We made it to the end of the year :)

Class Plan

1. Warm-ups
   *Unit 1: Linear
   *Unit 2: Coordinate Geometry (Vectors)
   *Unit 3: Similarity & Trigonometry
2. Briefly go over notes
3. Practice

Unit 1: Warm-up:

Write the slope - intercept form of the equation of the line described.

7) through: $(1, -1)$, perp. to $y = -\frac{1}{2}x + 1$

Unit 1: Warm-up:

Write the slope - intercept form of the equation of the line described.

7) through: $(1, -1)$, perp. to $y = -\frac{1}{2}x + 1$

$\perp m = 2$

$y = 2x + b$

$-1 = 2(1) + b$

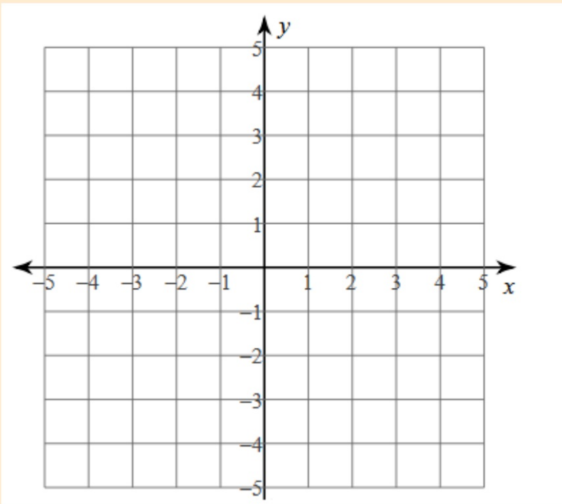
$-1 = 2 + b$

$-3 = b$

$y = 2x - 3$

Unit 1: Warm-up:

Solve the system of equations.

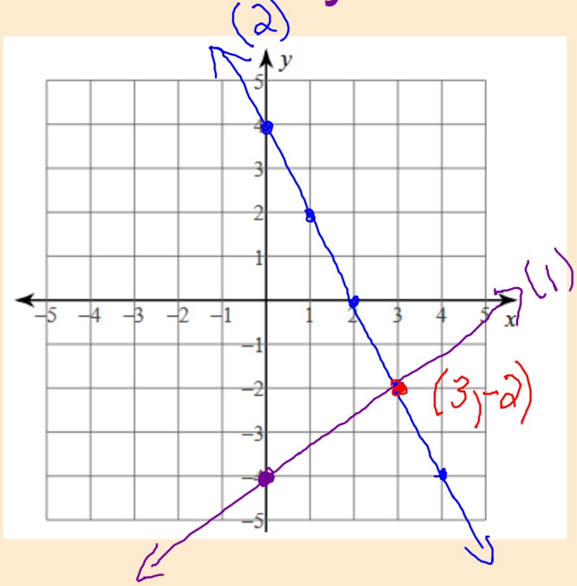


10) $y = \frac{2}{3}x - 4$

$y = -2x + 4$

Unit 1: Warm-up:

Solve the system of equations.



10) $y = \frac{2}{3}x - 4$ (1)

$y = -2x + 4$ (2)

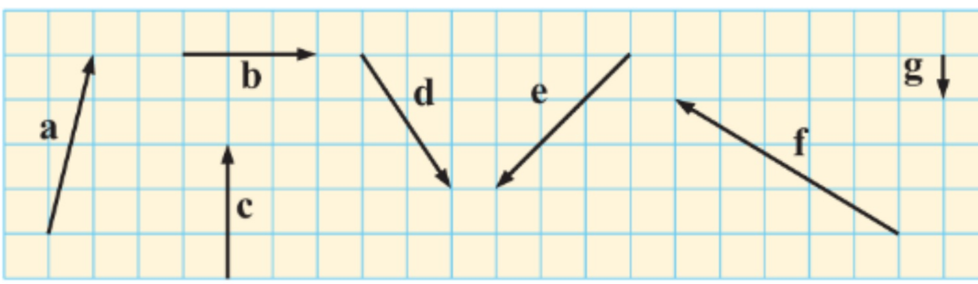
$m = \frac{2}{3}$ $b = -4$

$m = -\frac{2}{1}$ $b = 4$

(3, -2)

Unit 2: Warm-up:

Write each vector in the form $\begin{pmatrix} x \\ y \end{pmatrix}$:



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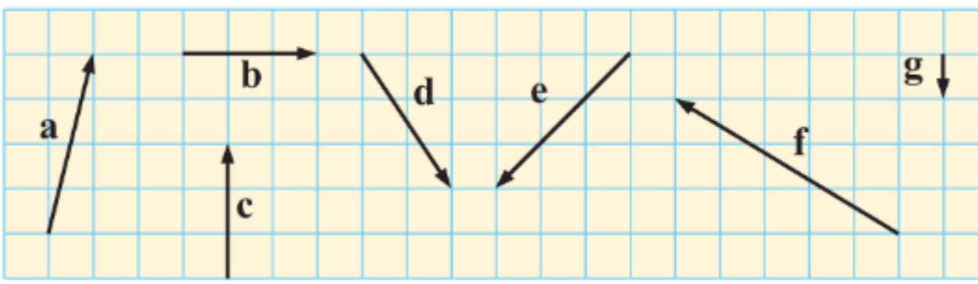
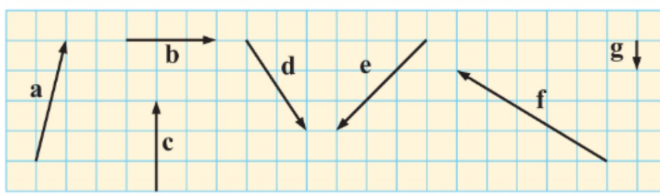


2 $\mathbf{a} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$, $\mathbf{c} = \begin{pmatrix} 0 \\ 3 \end{pmatrix}$, $\mathbf{d} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$,

$\mathbf{e} = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$, $\mathbf{f} = \begin{pmatrix} -5 \\ 3 \end{pmatrix}$, $\mathbf{g} = \begin{pmatrix} 0 \\ -1 \end{pmatrix}$

Unit 2: Warm-up:

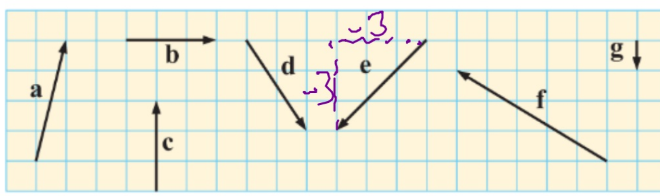
Write each vector in the form $\begin{pmatrix} x \\ y \end{pmatrix}$:



What is the magnitude of vector e?

Unit 2: Warm-up:

Write each vector in the form $\begin{pmatrix} x \\ y \end{pmatrix}$:

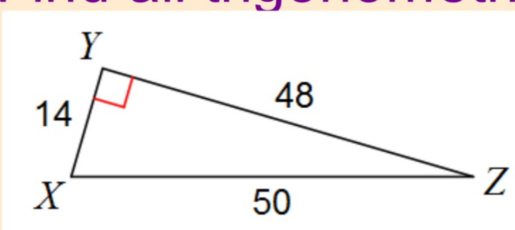


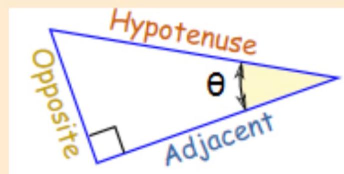
What is the magnitude of vector e?

$\vec{e} = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$ $|\vec{e}| = \sqrt{(-3)^2 + (-3)^2} = \sqrt{18} = 3\sqrt{2}$

Unit 3: Warm-up:

Find all trigonometric ratios of angle ***X***.





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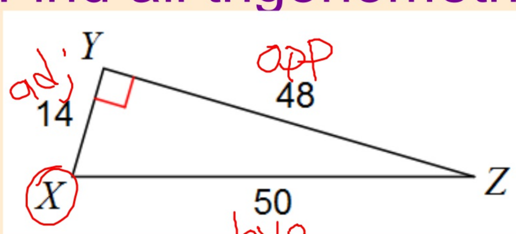
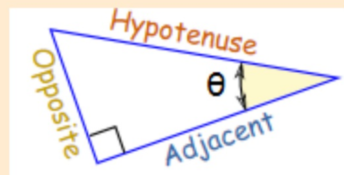




$\sin X = \frac{opp}{hyp} = \frac{48}{50} = \frac{24}{25}$

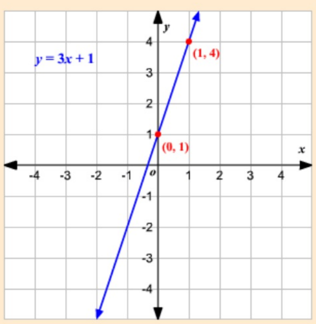
$\cos X = \frac{adj}{hyp} = \frac{14}{50} = \frac{7}{25}$

$\tan X = \frac{opp}{adj} = \frac{48}{14} = \frac{24}{7}$

E THE EQUATION OF A LINE

The **equation of a line** is a rule which connects the x and y-coordinates of **all** points on the line.

The equation of a line defines all *coordinate pairs* (points) on the line.



The equation also gives us a quick way to check if a specific point is on the line.

There are multiple forms of writing the equation of a line...Why?

Two our book uses:

- Gradient-Intercept Form (Slope-Intercept)

$$y = mx + c$$

- General Form

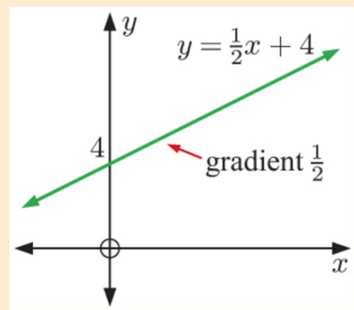
$$Ax + By = C$$

Gradient-Intercept Form

$$y = mx + c$$

gradient (slope) → m

y-intercept → c



Useful for...

- Graphing
- Quickly finding a slope and/or *y*-int.
- Decent for finding *y*'s from *x*'s.

General Form

$Ax + By = C$ (*A*, *B*, and *C* are coefficients.)

Examples: $4x + 5y = 3$ and $x - 3y = -4$

Generally written with positive coefficient of *x*.

Benefits:

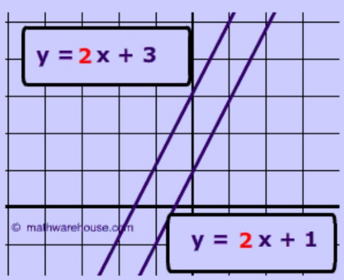
- Can quickly find *x* and *y*-intercepts.
- Can write equations without fractions/decimals.

Parallel and Perpendicular Lines

-- Example of Parallel Lines --

As you can see from the diagram below, these lines

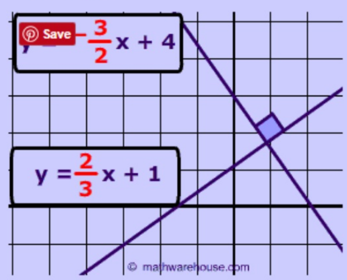
- have the same slope
  - 2
- are never going to intersect



Example of Perpendicular ----------- Lines -----------

As you can see from the picture below:

- the slope of these lines are negative reciprocals
  - $\frac{2}{3}$ and $-\frac{3}{2}$ are negative reciprocals
- these lines are perpendicular and intersect at 90 degrees

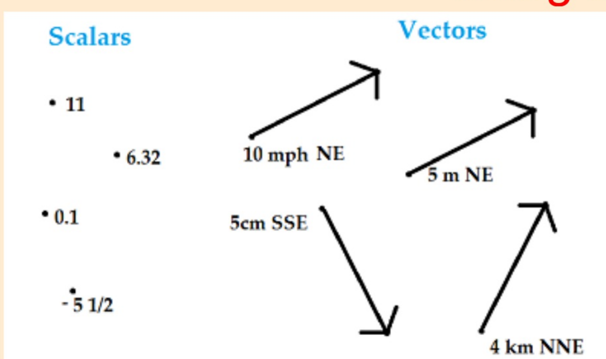


http://www.mathwarehouse.com/algebra/linear_equation/parallel-perpendicular-lines.php

Definition:

Vector - A quantity that has both size *and* direction.

*Represented using an arrow



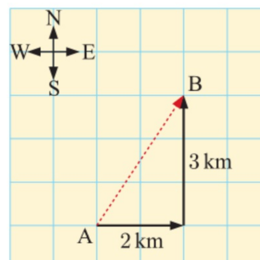
Scalars - quantities that are represented by a single number

Ex: Length, Area, Volume, Time, Speed, etc.

Application:

DISTANCE AND DISPLACEMENT

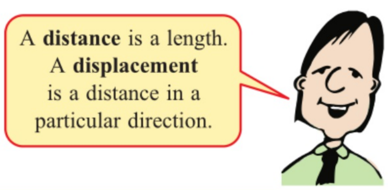
A ship starts at point A. It sails to point B which is 2 km to the east and 3 km to the north of A.



The **displacement vector** of the ship is $\overrightarrow{AB} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$.

The **distance** travelled by the ship is $|\overrightarrow{AB}| = \sqrt{2^2 + 3^2}$

$= \sqrt{13}$ km.

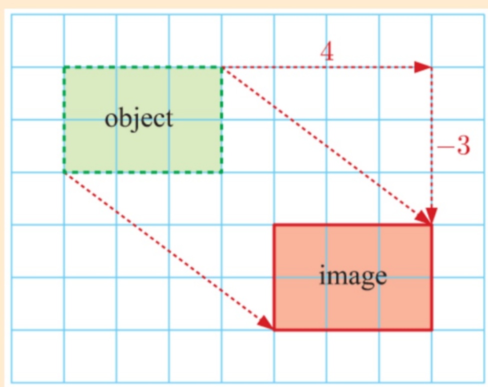


Vectors - Length and Direction

Direction (Notation)

This object has been translated 4 units right and 3 units down.

We can describe the translation using the **translation vector** $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ ← horizontal movement, ← vertical movement $\begin{pmatrix} x \\ y \end{pmatrix}$



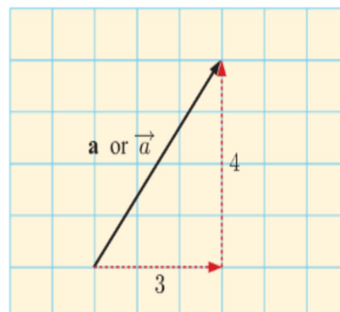
Direction (Notation)

A vector quantity can be represented using a small arrow over a lower case letter.

However, in textbooks we use a bold lower case letter.

For example, in the diagram alongside, the illustrated vector $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ is denoted **a** or $\overrightarrow{a}$.

We write $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ or $\overrightarrow{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$.



An arrowhead is used to show the direction of the vector. The non-arrow end is the **start** of the vector, and the arrowhead end is the **end** of the vector.

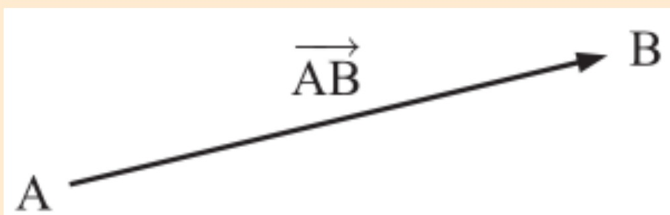
$$\begin{pmatrix} x \\ y \end{pmatrix}$$

We can think of vectors as a matrix with 2 rows and 1 column (also called a "column matrix").

Direction (Notation)

Another way to represent a vector is by referring to its end points.

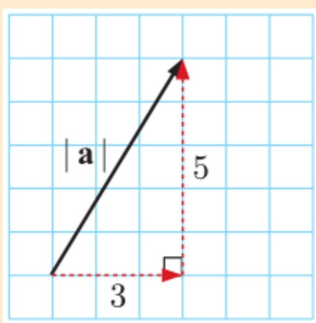
If we label the end points A and B, then $\overrightarrow{AB}$ is the vector from point A to point B.



Notice: $\overrightarrow{AB}$ is different than $\overrightarrow{BA}$

Magnitude: The "length" of vector

"Magnitude of vector *a*" is written as: $\left| \vec{a} \right|$



$$|\mathbf{a}|^2 = 3^2 + 5^2 \qquad \{\text{Pythagoras}\}$$

$$\therefore \quad |\mathbf{a}| = \sqrt{3^2 + 5^2} \qquad \{\text{as} \quad |\mathbf{a}| > 0\}$$

$$= \sqrt{34} \text{ units}$$

TI-84: Solving Matrices
(Systems of Equations)

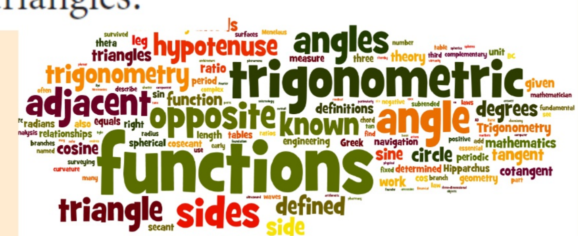
***Note: Quit between steps

Driving Questions...

What is trigonometry?

What are the different trig ratios and how are they related?

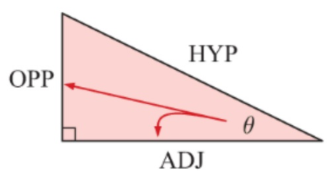
Trigonometry is the study of the relationships between the sides and the angles of triangles. In this lesson you will discover some of these relationships for right triangles.



A LABELLING RIGHT ANGLED TRIANGLES

Textbook Diagram

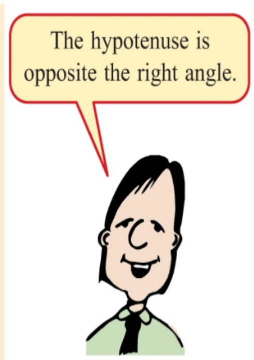
In trigonometry, there is a convention for labelling the sides of a right angled triangle.



For the right angled triangle with angle θ:

- the **hypotenuse (HYP)** is the longest side
- the **opposite (OPP)** side is opposite θ
- the **adjacent (ADJ)** side is adjacent to θ.

Remember:

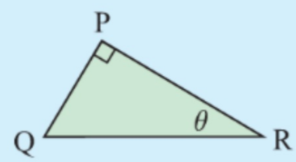


A LABELLING RIGHT ANGLED TRIANGLES

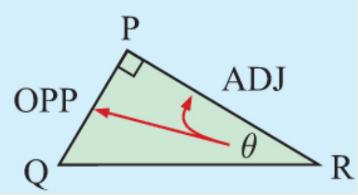
Example 1 **Self Tutor**

For the triangle alongside, name the:

a hypotenuse
b side opposite θ
c side adjacent to θ.

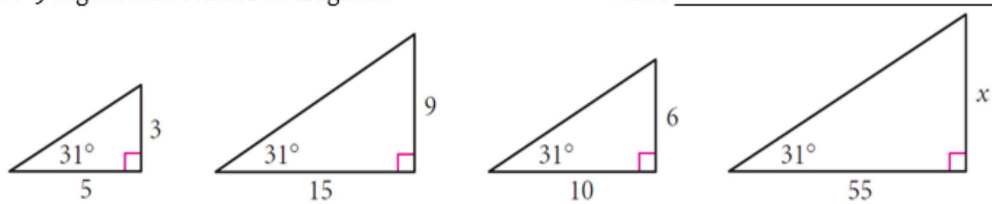


a The hypotenuse is [QR].
b The side opposite θ is [PQ].
c The side adjacent to θ is [PR].



Right Triangle Trigonometry

MYP 9 Trigonometric Ratios Investigation Name ______________________

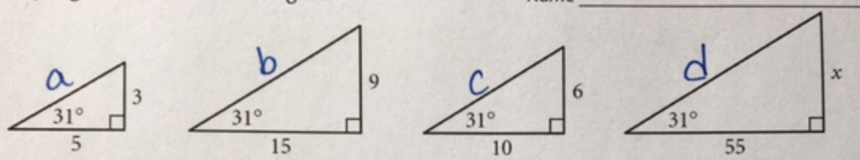


1. The four triangles above are similar. Which corresponding pairs of angles show the similarity?

2. What is a fair approximation of x? Explain your reasoning.

3. Solve for the hypotenuse lengths and label the triangles in the table below.
   [**Challenge:** Write the hypotenuses in ***exact radical form.*** What patterns do you notice?

MYP 9 Trigonometric Ratios Investigation Name ____________________



1. The four triangles above are similar. Which corresponding pairs of angles show the similarity?

$\angle 31^\circ = \angle 31^\circ$ $\quad 90^\circ = 90^\circ$

2. What is a fair approximation of x? Explain your reasoning.

$\frac{3}{5} = \frac{x}{55}$ $\quad 5x = 3(55)$ $\quad 5x = 165$ $\quad \boxed{x = 33}$

3. Solve for the hypotenuse lengths and label the triangles in the table below.
[**Challenge:** Write the hypotenuses in ***exact radical form***. What patterns do you notice?]

$a = \sqrt{3^2+5^2}$

$\boxed{a = \sqrt{34}}$

$b = \sqrt{9^2+15^2}$

$b = \sqrt{81+225}$

$b = \sqrt{306} = \boxed{3\sqrt{34}}$

$c = \sqrt{6^2+10^2}$

$c = \sqrt{36+100}$

$c = \sqrt{136}$

$c = \sqrt{4 \cdot 34}$

$\boxed{c = 2\sqrt{34}}$

$d = \sqrt{55^2+33^2}$

$d = \sqrt{3025+1089}$

$d = \sqrt{4114}$

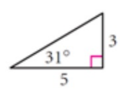
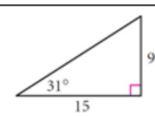
$d = \sqrt{121 \cdot 34}$

$\boxed{d = 11\sqrt{34}}$

All multiples of $\sqrt{34}$!

Right Triangle Trigonometry

4. Solve for the **ratios of the side lengths,** in relation to the 31 degree angle. Round to the nearest 0.01

Table 1 ***Most common*** Trigonometric Ratios			
$\frac{opposite}{hypotenuse}$			
$\frac{adjacent}{hypotenuse}$			
$\frac{opposite}{adjacent}$			

$C = \sqrt{9 \cdot 34}$	$C = \sqrt{4 \cdot 34}$	$C = \sqrt{121 \cdot 34}$
$C = 3\sqrt{34}$	$C = 2\sqrt{34}$	$C = 11\sqrt{34}$

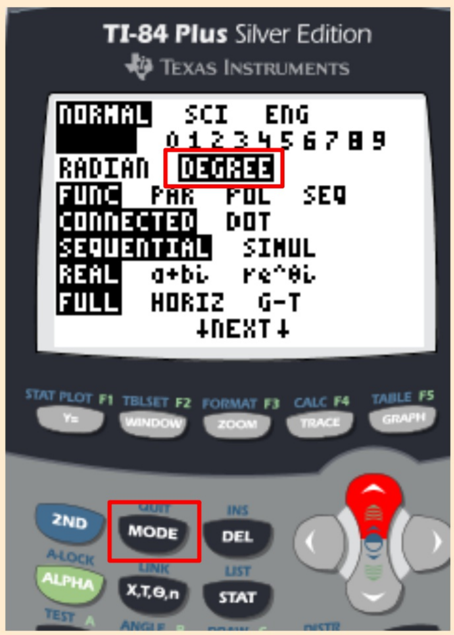
4. Solve for the **ratios of the side lengths,** in relation to the 31 degree angle. Round to the nearest 0.01

Table 1 **Most common** Trigonometric Ratios	$\sqrt{34}$, 3, 31°, 5	$3\sqrt{34}$, 9, 31°, 15	$2\sqrt{34}$, 6, 31°, 10
sin(31) = $\frac{opposite}{hypotenuse}$	$\frac{3}{\sqrt{34}} \approx .51$	$\frac{9}{3\sqrt{34}} \approx .51$	$\frac{6}{2\sqrt{34}} \approx .51$
cos(31) = $\frac{adjacent}{hypotenuse}$	$\frac{5}{\sqrt{34}} \approx .86$	$\frac{15}{3\sqrt{34}} \approx .86$	$\frac{10}{2\sqrt{34}} \approx .86$
tan(31) = $\frac{opposite}{adjacent}$	$\frac{3}{5} = .6$	$\frac{9}{15} = .6$	$\frac{6}{10} = .6$

If the three ratios above are familiar to you, then continue with table 2.

MODE: DEGREE

GRAPHICS CALCULATOR INSTRUCTIONS

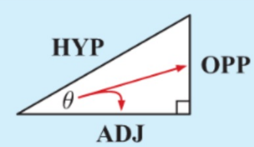


C FINDING SIDE LENGTHS

Suppose we are given the angles of a right angled triangle, and the length of a side. We can use the trigonometric ratios to find the other side lengths.

In any right angled triangle with one angle θ, we have:

$$\sin\theta = \frac{\textbf{OPP}}{\textbf{HYP}}, \quad \cos\theta = \frac{\textbf{ADJ}}{\textbf{HYP}}, \quad \tan\theta = \frac{\textbf{OPP}}{\textbf{ADJ}}$$



Step 1: Redraw the figure and mark on it HYP, OPP, and ADJ relative to a given angle.

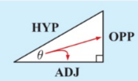
Step 2: Choose an appropriate trigonometric ratio, and construct an equation.

Step 3: Solve the equation to find the unknown side length.

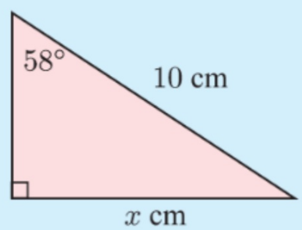
Example:

In any right angled triangle with one angle θ, we have:

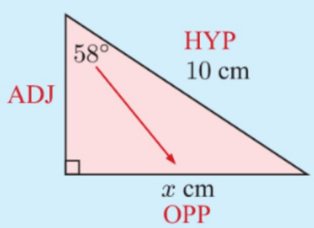
$\sin\theta = \frac{\textbf{OPP}}{\textbf{HYP}}$, $\cos\theta = \frac{\textbf{ADJ}}{\textbf{HYP}}$, $\tan\theta = \frac{\textbf{OPP}}{\textbf{ADJ}}$



Find x, giving your answer rounded to 2 decimal places:



The relevant sides are OPP and HYP, so we use the *sine* ratio.



$$\sin 58^\circ = \frac{x}{10} \quad \{\sin\theta = \frac{\text{OPP}}{\text{HYP}}\}$$

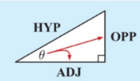
$$\therefore \sin 58^\circ \times 10 = x \quad \{\text{multiplying both sides by 10}\}$$

$$\therefore x \approx 8.48 \quad \{\text{calculator}\}$$

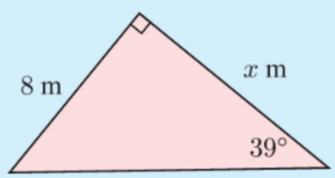
Example:

In any right angled triangle with one angle θ, we have:

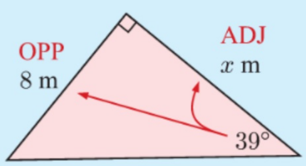
$\sin\theta = \frac{\text{OPP}}{\text{HYP}}, \quad \cos\theta = \frac{\text{ADJ}}{\text{HYP}}, \quad \tan\theta = \frac{\text{OPP}}{\text{ADJ}}$



Find x, giving your answer rounded to 2 decimal places:



The relevant sides are OPP and ADJ, so we use the *tangent* ratio.



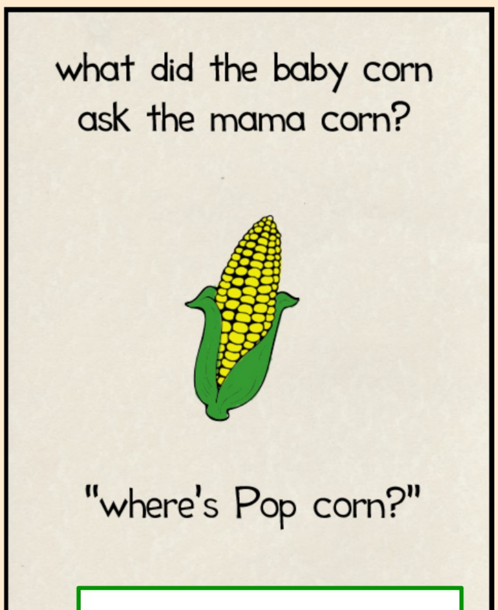
$$\tan 39° = \frac{8}{x} \qquad \{\tan\theta = \frac{\text{OPP}}{\text{ADJ}}\}$$

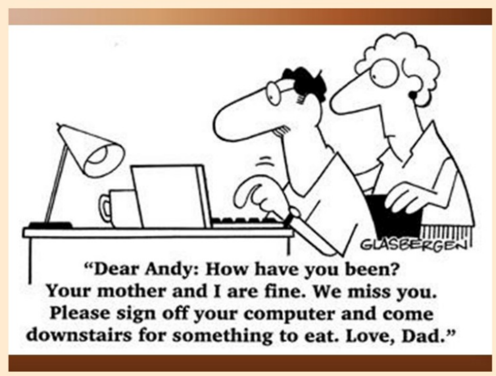
$$\therefore \ x \times \tan 39° = 8 \qquad \{\text{multiplying both sides by } x\}$$

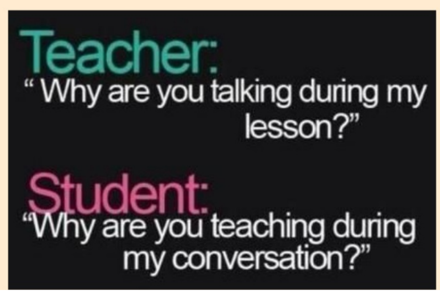
$$\therefore \ x = \frac{8}{\tan 39°} \qquad \{\text{dividing both sides by } \tan 39°\}$$

$$\therefore \ x \approx 9.88 \qquad \{\text{calculator}\}$$

Jokes for the day :)

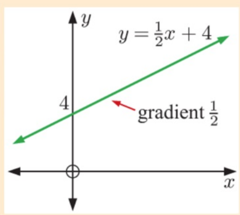






MYP Math 9 - Final Review

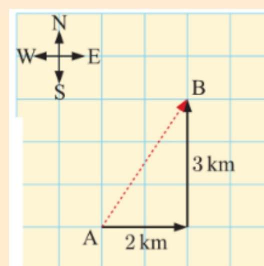
Do: Unit 1, 2, & 3 Review Handout



The **displacement vector** of the ship is $\overrightarrow{AB} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$.

The **distance** travelled by the ship is $|\overrightarrow{AB}| = \sqrt{2^2 + 3^2}$
$= \sqrt{13}$ km.

Solutions posted on Weebly under FINAL REVIEW



Done? Get Units 4 - 6 Handouts

Unit 1: Linear Functions

Write the slope-intercept form of the equation of each line.

1) $3x + 7y = -21$

2) $2x + y = 4$

Unit 1: Linear Functions

Write the slope-intercept form of the equation of the line through the given points.

3) through: $(1, -2)$ and $(-5, -4)$

Unit 1: Linear Functions

Write the slope-intercept form of the equation of the line through the given points.

4) through: $(3, -2)$ and $(-1, 2)$

Unit 1: Linear Functions

Write the slope-intercept form of the equation of the line described.

5) through: $(5, 4)$, parallel to $y = \frac{1}{8}x - 2$

Unit 1: Linear Functions

Write the slope-intercept form of the equation of the line described.

6) through: $(0, 3)$, parallel to $y = 3x + 5$

Unit 1: Linear Functions

Write the slope-intercept form of the equation of the line described.

7) through: $(1, -1)$, perp. to $y = -\frac{1}{2}x + 1$

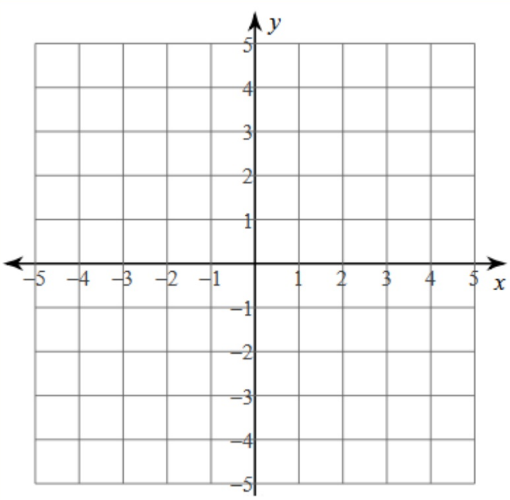
Unit 1: Linear Functions

Write the slope-intercept form of the equation of the line described.

8) through: $(-5, -2)$, perp. to $y = -\frac{5}{6}x$

Unit 1: Linear Functions

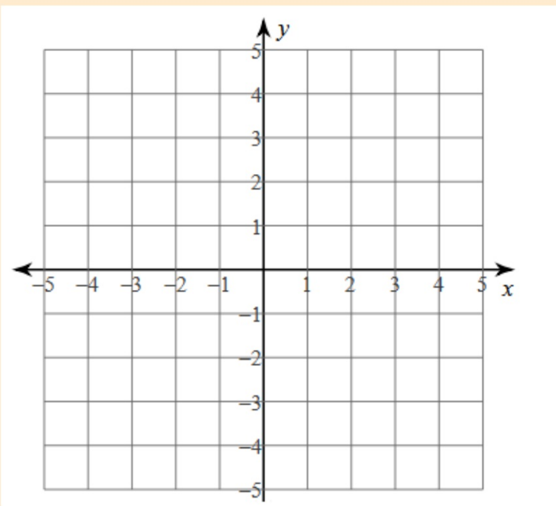
Solve each system by graphing.



9) $y = -x + 3$

$y = 4$

Unit 1: Linear Functions



10) $y = \frac{2}{3}x - 4$

$y = -2x + 4$

Unit 1: Linear Functions

Solve each system by substitution.

11) $y = -8x + 12$
$2x + 6y = -20$

Unit 1: Linear Functions

Solve each system by substitution.

12) $y = -7x - 12$
$8x + 5y = -6$

Unit 1: Linear Functions

Solve each system by elimination.

13) $-6x - 4y = -2$
$-12x - 9y = -3$

Unit 1: Linear Functions

Solve each system by elimination.

14) $-5x - 6y = -17$
$-6x - 7y = -20$

Unit 1: Linear Functions

15) Yellowstone National Park is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 10 vans and 2 buses with 134 students. High School B rented and filled 5 vans and 7 buses with 259 students. Each van and each bus carried the same number of students. Find the number of students in each van and in each bus.

Unit 1: Linear Functions

16) $y = 3x + 4z - 25$

$-6x - 5y + z = -29$

$-3x + 2y + 2z = 23$

A) $(7, 6, 1)$ B) $(1, 6, 7)$

C) $(-1, 5, 7)$ D) $(1, 7, 6)$

Unit 1: Linear Functions

17) $y = x + z + 5$
$4y - 4z = 16$
$-2x + 5y - 5z = 22$

A) Infinitely many solutions
B) $(2, 2, -7)$
C) $(-7, 2, 2)$
D) $(7, -1, 3)$

Unit 1: Linear Functions

Short answers to 1 - 17

Answers to Review - MYP Math 9 - Extended Level (ID: 1)

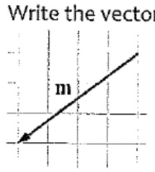
1) $y = -\frac{3}{7}x - 3$	2) $y = -2x + 4$	3) $y = \frac{1}{3}x - \frac{7}{3}$	4) $y = -x + 1$
5) $y = \frac{1}{8}x + \frac{27}{8}$	6) $y = 3x + 3$	7) $y = 2x - 3$	8) $y = \frac{6}{5}x + 4$
9) $(-1, 4)$	10) $(3, -2)$	11) $(2, -4)$	12) $(-2, 2)$
13) $(1, -1)$	14) $(1, 2)$	15) Van: 7, Bus: 32	16) B

17)A

Unit 2: Coordinate Geometry (Vectors)

Vector Review

1) Vectors are graphed below.
Write the vectors in component form.



Unit 2: Coordinate Geometry (Vectors)

2) Given vectors $\vec{a}$, and $\vec{b}$. $\vec{a}=\begin{pmatrix}1\\-4\end{pmatrix}$, $\vec{b}=\begin{pmatrix}3\\-2\end{pmatrix}$.

Find $3\vec{b}-4\vec{a}$ algebraically.

Unit 2: Coordinate Geometry (Vectors)

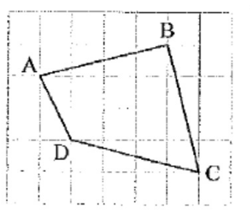
3)

Find the length of:

a $\begin{pmatrix} 2 \\ 7 \end{pmatrix}$ **b** $\begin{pmatrix} 0 \\ -5 \end{pmatrix}$ **c** $\begin{pmatrix} -8 \\ -3 \end{pmatrix}$

Unit 2: Coordinate Geometry (Vectors)

4)



a Find in component form:

i $\overrightarrow{BC}$ **ii** $\overrightarrow{BD}$

b Simplify $\overrightarrow{AD} + \overrightarrow{DC}$.

c Find $|\overrightarrow{AC}|$.

Unit 2: Coordinate Geometry (Vectors)

5) Show that $\begin{pmatrix} -2 \\ 4 \end{pmatrix}\begin{pmatrix} 8 \\ 4 \end{pmatrix}$ is orthogonal

The Dot Product

$$\begin{pmatrix} a \\ b \end{pmatrix} \cdot \begin{pmatrix} c \\ d \end{pmatrix} = ac + bd$$

dot product!

To find the dot product of two vectors we multiply their *x*-components and the *y*-components, then take the sum.

Unit 2: Coordinate Geometry (Vectors)

6) Simplify.

$$\begin{pmatrix} 8 \\ 2 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix} - \begin{pmatrix} 5 \\ -1 \end{pmatrix}$$

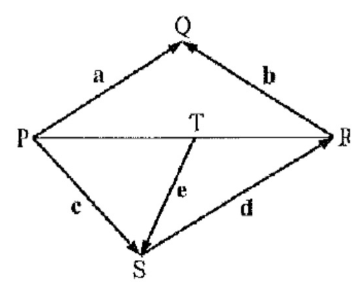
Unit 2: Coordinate Geometry (Vectors)

7)

Find in terms of **a**, **b**, **c**, **d**, and **e**:

a $\overrightarrow{TR}$ **b** $\overrightarrow{PR}$

c $\overrightarrow{PT}$ **d** $\overrightarrow{TQ}$



Unit 2: Coordinate Geometry (Vectors)

8) Given the four vectors

$\vec{a}$, $\vec{b}$, $\vec{c}$, and $\vec{d}$. $\vec{a}=\begin{pmatrix}-1\\2\end{pmatrix}$, $\vec{b}=\begin{pmatrix}4\\2\end{pmatrix}$, $\vec{c}=\begin{pmatrix}-4\\-2\end{pmatrix}$ $\vec{d}=\begin{pmatrix}-12\\24\end{pmatrix}$

a) Show ***at least*** one pair of vectors that are parallel.

b) Show ***at least*** one pair of vectors that are orthogonal.

c) Which pair of vectors are ***opposite vectors***?

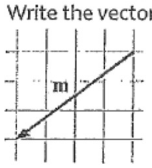
Unit 2: Coordinate Geometry (Vectors)

Answers to 1 - 11

Unit 2 Review Solutions

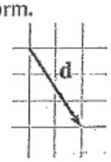
Vector Review

1) Vectors are graphed below.
Write the vectors in component form.



$m = \begin{pmatrix} -4 \\ -3 \end{pmatrix}$

$d = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$



2) Given vectors $\vec{a}$, and $\vec{b}$. $\vec{a} = \begin{pmatrix} 1 \\ -4 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$.

Find $3\vec{b} - 4\vec{a}$ algebraically.

$3\begin{pmatrix} 3 \\ -2 \end{pmatrix} - 4\begin{pmatrix} 1 \\ -4 \end{pmatrix} = \begin{pmatrix} 9 \\ -6 \end{pmatrix} - \begin{pmatrix} 4 \\ -16 \end{pmatrix}$

$= \boxed{\begin{pmatrix} 5 \\ 10 \end{pmatrix}}$

3)

Find the length of:

a $\begin{pmatrix} 2 \\ 7 \end{pmatrix}$ $\sqrt{4+49} = \boxed{\sqrt{53}}$

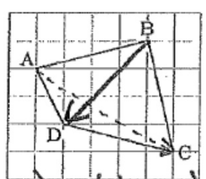
b $\begin{pmatrix} 0 \\ -5 \end{pmatrix}$ $\sqrt{0^2+5^2}$ $= \boxed{5}$

c $\begin{pmatrix} -8 \\ -3 \end{pmatrix}$ $\sqrt{(-8)^2+(-3)^2} = \sqrt{64+9}$ $= \boxed{\sqrt{73}}$

Unit 2: Coordinate Geometry (Vectors)

Answers to 1 - 11

4)



a Find in component form:

i $\overrightarrow{BC}$ ii $\overrightarrow{BD}$

b Simplify $\overrightarrow{AD} + \overrightarrow{DC}$. $= \overrightarrow{AC}$

c Find $|\overrightarrow{AC}|$. $\overrightarrow{AC} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$

$|\overrightarrow{AC}| = \sqrt{25+9}$

$|\overrightarrow{AC}| = \sqrt{34}$

$\overrightarrow{BC} = \begin{pmatrix} 1 \\ -4 \end{pmatrix}$ $\overrightarrow{BD} = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$

5) Show that $\begin{pmatrix} -2 \\ 4 \end{pmatrix}\begin{pmatrix} 8 \\ 4 \end{pmatrix}$ is orthogonal

[Dot Product = 0]

$-2 \cdot 8 + 4 \cdot 4$

$-16 + 16 = \boxed{0}$

6) Simplify.

$$\begin{pmatrix} 8 \\ 2 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix} - \begin{pmatrix} 5 \\ -1 \end{pmatrix}.$$

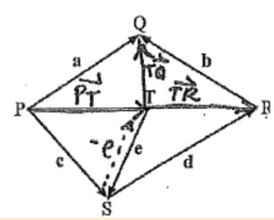
$$\begin{pmatrix} 8+3-5 \\ 2+4--1 \end{pmatrix} = \begin{pmatrix} 6 \\ 7 \end{pmatrix}$$

7)

Find in terms of a, b, c, d, and e:

a $\overrightarrow{TR}$ e+d b $\overrightarrow{PR}$ c+d

c $\overrightarrow{PT}$ c-e d $\overrightarrow{TQ}$ e+d+b



Unit 2: Coordinate Geometry (Vectors)

Answers to 1 - 11

8) Given the four vectors

$\vec{a}$, $\vec{b}$, $\vec{c}$, and $\vec{d}$. $\vec{a} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$, $\vec{c} = \begin{pmatrix} -4 \\ -2 \end{pmatrix}$ $\vec{d} = \begin{pmatrix} -12 \\ 24 \end{pmatrix}$

a) Show ***at least*** one pair of vectors that are parallel.

$12\vec{a} = \begin{pmatrix} -12 \\ 24 \end{pmatrix} = \vec{d}$ { $\vec{a}$ + $\vec{d}$ are parallel. }

b) Show ***at least*** one pair of vectors that are orthogonal.

$\vec{a} \cdot \vec{b} = (-1)(4) + 2 \cdot 2 = -4 + 4 = 0$ $\vec{a} \perp \vec{b}$ { $\vec{a} \cdot \vec{c} = (-1)(-4) + 2(-2) = 4 - 4 = 0$, $\vec{a} \perp \vec{c}$ } Also $\vec{b} \perp \vec{d}$, $\vec{c} \perp \vec{d}$

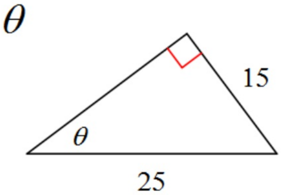
c) Which pair of vectors are ***opposite vectors***?

$\vec{b}$ + $\vec{c}$ are opposite vectors

Unit 3: Trigonometry

Find the value of each trigonometric ratio.

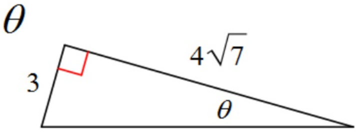
18) $\sin \theta$



Unit 3: Trigonometry

Find the value of each trigonometric ratio.

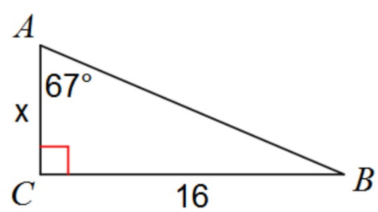
19) $\sin\theta$



Unit 3: Trigonometry

Find the missing side. Round to the nearest tenth.

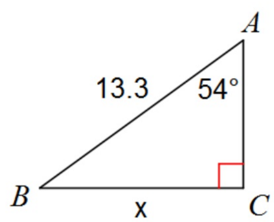
20)



Unit 3: Trigonometry

Find the missing side. Round to the nearest tenth.

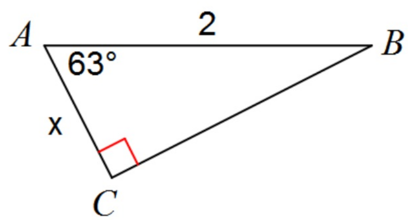
21)



Unit 3: Trigonometry

Find the missing side. Round to the nearest tenth.

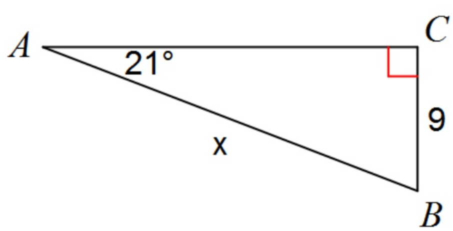
22)



Unit 3: Trigonometry

Find the missing side. Round to the nearest tenth.

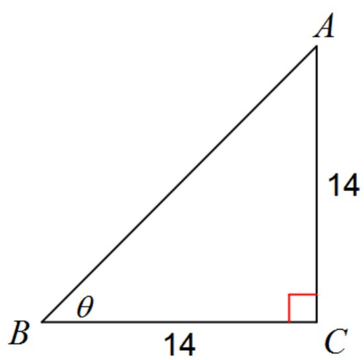
23)



Unit 3: Trigonometry

Find the measure of the indicated angle to the nearest degree.

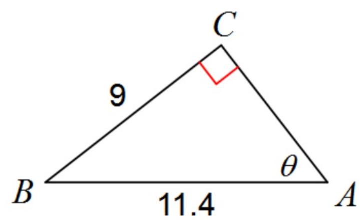
24)



Unit 3: Trigonometry

Find the measure of the indicated angle to the nearest degree.

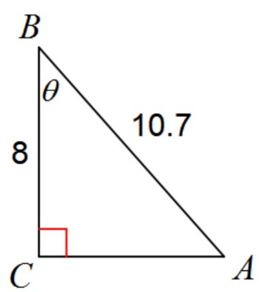
25)



Unit 3: Trigonometry

Find the measure of the indicated angle to the nearest degree.

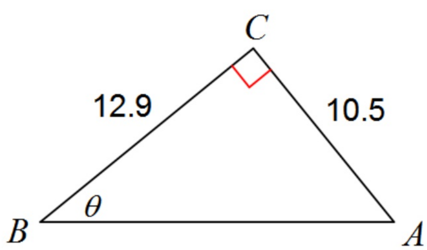
26)



Unit 3: Trigonometry

Find the measure of the indicated angle to the nearest degree.

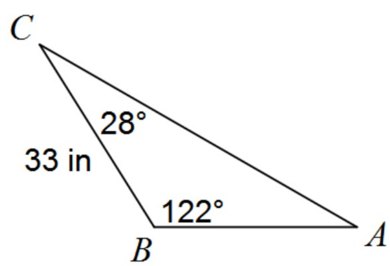
27)



Unit 3: Trigonometry

Find each measurement indicated.

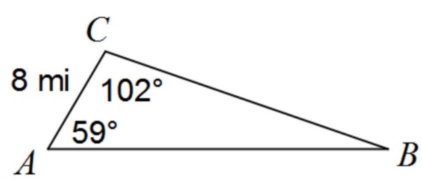
28) Find AB



Unit 3: Trigonometry

Find each measurement indicated.

29) Find BC



Unit 3: Trigonometry

Short answers to 18 - 29

	18) $\frac{3}{5}$	19) $\frac{3}{11}$	20) 6.8
21) 10.8	22) 0.9	23) 25.1	24) 45°
25) 52.1°	26) 41.6°	27) 39.1°	28) 31 in
29) 21.1 mi			