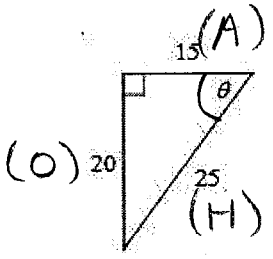
Chapter 2 Trigonometry – Review

Show all of your work.

1. Find the value of the **trig ratio** indicated. Express your answer as a fraction (simplified, if necessary).

a) $\cos\theta$

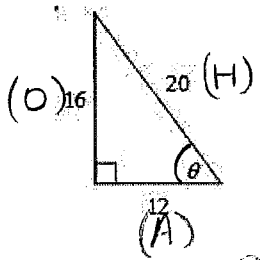


$\cos\theta = \frac{A}{H}$

$\cos\theta = \frac{15}{25}$

$\cos\theta = \frac{3}{5}$

b) $\sin\theta$

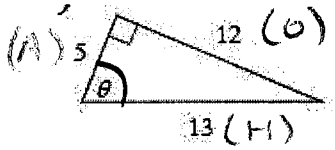


$\sin\theta = \frac{O}{H}$

$\sin\theta = \frac{16}{20}$

$\sin\theta = \frac{4}{5}$

c) $\tan\theta$

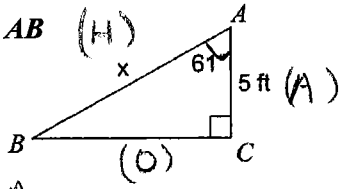


$\tan\theta = \frac{O}{A}$

$\tan\theta = \frac{12}{5}$

2. Find the measure of the indicated **side**. Round your final answer to the nearest tenth.

a) side AB



$\cos\theta = \frac{A}{H}$

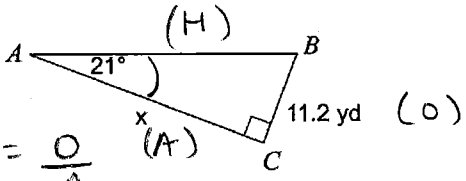
$\cos 61^\circ = \frac{5}{x}$

$x\cos 61^\circ = 5$

$x = \frac{5}{\cos 61^\circ}$

$x = 10.3$

b) side b



$\tan\theta = \frac{O}{A}$

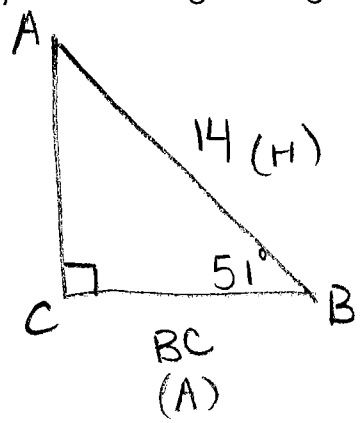
$\tan 21^\circ = \frac{11.2}{x}$

$x\tan 21^\circ = 11.2$

$x = \frac{11.2}{\tan 21^\circ}$

$x = 29.2$

c) ΔABC is a right triangle in which side $AB = 14$ yd, $\angle B = 51^\circ$ and $\angle C = 90^\circ$. Fide side BC.



$\cos\theta = \frac{A}{H}$

$\cos 51^\circ = \frac{BC}{14}$

$14(\cos 51^\circ)\ BC$

$BC = 8.8$

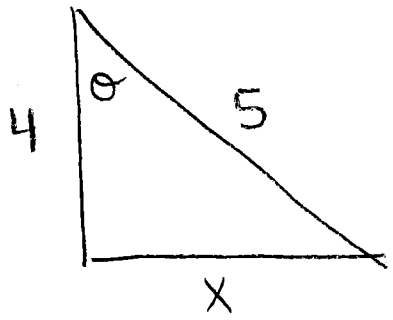
3. Given $\sin 30^\circ = \frac{x}{5}$, find x.

$5(\sin 30^\circ) = \left(\frac{x}{5}\right)5$

$5 \sin 30^\circ = x$

$x = 2.5$

4. Given $\cos\theta = \frac{4}{5}$, find $\sin\theta$.



$\cos\theta = \frac{A}{H}$

$\cos\theta = \frac{4}{5}$

$A = 4$

$H = 5$

$a^2 + b^2 = c^2$

$4^2 + b^2 = 5^2$

$16 + b^2 = 25$

$b^2 = 9$

$b = 3$

$\sin\theta = \frac{O}{H}$ $\sin\theta = \frac{3}{5}$

5. This diagram shows an awning over the window of a house. Find the height of the awning, ***GH***, to the nearest tenth of a meter.

$\tan\theta = \frac{O}{A}$

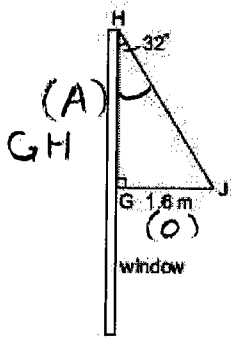
$\tan 32^\circ = \frac{1.6}{GH}$

$GH(\tan 32^\circ) = 1.6$

$GH = \frac{1.6}{\tan 32^\circ}$

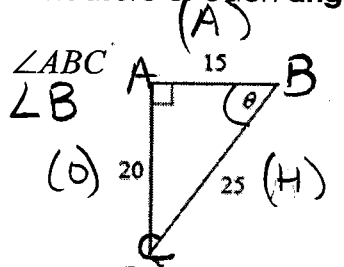
$GH = 2.5605$

$GH = 2.6$



6. Find the measure of each **angle** indicated. Round your final answer to the nearest degree.

a) $\angle ABC$



$\angle B = \tan^{-1}\left(\frac{20}{15}\right)$

or

$\angle B = \sin^{-1}\left(\frac{20}{25}\right)$

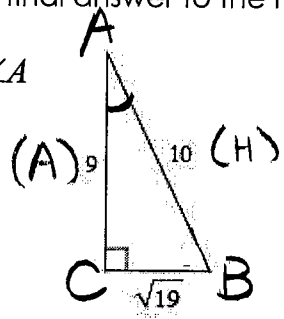
or

$\angle B = \cos^{-1}\left(\frac{15}{25}\right)$

$\angle B = 53.13^\circ$

$\angle B = 51^\circ$

b) $\angle A$



$\angle A = \tan^{-1}\left(\frac{\sqrt{19}}{9}\right)$

or

$\angle A = \sin^{-1}\left(\frac{\sqrt{19}}{10}\right)$

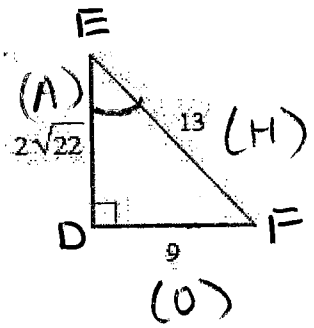
or

$\angle A = \cos^{-1}\left(\frac{9}{10}\right)$ ← Nicest

$\angle A = 25.84^\circ$

$\angle A = 26^\circ$

c) $\angle DEF$



$\angle E$

$\angle E = \tan^{-1}\left(\frac{9}{2\sqrt{22}}\right)$

or

$\angle E = \sin^{-1}\left(\frac{9}{13}\right)$ ← Nicest

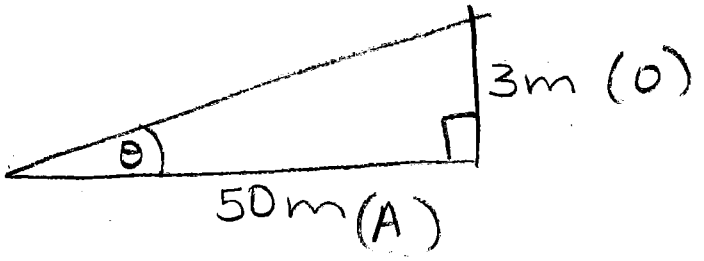
or

$\angle E = \cos^{-1}\left(\frac{2\sqrt{22}}{13}\right)$

$\angle E = 43.813$

$\angle E = 44°$

7. Victor is building a wheelchair ramp to an entranceway that is 3 m above the sidewalk. The ramp will cover a horizontal distance of 50 m. What angle, to the nearest degree, will the ramp make with the ground?



$\theta = \tan^{-1}\left(\frac{O}{A}\right)$

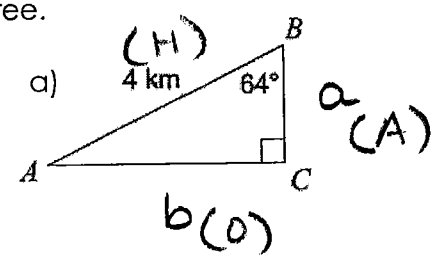
$\theta = \tan^{-1}\left(\frac{3}{50}\right)$

$\theta = 3.434°$

$\theta = 3°$

9. **Solve** the following right triangles. Give lengths to the nearest tenth and angles to the nearest degree.

a)



$\angle A + \angle B + \angle C = 180°$

$\angle A + 64° + 90° = 180°$

$\angle A =$

side AC

$\sin\theta = \frac{O}{H}$

$\sin 64° = \frac{b}{4}$

$4(\sin 64°) = b$

$b = 3.595$

$b = 3.6$

side BC

$\cos\theta = \frac{A}{H}$

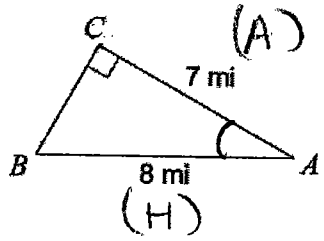
$\cos 64° = \frac{a}{4}$

$4(\cos 64°) = a$

$a = 1.753$

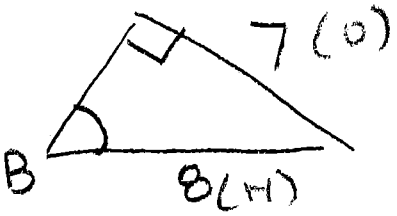
$a = 1.8$

b)



(A)

(H)



$\angle A$

$\theta = \cos^{-1}\left(\frac{A}{H}\right)$

$\angle A = \cos^{-1}\left(\frac{7}{8}\right)$

$\angle A = 28.955$

$\angle A = 29°$

$\angle B$

$\theta = \sin^{-1}\left(\frac{O}{H}\right)$

$\angle B = \sin^{-1}\left(\frac{7}{8}\right)$

$\angle B = 61.0449$

$\angle B = 61°$

Side BC

$a^2 + b^2 = c^2$

$a^2 + 7^2 = 8^2$

$a^2 + 49 = 64$

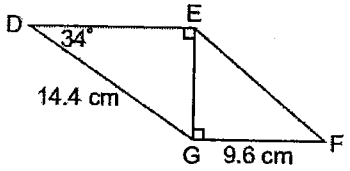
$a^2 = 15$

$a = \sqrt{15}$

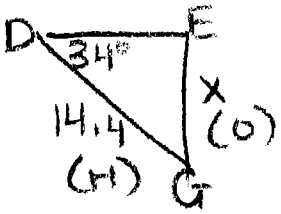
$BC = 3.873$

$BC = 3.9$

10. Find the measure of $\angle F$ to the nearest degree.



Find EG first



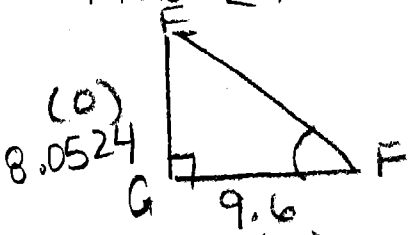
$\sin\theta = \frac{O}{H}$

$\sin 34° = \frac{X}{14.4}$

$14.4(\sin 34°) = X$

$X = 8.0524$

Find $\angle F$



$\theta = \tan^{-1}\left(\frac{O}{A}\right)$

$\angle F = \tan^{-1}\left(\frac{8.0524}{9.6}\right)$

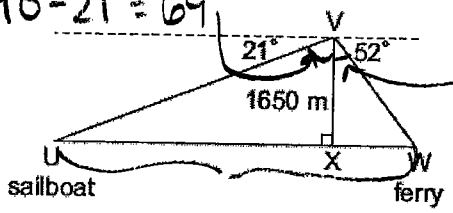
$\angle F = 39.9896$

$F = 40°$

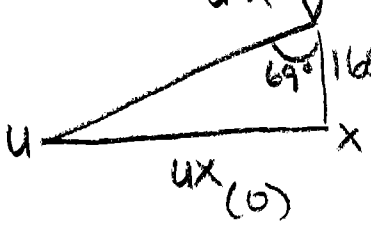
11. From a small plane, *V*, the angle of depression of a sailboat is 21°. The angle of depression of a ferry on the other side of the plane is 52°. The plane is flying at an altitude of 1650 m. How far apart are the boats, to the nearest meter?

$90° - 21° = 69°$

$90° - 52° = 38°$



$\overline{UX}$



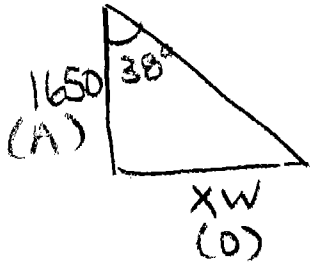
$\tan\theta = \frac{O}{A}$

$\tan 69° = \frac{UX}{1650}$

$1650(\tan 69°) = UX$

$UX = 4298.4$

$\overline{XW}$



$\tan\theta = \frac{O}{A}$

$\tan 38° = \frac{XW}{1650}$

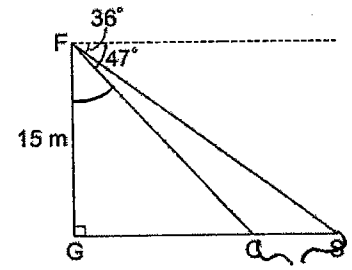
$1650(\tan 38°) = XW$

$XW = 1289.1$

$UW = UX + XW$

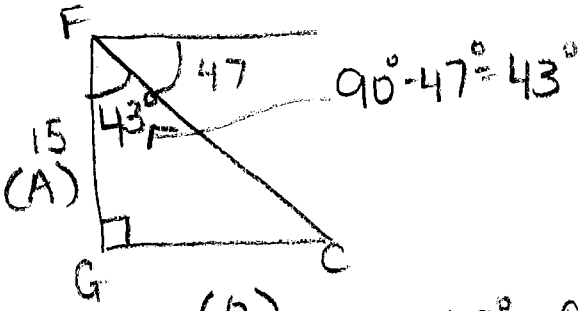
$UW = 4298.4 + 1289.1 = 5587.5$

12. The diagram shows a falcon, ***F***, on a tree, with a squirrel, ***S***, and a chipmunk, ***C***, on the ground. From the falcon, the angles of depression of the animals are 36° and 47°.
How far apart are the animals on the ground to the nearest tenth of a meter?



Find CS

$CS = GS - GC$



$90° - 47° = 43°$

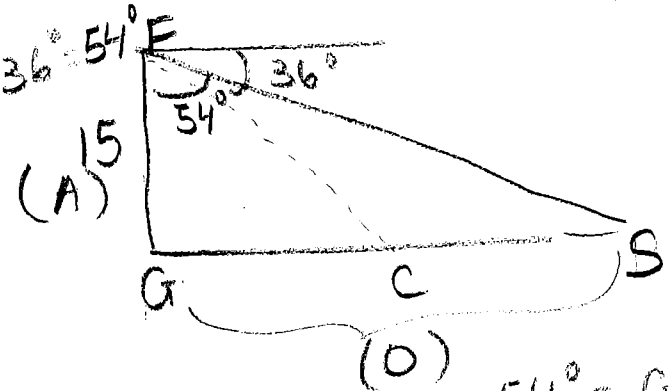
(O)

$\tan\theta = \frac{O}{A}$

$\tan 43° = \frac{GC}{15}$

$15(\tan 43°) = GC$

$GC = 13.988$



(O)

$\tan\theta = \frac{O}{H}$

$\tan 54° = \frac{GS}{15}$

$15\tan 54° = GS$

$GS = 20.646$

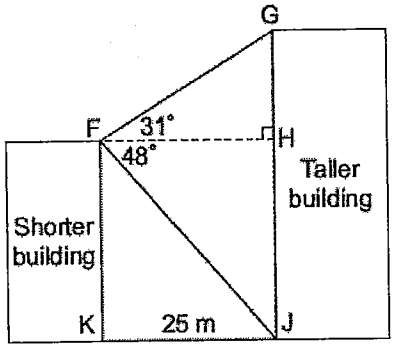
$CS = 20.646 - 13.988$

$CS = 6.658$

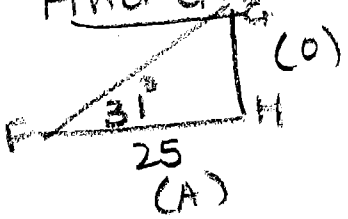
$CS = 6.7$

13. Two buildings are 25 m apart. From the top of the shorter building, the angles of elevation and depression of the top and bottom of the taller building are 31° and 48° respectively.
What is the height of the taller building? Give your answer to the nearest meter.

Tall building = GH + JH



Find GH



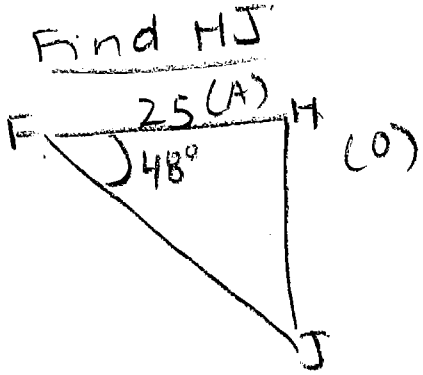
$\tan\theta = \frac{O}{A}$

$\tan 31° = \frac{GH}{25}$

$25(\tan 31°) = GH$

$GH = 15.0215$

Find HJ



$\tan\theta = \frac{O}{A}$

$\tan 48° = \frac{HJ}{25}$

$25\tan 48° = HJ$

$HJ = 27.765$

Tall building $= 15.0215 + 27.765$

$= 42.7865 = 43$ m