Find the exact value for the following:

a. $\sin 150°$

b. $\cos 240°$

c. $\csc 135°$

d. $\tan -\frac{\pi}{6}$

e. $\sec \frac{5\pi}{4}$

f. $\cos \frac{2\pi}{3}$

Find the amplitude and period for the following functions:

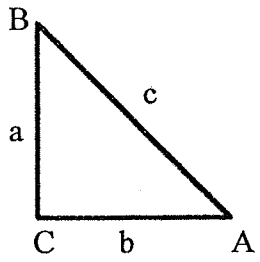
a. $y = 4 + 2\sin x$

b. $y = 3\cos 2x$

c. $f(x) = \sin\left(\frac{x}{2}\right)$

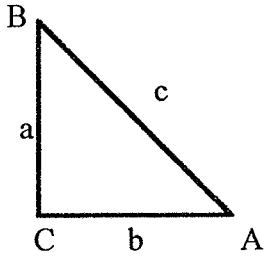
Solve the following (right) triangles:

a.



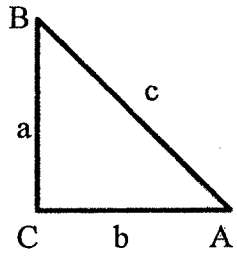
A = 23.5°, b = 10 solve for c

b.



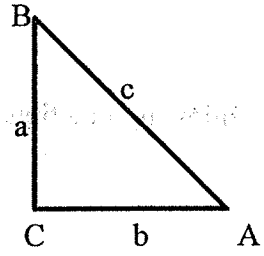
B = 16.8°, b = 30.5 solve for a

c.



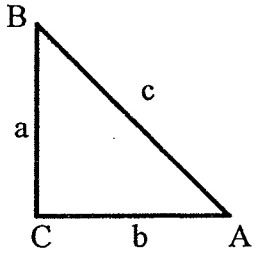
a = 30.4, c = 50.2 solve for A

d.



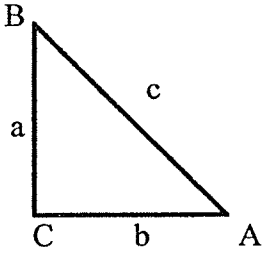
a = 10.8, b = 24.7 solve for B

e.



A = 54.8°, c = 80 solve for a

f.



B = 23.8°, b = 40.5 solve for c

Simplify the following trigonometric expressions:

a. $\frac{\cos x}{sin^2 x}$

b. $\frac{\sin x + \sin x \, tan^2 x}{sec^2 x}$

c. $\frac{1+cos^2 x}{cos^2 x}$

d. $\frac{sint}{tant} + \frac{cost}{\cot t}$

e. $(\sin x + \cos x)^2$

f. $\frac{sin^2x}{1-\cos x}$

If $\sin X = \frac{3}{5}$ and angle X terminates in the second quadrant and $\tan Y = \frac{12}{5}$ and angle Y terminates in the first quadrant. Find the exact value of the following:

a. $\sin (X - Y)$

b. $\cos (X + Y)$

c. $\tan (X + Y)$

If $\sin X = \frac{3}{5}$ and angle X terminates in the first quadrant and $\sin Y = \frac{5}{13}$ and angle Y terminates in the second quadrant. Find the exact value of the following:

a. $\cos (X + Y)$

b. $\sin (X + Y)$

c. $\tan (X + Y)$

If $\tan X = -\frac{4}{3}$ and angle X terminates in the second quadrant and $\cos Y = \frac{2}{3}$ and angle Y terminates in the first quadrant. Find the exact value of the following:

a. $\cos (X - Y)$

b. $\sin (X - Y)$

c. $\tan(X - Y)$

Expand and simplify: $\cos\left(X - \frac{3\pi}{2}\right)$

Find the exact value of the following:

a. $\sin 25° \cos 5° + \cos 25° \sin 5°$

b. $\frac{\tan 10° + \tan 35°}{1 - \tan 10° \tan 35°}$

Find the exact value of: $\sin\left(\cos^{-1}\left(\frac{5}{13}\right) + \tan^{-1}\left(\frac{15}{8}\right)\right)$

If $\sin\theta = a$ for $0 \leq \theta < 90°$, find the following:

a. $\cos\theta$

b. $\tan\theta$

c. $\csc\theta$

d. $\sec\theta$

Use right triangles to solve the following application problem:

a. A wheelchair ramp is to be built beside the steps to the campus library. Find the angle of elevation of the 23-foot ramp, to the nearest tenth of a degree, if its final height is 6 feet.

b. A 200-foot cliff drops vertically into the ocean. If the angle of elevation from a ship to the top of the cliff is 23.7° how far, to the nearest foot, is the ship from the base of the cliff?

c. A building that is 250 feet high casts a shadow 40 feet long. Find the angle of elevation, to the nearest tenth of a degree, of the sun at this time.

d. A road is inclined at an angle of 5°. After driving 5000 feet along this road, find the driver's increase in altitude to the nearest foot.

Find all solutions in the interval $[0, 2\pi)$

a. $\sin x = \frac{-\sqrt{3}}{2}$

b. $\cos x = \pm\frac{\sqrt{2}}{2}$

c. $\tan x = \sqrt{3}$

d. $2\cos x + \sqrt{3} = 0$

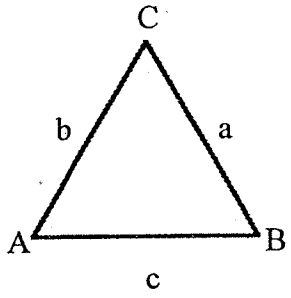
e. $5\sin x + 1 = 3\sin x$

f. $sin^2 x - 1 = 0$

g. $cos^2 x + 2\cos x - 3 = 0$

h. $2sin^2 x = \sin x + 3$

Use the Law of Sines to solve the following triangles:



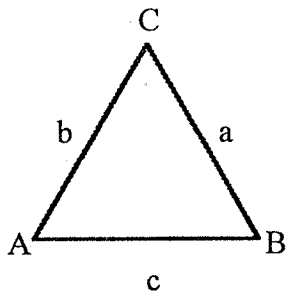
a. Given $a = 20$, $b = 15$, $A = 40°$, how many triangles are possible? _____ Find all the missing parts of the triangle(s).

b. Given $a = 6.1$, $b = 4$, $A = 162°$, how many triangles are possible? _____ Find all the missing parts of the triangle(s).

c. Given $a = 16$, $b = 18$, $A = 60°$, how many triangles are possible? _____ Find all the missing parts of the triangle(s).

d. Given $a = 7$, $b = 28$, $B = 12°$, how many triangles are possible? _____ Find all the missing parts of the triangle(s).

Use the Law of Cosines to solve the following triangles:



a. $a = 5, b = 7, C = 42°$

b. $a = 5, b = 7, c = 10$

c. $a = 4, c = 7, B = 60°$

d. $a = 10, b = 3, C = 15°$

Convert each of the following points in rectangular coordinates to polar coordinates:

a. $(2, -2)$

b. $(1, \sqrt{3})$

c. $(4, 0)$

Convert each of the following points in polar coordinates to rectangular coordinates:

a. $(-3, \frac{\pi}{6})$

b. $(2, \frac{3\pi}{4})$

c. $(-1, \frac{5\pi}{3})$

Convert the rectangular equation $2y = x^2 + y^2$ to polar coordinates.

Convert the polar equation $r = \cos\theta$ to rectangular coordinates.