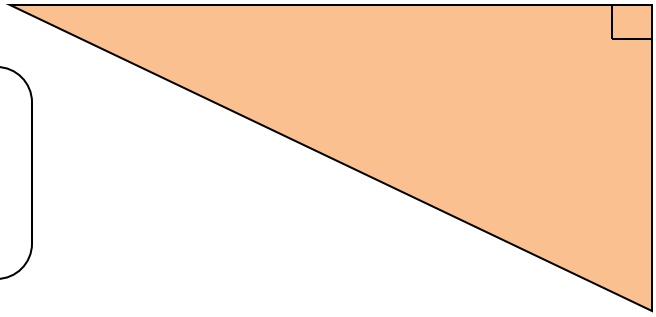
College Review Math
Section 9A

SOHCAHTOA, Pilgrim! You do biggum math problems or me scalp 'em your head.

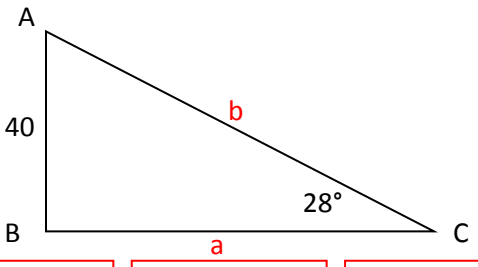


$$\sin\theta = \frac{opposite}{hypontenuse} \qquad \cos\theta = \frac{adjacent}{hypontenuse} \qquad \tan\theta = \frac{opposite}{adjacent}$$

$$\csc\theta = \frac{1}{\sin} \qquad \sec\theta = \frac{1}{\cos} \qquad \cot\theta = \frac{1}{\tan}$$

Use the above trig functions and the Pythagorean Theorem to determine the missing measurements for each triangle. Round all angles to nearest tenth of a degree and lengths to three significant digits.

1)

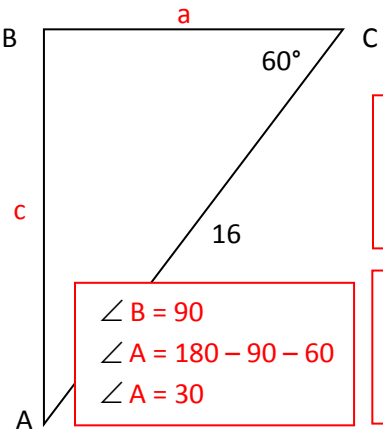


$\sin 28 = \frac{40}{b}$
$b \sin 28 = 40$
$b = \frac{40}{sin28}$
$b \approx 85.202$

$\tan 28 = \frac{40}{a}$
$a \tan 28 = 40$
$a = \frac{40}{tan28}$
$a \approx 75.229$

$\angle B = 90$
$\angle A = 180 - 90 - 28$
$\angle A = 62$

2)

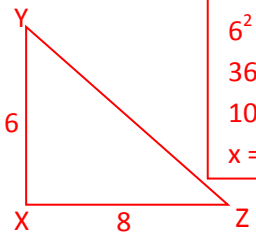


$\angle B = 90$
$\angle A = 180 - 90 - 60$
$\angle A = 30$

$\sin 60 = \frac{c}{16}$
$16 \sin 60 = c$
$c \approx 13.856$

$\cos 60 = \frac{a}{16}$
$16 \cos 60 = a$
$a = 8$

3) In ΔXYZ, $\angle X = 90°$, XY = 6, XZ = 8

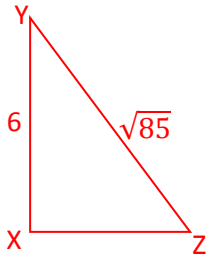


$a^2 + b^2 = c^2$
$6^2 + 8^2 = x^2$
$36 + 64 = x^2$
$100 = x^2$
$x = 10$

$\tan Y = \frac{8}{6}$
$Y = \tan^{-1}\frac{8}{6}$
$\angle Y \approx 53.1°$

$\angle Z \approx 180 - 90 - 53.1$
$\angle Z \approx 36.9°$

4) In ΔXYZ, $\angle X = 90°$, $x = \sqrt{85}$, z = 6

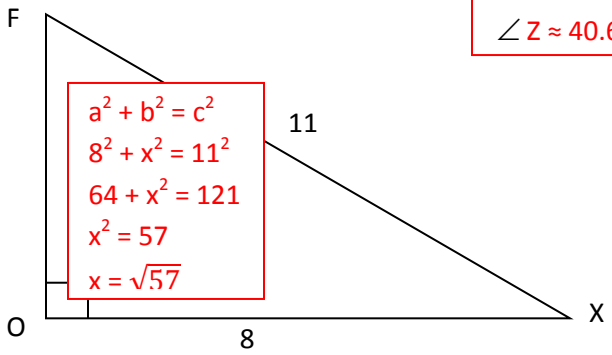


$a^2 + b^2 = c^2$
$6^2 + y^2 = \sqrt{85}^2$
$36 + y^2 = 85$
$y^2 = 49$
$y = 7$

$\cos Y = \frac{6}{\sqrt{85}}$
$Y = \cos^{-1}\frac{6}{\sqrt{85}}$
$\angle Y \approx 49.4°$

$\angle Z \approx 180$
$- 90 - 49.4$
$\angle Z \approx 40.6°$

5) Use the diagram at the right to find:



$a^2 + b^2 = c^2$
$8^2 + x^2 = 11^2$
$64 + x^2 = 121$
$x^2 = 57$
$x = \sqrt{57}$

sin F

$\sin F = \frac{opp}{hyp}$
$\sin F = \frac{8}{11}$

cos F

$\cos F = \frac{\sqrt{57}}{11}$

tan F

$\tan F = \frac{8}{\sqrt{57}}$
$\tan F = \frac{8\sqrt{57}}{57}$

csc F

$\csc F = \frac{hyp}{opp}$
$\csc F = \frac{11}{8}$

sec F

$\sec F = \frac{11}{\sqrt{57}}$
$\sec F = \frac{11\sqrt{57}}{57}$

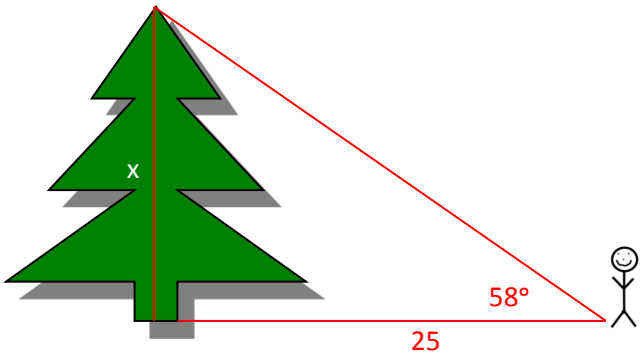
cot F

$\cot F = \frac{\sqrt{57}}{8}$

Word problems? Yeah, I just love them!

When in doubt…

6) A person standing near the base of a tall tree begins to wonder exactly how tall the tree is. After measuring the distance from the tree's base to himself as 25 feet, he observes the angle at which he must look up to see the top of the tree is 58°. To the nearest foot, how tall is the tree?



$\tan 58 = \frac{x}{25}$

$25\tan 58 = x$

$x \approx 40$ feet

Technically, the answer would need to add the person's height to be more accurate.

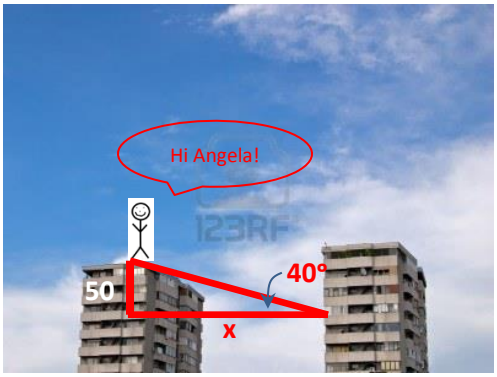
7) A plane flying at an altitude of 15,000 feet radios the tower that it is about to begin its descent. If the plane is 175,000 feet from the airport, what will its angle of descent be (to the nearest tenth of a degree)?

$\sin x = \frac{15000}{175000}$

$x = \sin^{-1}\frac{15000}{175000}$

$x \approx 4.9°$

8) Two buildings stand directly across the street from one another. Each floor on each building is exactly 10 feet high. Angela who is on the 4th floor of one building is observing Colton who stands on the roof of the 8-story building across the street at an angle of inclination of 40°. How far apart are the buildings?



$\tan 40 = \frac{50}{x}$

$x \tan 40 = 50$

$x = \frac{50}{\tan 40}$

$x \approx 60$ feet