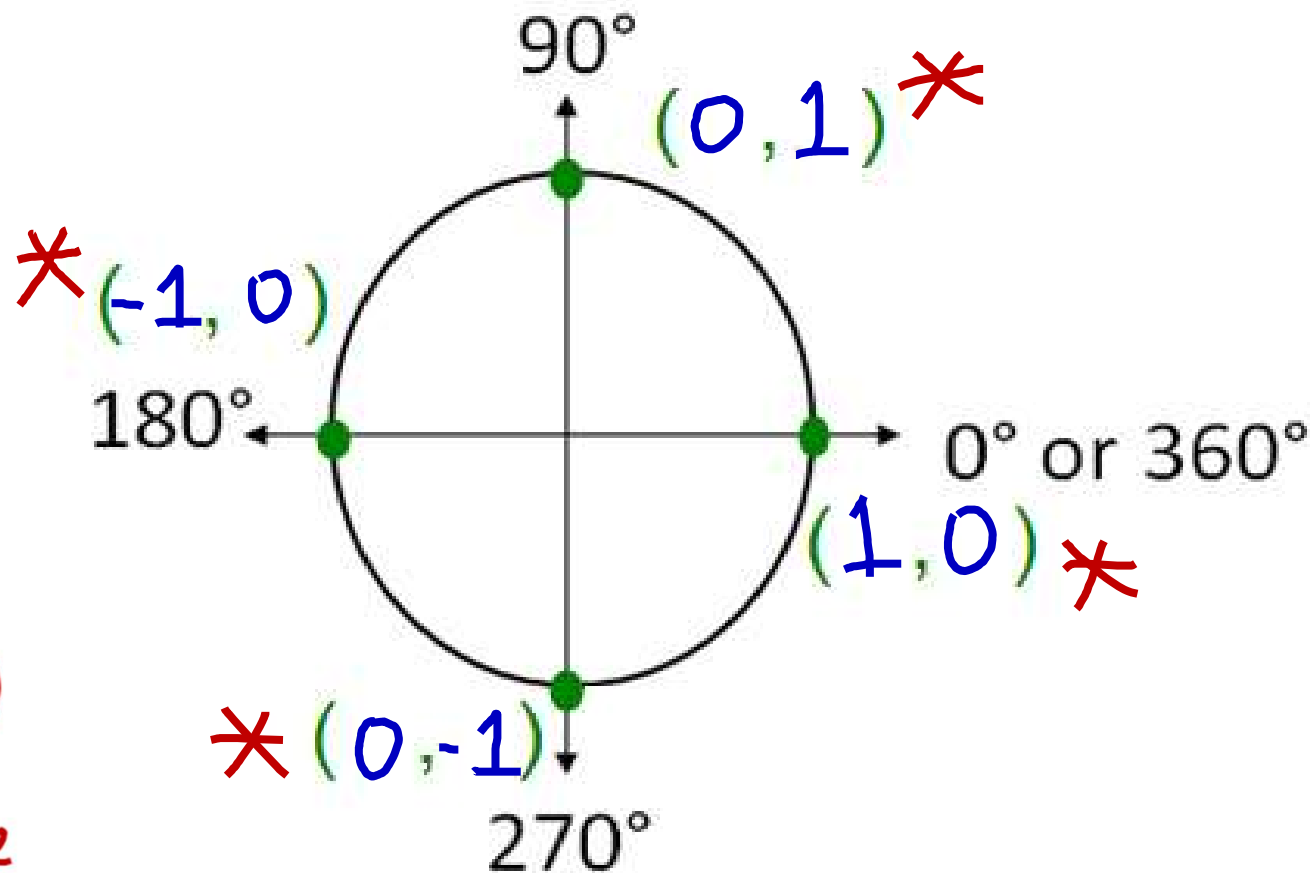# SOLUTIONS TO WARM-UP

A. Draw this unit circle and label the coordinates of the given points.

SOLUTIONS TO WARM-UP

B. Give a "definition" for each of the following in terms of x, y, and r:

$\sin\theta = \dfrac{y}{r}$

$\csc\theta = \dfrac{r}{y}$

$\cos\theta = \dfrac{x}{r}$

$\sec\theta = \dfrac{r}{x}$

$\tan\theta = \dfrac{y}{x}$

$\cot\theta = \dfrac{x}{y}$

SOLUTIONS TO WARM-UP

C. Use your unit circle and definitions to evaluate the following expressions:

$$\sin 180° = \frac{0}{1} = \boxed{0}$$

$$\tan 90° = \frac{1}{0} = \boxed{\text{undefined}}$$

$$\cot 270° = \frac{0}{-1} = \boxed{0}$$

$$\sec 360° = \frac{1}{1} = \boxed{1}$$

Ch.6 Group Quiz: Study List

*Find coterminal angles $\theta \pm 360n$ (n is a whole number)
*Find reference angles $\theta, 180 - \theta, \theta - 180, 360 - \theta$

*30°-60°-90° and 45°-45°-90° triangles (know basic measurements and find trig ratios)

*Use unit circle to find "special" trig ratios for 0°, 90°, 180°, 270°, 360°

*Find trig ratios, given a point, angle, triangle, or terminal side in a certain quadrant (apply negatives appropriately)

$\sin\theta = y/r \qquad \cos\theta = x/r \qquad \tan\theta = y/x$
$\csc\theta = r/y \qquad \sec\theta = r/x \qquad \cot\theta = x/y$

*Solve for a missing side or angle in a right triangle: Soh Cah Toa

*Apply inverses: $\sin^{-1}\theta, \cos^{-1}\theta, \tan^{-1}\theta$

*Law of Sines

*Law of Cosines

*Area of Triangle: $A = \frac{1}{2}(side1)(side2)\sin(\text{included angle})$

*Solve word problems using trig

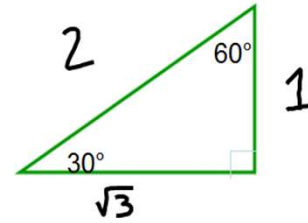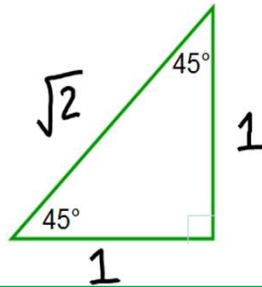# Formulas to know for the quiz!!!

$$\sin\theta = \frac{y}{r}$$

$$\cos\theta = \frac{x}{r}$$

$$\tan\theta = \frac{y}{x}$$

$$r^2 = x^2 + y^2$$

$$r = \sqrt{x^2 + y^2}$$

Special triangles:

Law of Sines:

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

Law of Cosines:

↓This side is across from this angle ↓

$$a^2 = b^2 + c^2 - 2bc(\cos A)$$

*Finding the **area of a triangle** when the base and height are not given:*

$$A = \frac{1}{2}(\text{side1})(\text{side2}) \cdot \sin(\text{included angle})$$
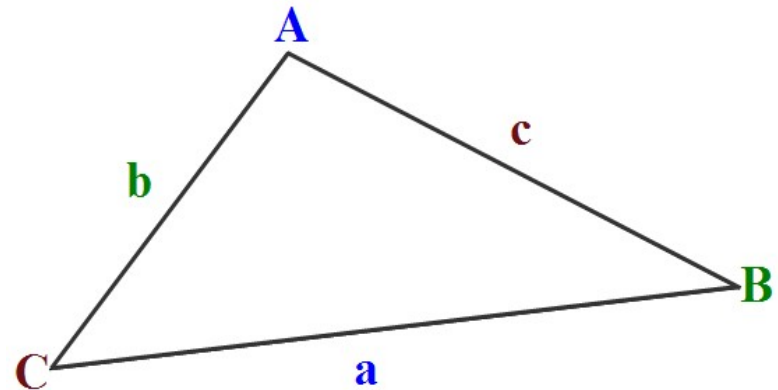
Notes 6.6: Law of Cosines

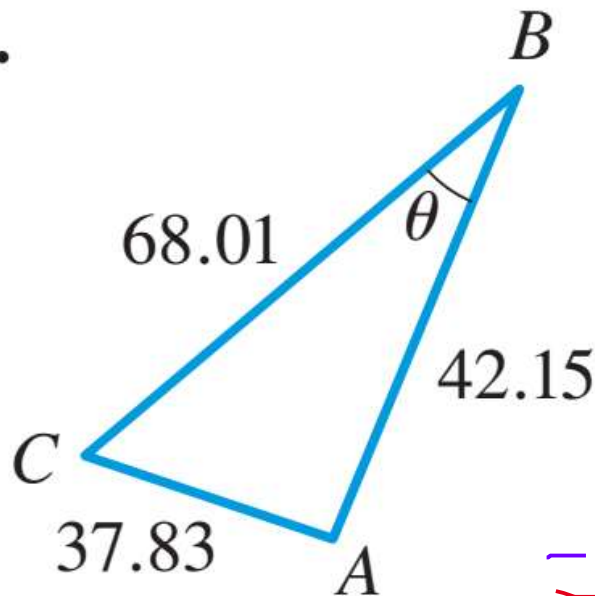↓This side is across from this angle ↓

$$a^2 = b^2 + c^2 - 2bc(\cos A)$$

or $$b^2 = a^2 + c^2 - 2ac(\cos B)$$

or $$c^2 = a^2 + b^2 - 2ab(\cos C)$$

7.

B

68.01

θ

42.15

C

37.83

A

$$37.83^2 = 68.01^2 + 42.15^2 - 2(68.01)(42.15)(\cos\theta)$$

$$1431.11 = 6401.98 - 5733.243\cos\theta$$

$$-6401.98 \quad -6401.98$$

$$\dfrac{-4970.87}{-5733.243} = \dfrac{-5733.243\cos\theta}{-5733.243}$$

$$.86703... = \cos\theta$$
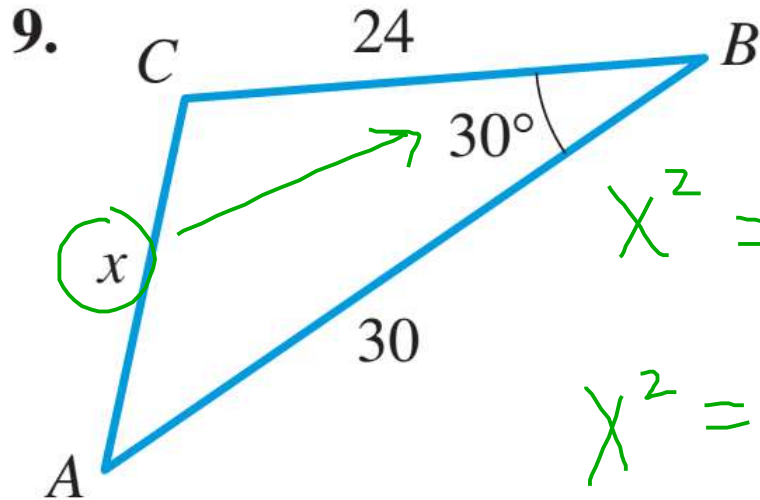
$$\cos^{-1}(86703) = \theta$$

$$\boxed{29.89° \approx \theta}$$

use $\boxed{COS^{-1}}$

$\boxed{2^{nd}}$ $\boxed{ANS}$ to insert

the entire decimal

9.

C   24   B

$30°$

x

30

A

$$x^2 = 24^2 + 30^2 - 2(24)(30)(\cos 30°)$$

$$x^2 = 1476 - 1440(\cos 30)$$

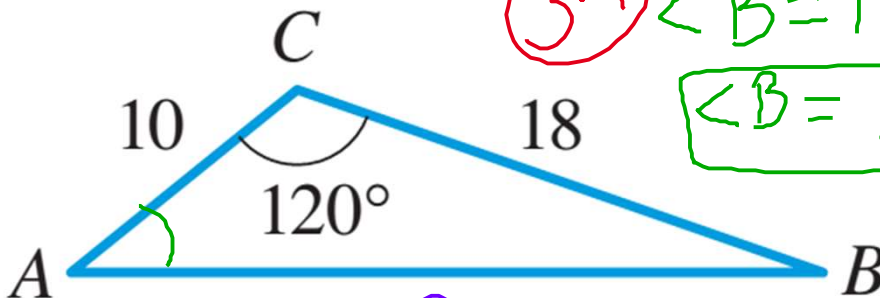$$\sqrt{x^2} = \sqrt{228.9234\ldots}$$ ← carry all values in your calculator by using

$$x \approx 15.13$$

$\boxed{\sqrt{}}$ $\boxed{2^{nd}}$ $\boxed{ANS}$

Find all missing sides and angles!

11–20 ■ **Solving a Triangle**   Solve triangle ABC.

11.

C

10 18

$120°$

A B

c

(3rd) $\angle B = 180 - (120 + 39.36)$

$\boxed{\angle B = 20.64°}$

(1st)

$c^2 = 10^2 + 18^2 - 2(10)(18)(\cos 120°)$

$c^2 = 424 - 360 \cos 120°$

$c^2 = 604$

$c = \sqrt{604}$

$\boxed{c \approx 24.58}$

(2nd) $\dfrac{\sin A}{18} = \dfrac{\sin 120°}{24.58}$

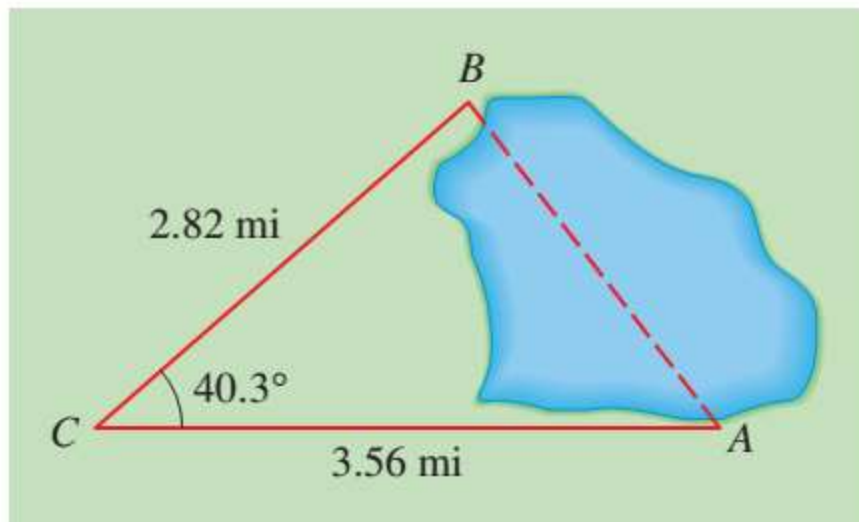$24.25 \sin A = 18 \sin 120$

$\sin A = \dfrac{18 \sin 120}{24.58}$
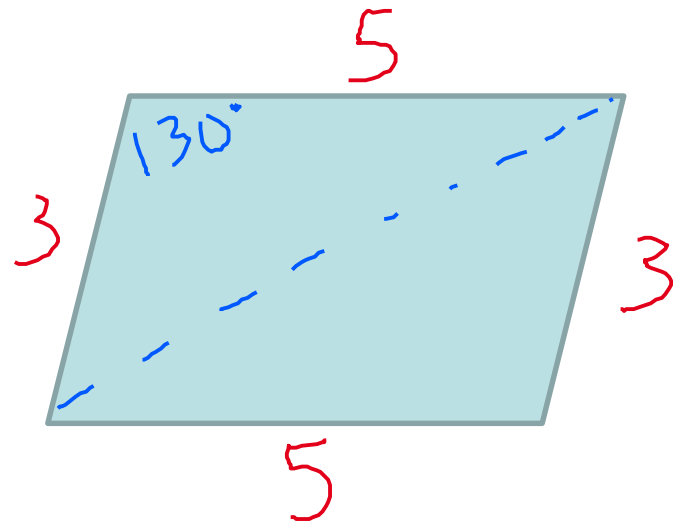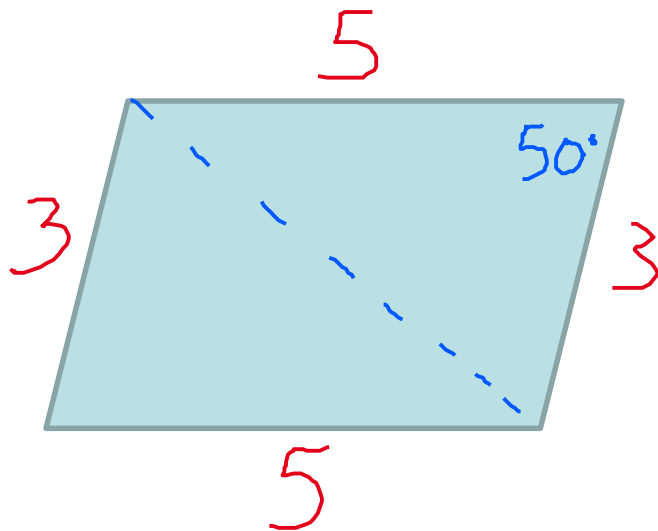
$A = \sin^{-1}(.6342\ldots)$

$\boxed{A \approx 39.36°}$

APPLICATIONS

39. Surveying To find the distance across a small lake, a surveyor has taken the measurements shown. Find the distance across the lake using this information.

40. Geometry A parallelogram has sides of lengths 3 and 5, and one angle is 50°. Find the lengths of the diagonals.

5

50°

3   3

5

5

130°

3   3

5

Notes:
Angles are NOT bisected by the diagonals.
Opposite angles are congruent (all 4 add to 360°).
Adjacent angles are supplementary.

44. Navigation   Two boats leave the same port at the same time. One travels at a speed of 30 mi/h in the direction N 50° E, and the other travels at a speed of 26 mi/h in a direction S 70° E (see the figure). How far apart are the two boats after 1 h?

N 50° E

N

50°

x

W   E

θ

70°

S 70° E

S
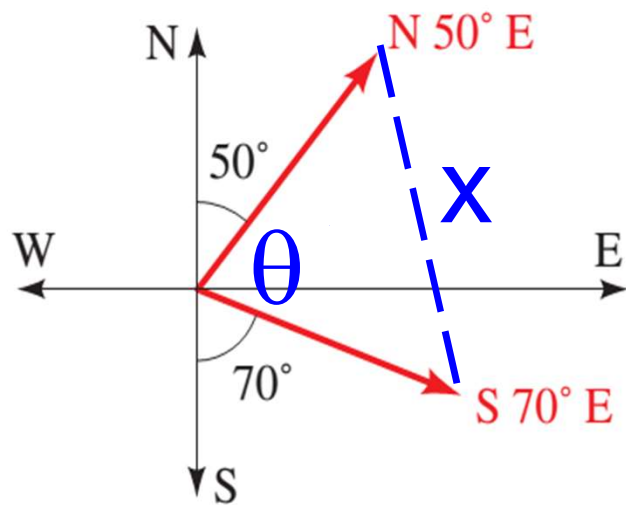
The rate is 26 mi/h and 30 mi/h →
   how far do they travel in one hour?

Label your sides accordingly.

48. Towing a Barge Two tugboats that are 120 ft apart pull a barge, as shown. If the length of one cable is 212 ft and the length of the other is 230 ft, find the angle formed by the two cables.

212 ft

120 ft

230 ft