$$

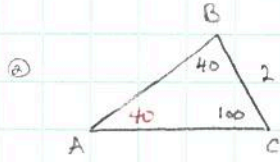
$$c \approx 7.86$$

$$\frac{\sin A}{5} = \frac{\sin 80^\circ}{7.864}$$

$$A = \sin^{-1} \left( \frac{5 \sin 80^\circ}{7.864} \right)$$

$$A \approx 38.8^\circ$$

$$B \approx 61.2^\circ$$



ASA: Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

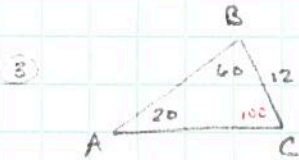
$$\frac{2}{\sin 40^\circ} = \frac{b}{\sin 40^\circ}$$

$$b = 2$$

$$\frac{2}{\sin 40^\circ} = \frac{c}{\sin 100^\circ}$$

$$\frac{2 \sin 100^\circ}{\sin 40^\circ} = c$$

$$3.06 = c$$



ASA: Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{12}{\sin 20^\circ} = \frac{b}{\sin 60^\circ}$$

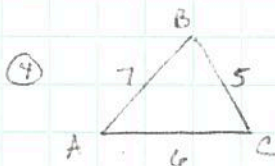
$$\frac{12 \sin 60^\circ}{\sin 20^\circ} = b$$

$$30.4 \approx b$$

$$\frac{12}{\sin 20^\circ} = \frac{c}{\sin 100^\circ}$$

$$\frac{12 \sin 100^\circ}{\sin 20^\circ} = c$$

$$34.6 \approx c$$



SSS: Law of Cosines

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

$$5^2 = 6^2 + 7^2 - 2(6)(7) \cos A$$

$$\cos^{-1} \left( \frac{25 - 36 - 49}{-2(6)(7)} \right) = A$$

$$114.4^\circ \approx A$$

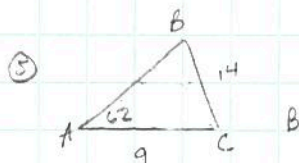
$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$6^2 = 5^2 + 7^2 - 2(5)(7) \cos B$$

$$\cos^{-1} \left( \frac{36 - 25 - 49}{-2(5)(7)} \right) = B$$

$$57.1^\circ \approx B$$

$$C \approx 78.5^\circ$$



SSA: Law of Sines

$14 > 9$  ∴ one  $\Delta$

$$\frac{\sin 62^\circ}{14} = \frac{\sin B}{9}$$

$$\sin^{-1} \left( \frac{9 \sin 62^\circ}{14} \right) = B$$

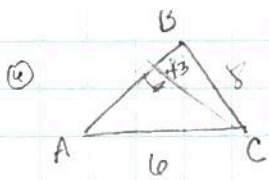
$$34.6^\circ \approx B$$

$$83.4^\circ \approx C$$

$$\frac{\sin 62^\circ}{14} = \frac{\sin 83.4^\circ}{c}$$

$$c = \frac{14 \sin 83.4^\circ}{\sin 62^\circ}$$

$$c \approx 15.8$$



SSA: Law of Sines  
 $h < \text{opp} < \text{adj} \therefore$  two  $\Delta$ 's

Case #1  $\frac{\sin 43}{6} = \frac{\sin A}{8}$

$$8 \sin 43 = h$$

$$4.5 = h$$

$$\sin^{-1}\left(\frac{8 \sin 43}{6}\right) = A$$

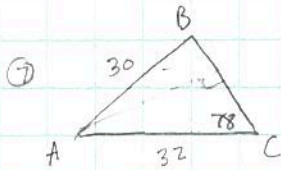
$$65.4^\circ \approx A$$

$$71.6^\circ \approx C$$

$$\frac{\sin 43}{6} = \frac{\sin 71.6}{c}$$

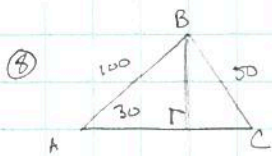
$$c = \frac{6 \sin 71.6}{\sin 43}$$

$$c \approx 8.35$$



SSA: Law of Sines

$$30 \sin 78 = 31.3 > 30 \therefore \text{no } \Delta$$



SSA: Law of Sines

$$100 \sin 30 = 50 = 50 \therefore \text{right } \Delta$$

$$\frac{\sin 30}{50} = \frac{\sin C}{100}$$

$$\sin^{-1}\left(\frac{100 \sin 30}{50}\right) = C$$

$$90^\circ = C$$

$$60^\circ = B$$

$$30-60-90 \Delta : 50\sqrt{3} = b \approx 86.6$$

⑨ Case #2

$$180 - 65.4 = 114.6^\circ \approx m\angle A$$

$$180 - 114.6 - 43 = 22.4^\circ \approx m\angle C$$

$$\frac{\sin 43}{6} = \frac{\sin 22.4}{c}$$

$$c = \frac{6 \sin 22.4}{\sin 43}$$

$$c \approx 3.35$$