Name_____
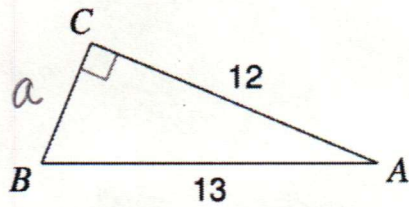
Unit 5b Review

1. Find the missing measures (sides & angles) of each triangle. Show all work.

a.

$a^2 + 12^2 = 13^2$
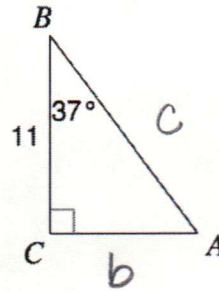$a^2 + 144 = 169$ $\boxed{a = 5}$
$\quad a^2 = 25$

$\cos A = \frac{12}{13}$

$\cos^{-1}\left(\frac{12}{13}\right) \approx$ $\boxed{A \approx 22.62°}$

$\sin B = \frac{12}{13}$

$\sin^{-1}\left(\frac{12}{13}\right) \approx$ $\boxed{B \approx 67.38°}$

b.

$\tan 37 = \frac{b}{11}$

$11 \cdot \tan 37 \approx$ $\boxed{b \approx 8.29}$

$A = 90 - 37$ $\boxed{A = 53°}$
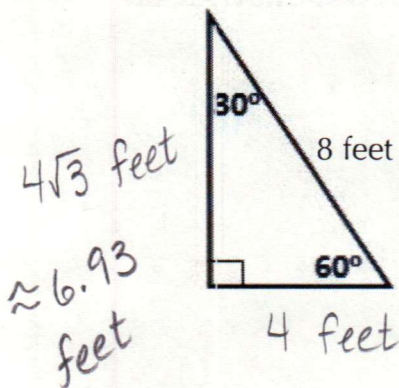
$\cos 37 = \frac{11}{c}$

$\frac{11}{\cos 37} \approx$ $\boxed{c \approx 13.77}$

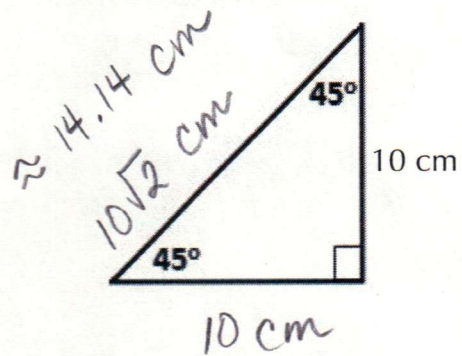2. Use the relationships in special right triangles to find all sides.
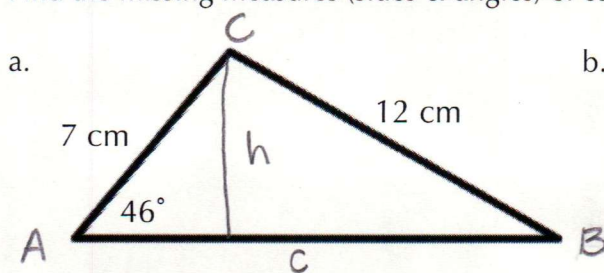
a.

30-60-90 Triangle

$30°$

$4\sqrt{3}$ feet

≈ 6.93 feet

8 feet

$60°$

4 feet

b.

45-45-90 Triangle

≈ 14.14 cm

$10\sqrt{2}$ cm

$45°$

$45°$

10 cm

10 cm

3. Find the missing measures (sides & angles) of each triangle. Show all work.

a.

$$h = 7 \sin 46 \approx 5.04 \text{ cm}$$
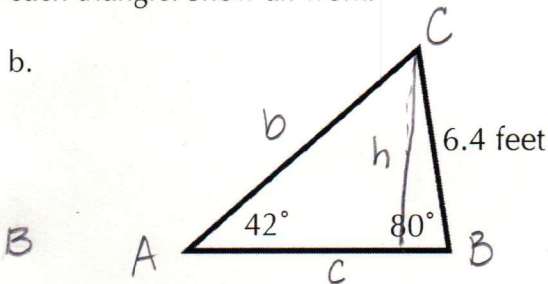
$$\sin B = \frac{5.04}{12}$$

$$\sin^{-1}\left(\frac{5.04}{12}\right) \quad \boxed{B \approx 24.83°}$$

$$C = 180 - 46 - 24.83$$

$$\boxed{C \approx 109.17°}$$

$$c = 7 \cos 46 + 12 \cos(24.83)$$

$$\boxed{c \approx 15.75 \text{ cm}}$$

b.

$$C = 180 - 80 - 42$$

$$\boxed{C = 58°}$$

$$\sin 80 = \frac{h}{6.4}$$

$$h = 6.4 \sin 80$$

$$h \approx 6.30 \text{ feet}$$

$$\sin 42 = \frac{6.30}{b}$$

$$b \approx \frac{6.30}{\sin 42}$$
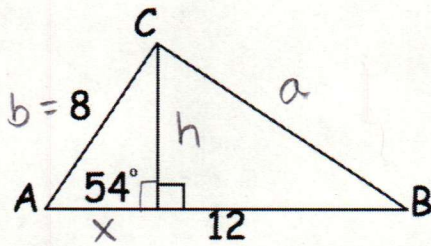
$$\boxed{b \approx 9.42 \text{ feet}}$$

$$c \approx 9.42 \cos 42 + 6.4 \cos 80$$

$$\boxed{c \approx 8.11 \text{ feet}}$$

4.   Find the area of each triangle. Show all work.

a.

$$h = 8 \sin 54$$

$$h \approx 6.47$$

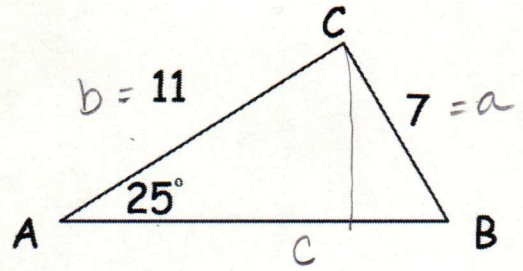$$\cos 54 = \frac{x}{8}$$

$$8 \cos 54 = x$$

$$x \approx 4.70$$

$$C = 12 + 4.70$$

$$C \approx 16.70$$

$$Area = \frac{1}{2}(16.70)(6.47)$$

$$\boxed{Area \approx 54.02 \text{ units}^2}$$

b.

$$h = \sin 25 = \frac{h}{11}$$

$$h \approx 11 \sin 25$$

$$h \approx 4.65$$

$$\sin B = \frac{4.65}{7}$$

$$\sin^{-1}\left(\frac{4.65}{7}\right) \approx B$$

$$B \approx 41.63°$$

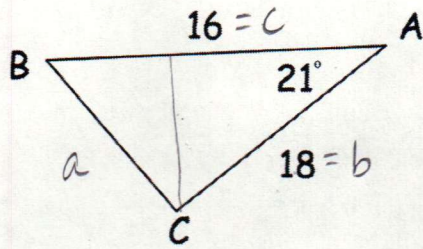$$C \approx 11 \cos 25 + 7 \cos 41.63$$

$$C \approx 15.20$$

$$Area = \frac{1}{2}(4.65)(15.20)$$

$$\boxed{Area \approx 35.34 \text{ units}^2}$$

5.   Use Law of Sines or Law of Cosines to find all missing measures. Show all work.

a.

$16 = c$ A

B $21°$

a $18 = b$

C

b.

C

b $67°$ 18

$69°$ $44°$

A c B

$a^2 = 18^2 + 16^2 - 2(18)(16)\cos 21$

$a^2 = 324 + 256 - 537.74$

$a^2 = 42.26$

$\boxed{a \approx 6.50}$

$\dfrac{6.50}{\sin 21} = \dfrac{18}{\sin B}$

$18 \sin 21 = 6.5 \sin B$
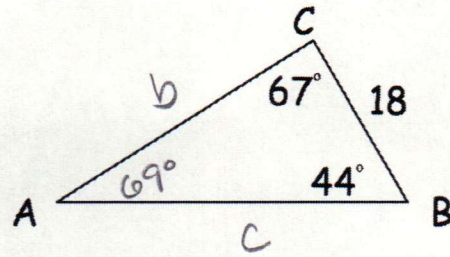
$\dfrac{18 \sin 21}{6.5} = \sin B$

$\sin^{-1}\left(\dfrac{18 \sin 21}{6.5}\right) \approx B$

$\boxed{B \approx 82.93°}$

$C \approx 180 - 21 - 82.93$

$\boxed{C \approx 76.07°}$

$A = 180 - 67 - 44$

$\boxed{A = 69°}$

$\dfrac{18}{\sin 69} = \dfrac{b}{\sin 44}$

$\dfrac{18 \sin 44}{\sin 69} = b$ $\boxed{b \approx 13.39}$

$\dfrac{18}{\sin 69} = \dfrac{c}{\sin 67}$

$\dfrac{18 \sin 67}{\sin 69} = c$

$\boxed{c \approx 17.75}$