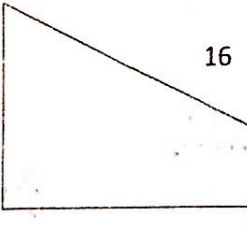
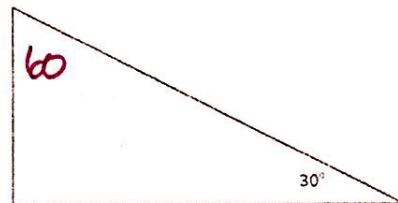
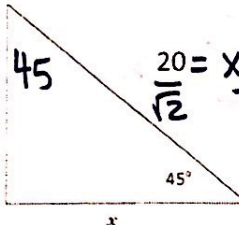
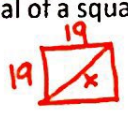


Section 1: Find the length of the missing side. Give exact values only (no decimal approximations).

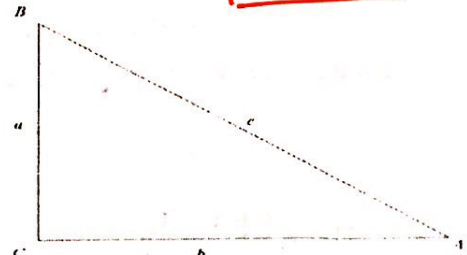
1.   $12^2 + x^2 = 16^2$   
 $144 + x^2 = 256$   
 $\sqrt{x^2} = \sqrt{112}$   
 $x = 4\sqrt{7}$


2.   $52 = \frac{x\sqrt{3}}{\sqrt{3}}$   
 $\frac{52\sqrt{3}}{3} = x$


3.   $\frac{20}{\sqrt{2}} = \frac{x}{\sqrt{2}}$   
 $\frac{20 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = x$   
 $\frac{20\sqrt{2}}{2} = x$   
 $10\sqrt{2} = x$


4. Find the length of the diagonal of a square with sides 19 cm.  
  $19^2 + 19^2 = x^2$   
 $\sqrt{722} = \sqrt{x^2}$   
 $19\sqrt{2} = x$


Section 2: Given the following right triangle, Find the indicated missing value. Round all answers to the nearest tenth.





A = 35°, b = 9, find a.  
  $\tan 35 = \frac{a}{9}$   
 $9 \tan 35 = a$   
 $a = 6.3$

6. A = 63°, c = 25, find b.  
  $\cos 63 = \frac{b}{25}$   
 $25 \cos 63 = b$   
 $11.3 = b$

7. B = 43°, b = 21, find c.  
  $\sin 43 = \frac{21}{c}$   
 $c = \frac{21}{\sin 43}$   
 $c = 30.8$

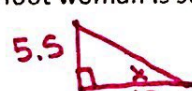
8. b = 14, c = 26, find angle B.  
  $\sin B = \frac{14}{26}$   
 $\sin^{-1}(\frac{14}{26}) = B$   
 $32.6^\circ = B$


9. a = 9, c = 17, find angle B.  
  $\cos B = \frac{9}{17}$   
 $\cos^{-1}(\frac{9}{17}) = B$   
 $58.0^\circ = B$

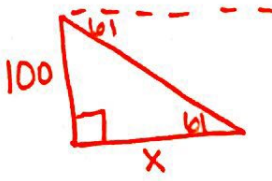
10. b = 37, a = 21, find angle A.  
  $\tan A = \frac{21}{37}$   
 $\tan^{-1}(\frac{21}{37}) = A$   
 $29.6^\circ = A$

Section 3: Applications. Solve the problem for the requested quantity. Show all work.

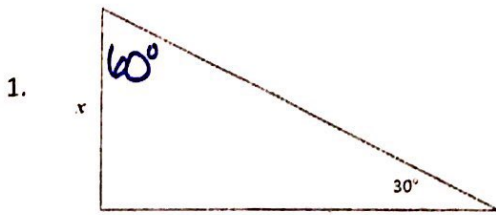
Round answers to the nearest hundredth unit.

11. A 5.5 foot woman is standing in the sun. Her shadow is 13 feet long. What is the angle of elevation of the sun?  
  $\tan x = \frac{5.5}{13}$   
 $\tan^{-1}(\frac{5.5}{13}) = x$   
 $x = 22.98^\circ$

12. A 26-foot extension ladder is placed against the wall of a building making an angle with the ground of 52°. How far up the wall does the ladder touch?  
  $\sin 52 = \frac{x}{26}$   
 $26 \sin 52 = x$   
 $x = 20.49 \text{ ft}$

13. A person is looking down from a 100 foot cliff at a boat out on the ocean. If the angle of depression from the person to the boat is 61°, how far out is the boat?  
  $\tan 61 = \frac{100}{x}$   
 $x = \frac{100}{\tan 61}$   
 $x = 55.43 \text{ ft}$

Section 1: Find the length of the missing side. Give exact values only (no decimal approximations).

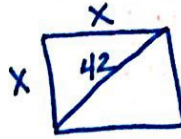


$$\frac{41}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$$

$$\frac{41 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = x$$

$$\boxed{\frac{41\sqrt{3}}{3} = x}$$

2. Find the length of the sides of a square with diagonal of 42 cm.

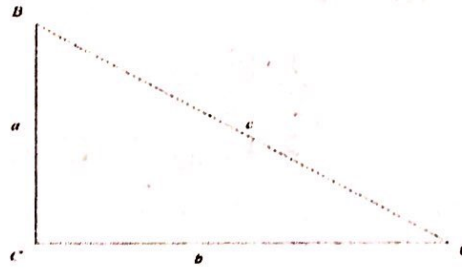


$$\frac{42}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$$

$$\frac{42 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = x$$

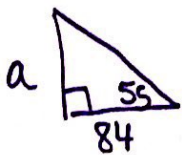
$$\frac{42\sqrt{2}}{2} = x$$

$$\boxed{21\sqrt{2} = x}$$



Section 2: Given the following right triangle, Find the indicated missing value. Round all answers to the nearest tenth.

3.  $A = 55^\circ$ ,  $b = 84$ , find  $a$ .

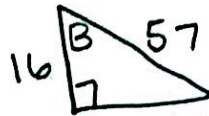


$$\tan 55 = \frac{a}{84}$$

$$84 \tan 55 = a$$

$$\boxed{120.0 = a}$$

4.  $a = 16$ ,  $c = 57$ , find Angle B.



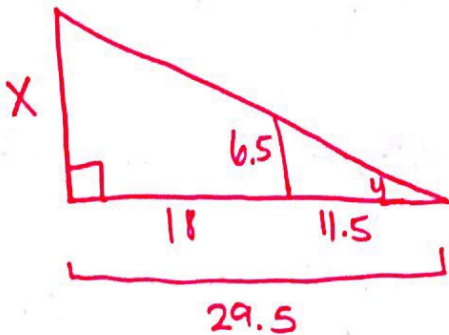
$$\cos B = \frac{16}{57}$$

$$\cos^{-1}\left(\frac{16}{57}\right) = B$$

$$\boxed{73.7^\circ = B}$$

Section 3: Applications. Solve the problem for the requested quantity. Show all work. Round answers to the nearest hundredth unit.

5. A 6.5 foot man is standing in the shadow of a flagpole 18 feet from its base. His shadow is 11.5 feet long. How tall is the flag pole?



$$\frac{x}{6.5} = \frac{29.5}{11.5}$$

$$11.5x = 191.75$$

$$\boxed{x = 16.67 \text{ ft}}$$

OR

$$\tan y = \frac{6.5}{11.5}$$

$$\tan^{-1}\left(\frac{6.5}{11.5}\right) = y$$

$$29.48^\circ = y$$

$$\tan 29.48 = \frac{x}{29.5}$$

$$29.5 \tan 29.48 = x$$

$$\boxed{16.68 \text{ ft} = x}$$