3.3 Graphs with Intercepts-optional (but required for us)
3.3 Exercise Set, page 373 (355): 10,16
3.4 Understand Slope of a Line-optional
3.4 Exercise Set, page 409 (391): 1, 3, 9, 10, 13, 19, 28
3.5 Use the Slope-Intercept Form of an Equation of a Line-optional
3.5 Exercise Set, page 451 (433): 1, 4, 7, 9, 25, 29, 37, 42, 44

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5. Trigonometry

5.1 Use Properties of Angles, Triangles, and the Pythagorean and Theorem
5.1 Exercise Set, page 612 (594): 1, 5, 7, 9, 13, 15, 22
5.2 Applications: Sine, Cosine and Tangent Ratios
5.2 Exercise Set, page 640 (622): 1, 5, 7, 11, 15, 16, 19, 26
I will supply supplementary material about converting between decimal degrees and DMS notation.
6. Health Option

6.1 Measurement; Health Applications
6.1 Exercise Set, page 663 (645): 1, 3, 5, 8, 14, 17, 19

Solve for y to put the equation in slope intercept form.

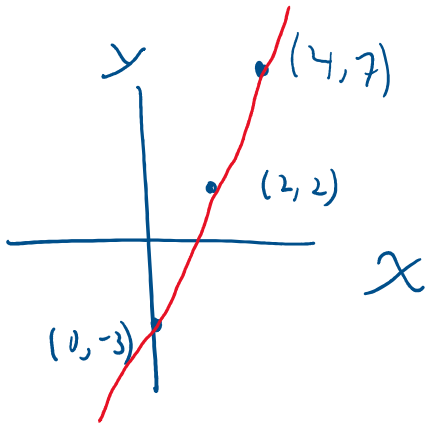
$5x - 2y = 3.$

$5x = 2y + 3$

$2y = 5x - 3$

$y = \frac{5x}{2} - 3$

x	y
0	−3
2	2
4	7



5.1

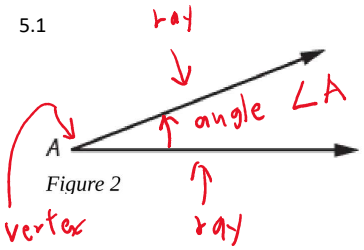
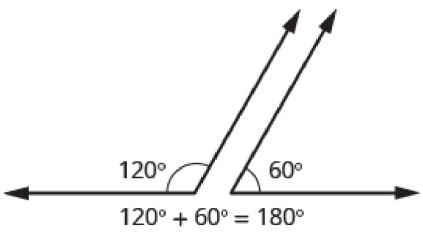


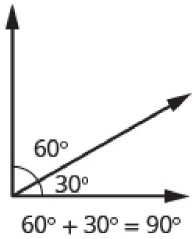
Figure 2

Definition: two angles are supplementary if they add up to $180°$.



Definition: an angle of 180° is called a straight angle

Definition: two angle are complementary if they add up to 90°.



$60° + 30° = 90°$

EXAMPLE 2

Two angles are supplementary. The larger angle is $30°$ more than the smaller angle. Find the measure of both angles.

Let $\angle A, \angle B$ be the 2 angles

Let $\angle A$ be the larger angle

$\angle A + \angle B = 180^\circ$

$\angle A = \angle B + 30^\circ$

Find $\angle A, \angle B$

$(\angle B + 30^\circ) + \angle B = 180^\circ$

$2\angle B = 180^\circ - 30^\circ$

$2\angle B = 150^\circ$

$\angle B = \frac{150^\circ}{2}$

$\angle B = 75^\circ$

$\angle A = 75^\circ + 30^\circ$

$\angle A = 105^\circ$

$$2\overline{)150} \quad 75,\ 14,\ 10,\ 10,\ 0$$

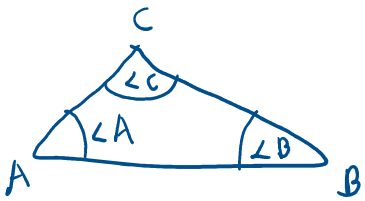
The two angles are 75 degrees and 105 degrees.

Memorize

Sum of the Measures of the Angles of a Triangle

For any ΔABC, the sum of the measures of the angles is $180°$.

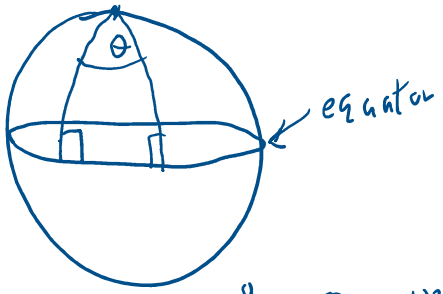
$m\angle A + m\angle B + m\angle C = 180°$



$\angle A + \angle B + \angle C = 180^\circ$

This theorem is true for any triangle in the plane.

N = north pole



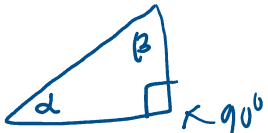
Sphere

non-Euclidean geometry (not required in MTH 111)

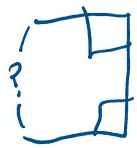
$\theta + 90^\circ + 90^\circ = \theta + 180^\circ > 180^\circ$

Memorize

Definition: a right triangle is a triangle containing a right angle, which is 90°.



$\alpha + \beta = 90^\circ$

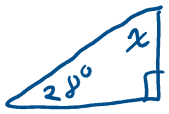


Impossible triangle

EXAMPLE 4

One angle of a right triangle measures 28°. What is the measure of the third angle?

Let x = 3rd angle



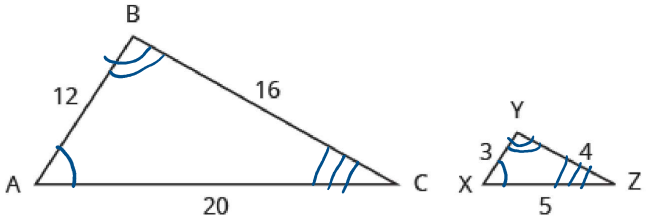
$x + 28^\circ = 90^\circ$

$x = 90^\circ - 28^\circ$

$x = 62^\circ$

The 3rd angle is 62°

ΔABC and ΔXYZ are similar triangles. Their corresponding sides have the same ratio and the corresponding angles have the same measure.



$m\angle A = m\angle X$
$m\angle B = m\angle Y$
$m\angle C = m\angle Z$

$\frac{16}{4} = \frac{20}{5} = \frac{12}{3}$

$\frac{BC}{YZ} = \frac{16}{4} = 4$, $\frac{AB}{XY} = \frac{12}{3} = 4$

$\frac{AB}{BC} = \frac{12}{16} = \frac{3}{4}$ $\frac{XY}{YZ} = \frac{3}{4}$

Triangle ABC is similar to triangle XYZ is written $\Delta ABC \sim \Delta XYZ$

Memorize

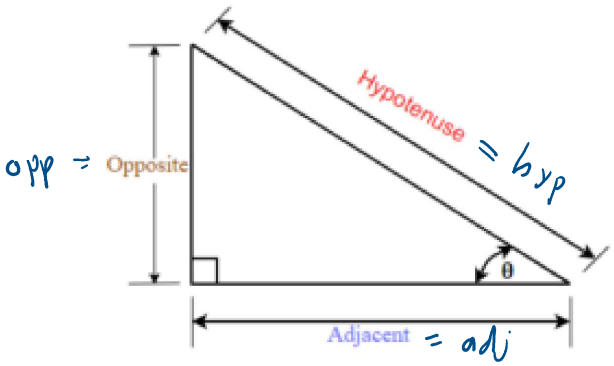
The Pythagorean Theorem

In any right triangle ΔABC,
$a^2 + b^2 = c^2$

Converse: If in a ΔABC, *with sides* a, b, c,
if $a^2 + b^2 = c^2$, *then* ΔABC is a right triangle.

5.2
Memorize

θ = theta



Memorize

Three Basic Trigonometric Ratios

- sine θ = $\frac{\text{the length of the opposite side}}{\text{the length of the hypotenuse side}}$ $= \frac{opp}{hyp}$
- cosine θ = $\frac{\text{the length of the adjacent side}}{\text{the length of the hypotenuse side}}$ $= \frac{adj}{hyp}$
- tangent θ = $\frac{\text{the length of the opposite side}}{\text{the length of the adjacent side}}$ $= \frac{opp}{adj}$ $= \frac{\sin\theta}{\cos\theta}$

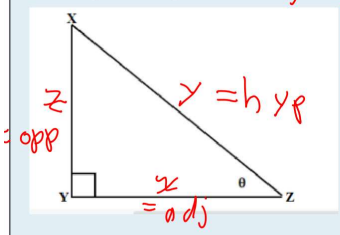
Where θ is the measure of a reference angle measured in degrees.

- $\sin\theta = \frac{\text{opp}}{\text{hyp}}$
- $\cos\theta = \frac{\text{adj}}{\text{hyp}}$
- $\tan\theta = \frac{\text{opp}}{\text{adj}}$

Some people remember the definition of the trigonometric ratios as SOH CAH TOA.

TRY IT 2

For the given triangle find the sine, cosine and tangent ratio.

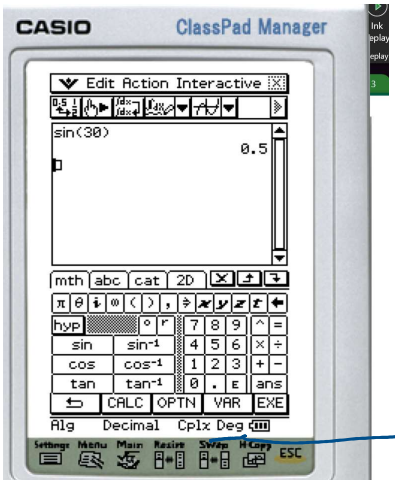


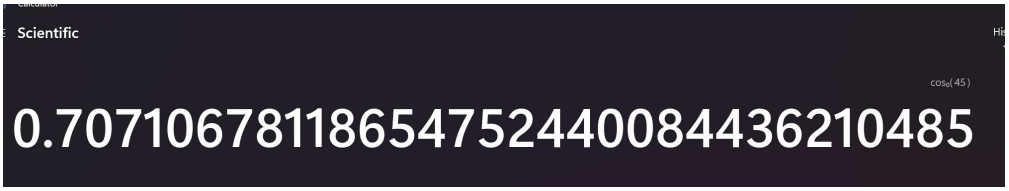
Show answer

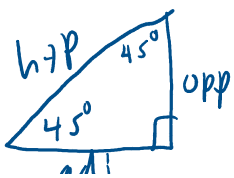
$\sin\theta = \frac{z}{y}$

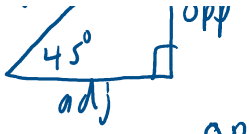
$\cos\theta = \frac{x}{y}$

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



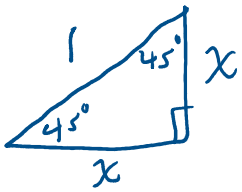






$\tan 45^\circ = \frac{opp}{adj} = \frac{1}{1} = 1$

$\sin 45^\circ =$



Pythagorean Theorem $\Rightarrow x^2 + x^2 = 1^2$

$2x^2 = 1$

$x^2 = \frac{1}{2}$

$x = \pm\sqrt{\frac{1}{2}}$

$x = \pm\frac{\sqrt{1}}{\sqrt{2}}$

$\boxed{x = \pm\frac{1}{\sqrt{2}}}$

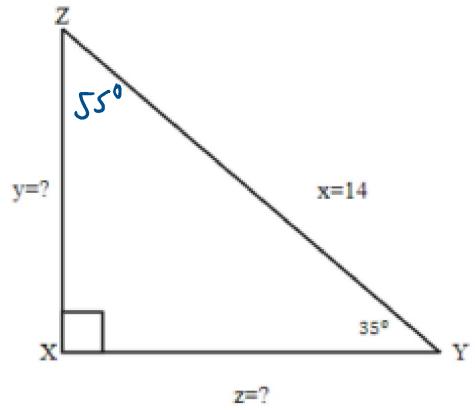
$\sin 45^\circ = \frac{x}{1} = x = \frac{1}{\sqrt{2}} \approx 0.707$

1/sqrt(2)=0.707106781186547

OR $45^\circ = \frac{1}{\sqrt{2}} \approx 0.707$

Find the missing sides. Round your final answer to two decimal places

Use calculator



$\angle Z = 90^\circ - 35^\circ$

$\boxed{\angle Z = 55^\circ}$

$\sin 35^\circ = \frac{\text{opp}}{\text{hyp}} = \frac{y}{14}$

$y = 14 \sin 35^\circ \approx \boxed{8.03}$

```
14*sin(35)
                    8.030070109
```

$z^2 + y^2 = 14^2$

$z^2 \approx 14^2 - 8.03^2$

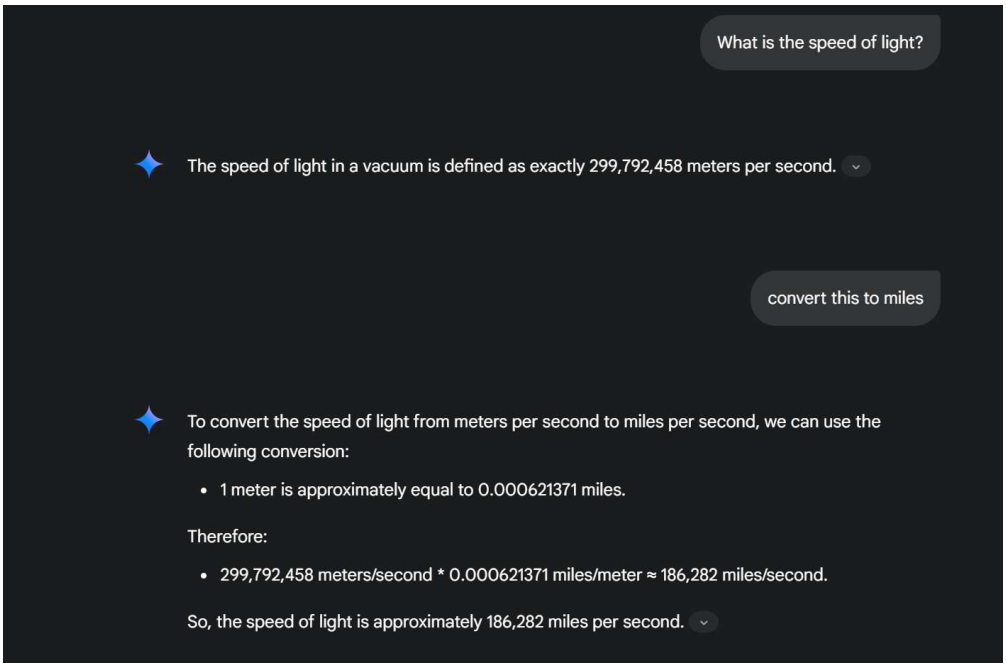
$z \approx \sqrt{14^2 - 8.03^2} \approx \boxed{11.47}$

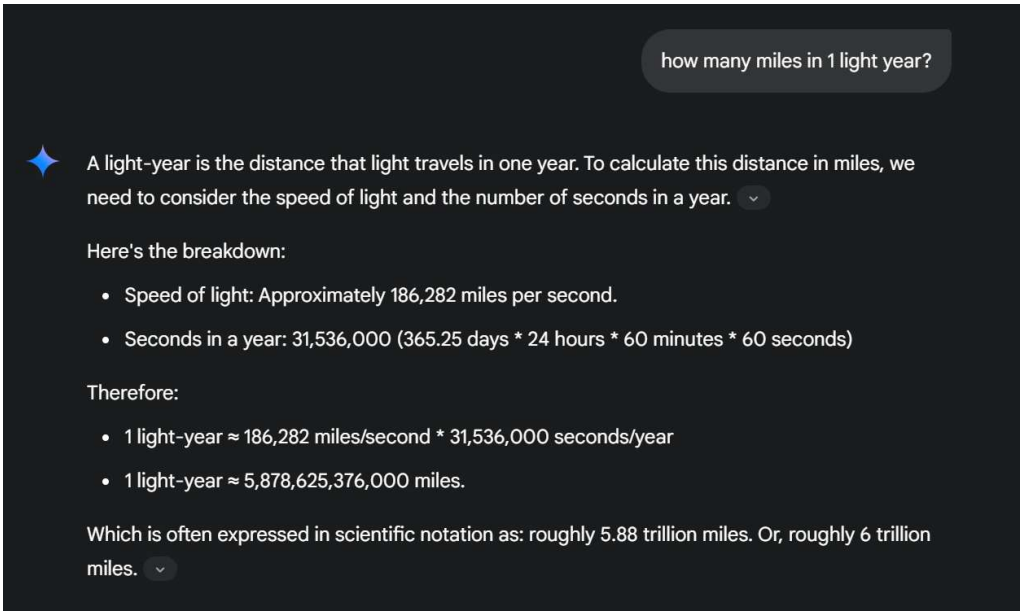
```
√(14^2-8.03^2
                   11.46817771
```

$\cos 35^\circ = \frac{\text{adj}}{\text{hyp}} = \frac{z}{14}$

$z = 14 \cos(35^\circ) \approx \boxed{11.47}$

```
14*cos(35)
                   11.46812862
```





Memorize

Solving a triangle means : given some sides and angles of a triangle, find the missing sides and angles.

6.1

Imperial System of Measurement

1 foot (ft.) = 12 inches (in.)	3 teaspoons (t) = 1 tablespoon (T) 16 tablespoons (T) = 1 cup (C) 1 cup (C) = 8 fluid ounces (fl. oz.)

Length	1 foot (ft.)	=	12 inches (in.)	Volume	3 teaspoons (t)	=	1 tablespoon (T)
	1 yard (yd.)	=	3 feet (ft.)		16 tablespoons (T)	=	1 cup (C)
	1 mile (mi.)	=	5, 280 feet (ft.)		1 cup (C)	=	8 fluid ounces (fl. oz.)
					1 pint (pt.)	=	2 cups (C)
					1 quart (qt.)	=	2 pints (pt.)
					1 gallon (gal)	=	4 quarts (qt.)
Weight	1 pound (lb.)	=	16 ounces (oz.)	Time	1 minute (min)	=	60 seconds (sec)
	1 ton	=	2000 pounds (lb.)		1 hour (hr)	=	60 minutes (min)
					1 day	=	24 hours (hr)
					1 week (wk)	=	7 days
					1 year (yr)	=	365 days

memorize

$$66 \text{ inches} \cdot \frac{1 \text{ foot}}{12 \text{ inches}} \quad \text{or} \quad 66 \text{ inches} \cdot \frac{12 \text{ inches}}{1 \text{ foot}}$$

The first form works since 66 inches $\cdot \frac{1 \text{ foot}}{12 \text{ inches}}$.

Metric System of Measurement

Length	**Mass**	**Capacity** (volume)
1 kilometre (km) = 1,000 m	1 kilogram (kg) = 1,000 g	1 kilolitre (kL) = 1,000 L
1 hectometre (hm) = 100 m	1 hectogram (hg) = 100 g	1 hectolitre (hL) = 100 L
1 dekametre (dam) = 10 m	1 dekagram (dag) = 10 g	1 dekalitre (daL) = 10 L
1 metre (m) = 1 m	1 gram (g) = 1 g	1 litre (L) = 1 L
1 decimetre (dm) = 0.1 m	1 decigram (dg) = 0.1 g	1 decilitre (dL) = 0.1 L
1 centimetre (cm) = 0.01 m	1 centigram (cg) = 0.01 g	1 centilitre (cL) = 0.01 L
1 millimetre (mm) = 0.001 m	1 milligram (mg) = 0.001 g	1 millilitre (mL) = 0.001 L
	1 microgram (mcg) = 0.000001 g	
1 metre = 100 centimetres	1 gram = 100 centigrams	1 litre = 100 centilitre s
1 metre = 1,000 millimetres	1 gram = 1,000 milligrams	1 litre = 1,000 millilitre s

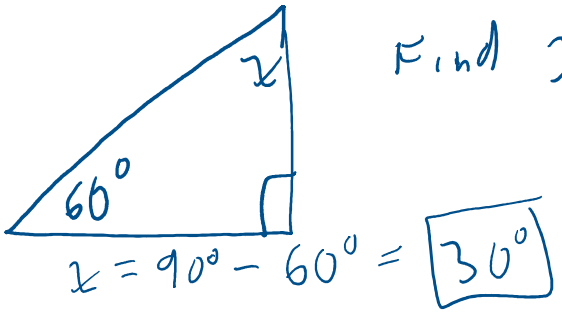
supplied

Conversion Factors Between Imperial and Metric Systems

Length	Mass	Capacity
1 in. = 2.54 cm 1 ft. = 0.305 m 1 yd. = 0.914 m 1 mi. = 1.61 km 1 m = 3.28 ft.	1 lb. = 0.45 kg 1 oz. = 28 g 1 kg = 2.2 lb.	1 qt. = 0.95 L 1 fl. oz. = 30 mL 1 L = 1.06 qt.

Quiz 5

1.



Find x

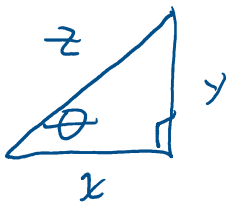
$x = 90° - 60° = \boxed{30°}$

2. Let $y = -6x + 12$.

Find the slope and y-intercept of the line.

This equation is already in slope-intercept form y = mx+b,
with m = slope and b = y-intercept.
Thus, slope = -6 and y-intercept = 12 , or the point (0,12).

3. Find $\sin(\theta)$.



$\sin\theta = \frac{opp}{hyp} = \boxed{\frac{y}{z}}$