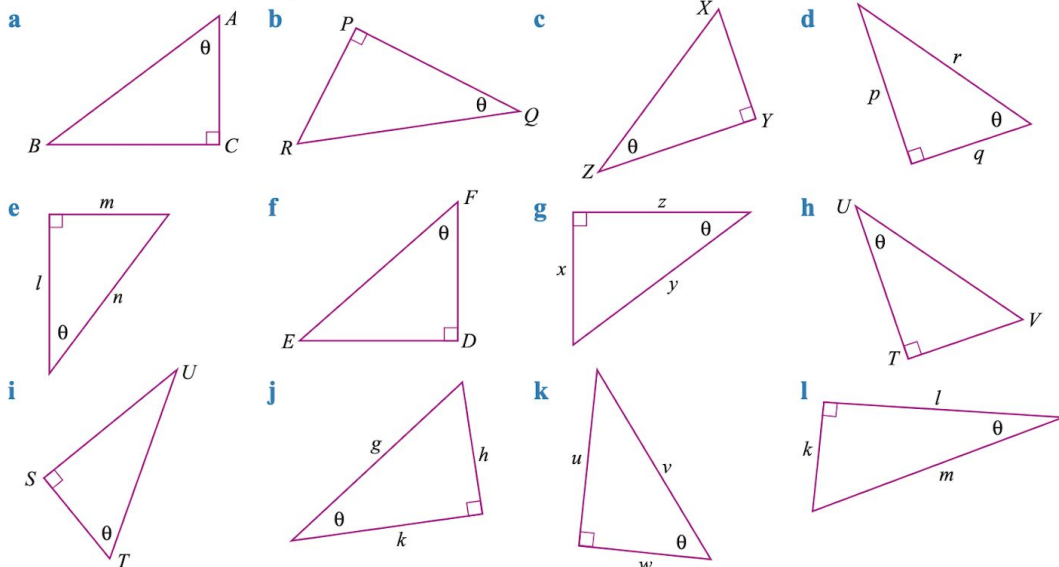


WALT Identify sides of a right angle triangle

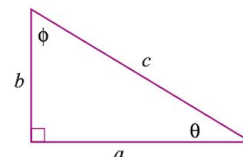
Success Criteria - I can identify hypotenuse and read the sign theta

I am able to list the rules for Sine, Cosine and Tangent

- 1 For each triangle below, name the:
- i hypotenuse
  - ii side opposite the angle marked  $\theta$
  - iii side adjacent to the angle marked  $\theta$ .



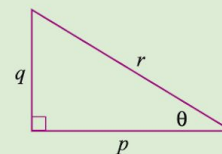
- 2 For the triangle shown, name the side:
- a opposite the angle marked  $\theta$
  - b opposite the angle marked  $\phi$
  - c adjacent to the angle marked  $\theta$
  - d adjacent to the angle marked  $\phi$



## EXAMPLE 2

Using the given triangle, write expressions to complete the table for  $\theta$ .

$\frac{\text{opposite}}{\text{adjacent}}$	$\frac{\text{opposite}}{\text{hypotenuse}}$	$\frac{\text{adjacent}}{\text{hypotenuse}}$



Solve			Think	Apply
$\frac{\text{opposite}}{\text{adjacent}}$	$\frac{\text{opposite}}{\text{hypotenuse}}$	$\frac{\text{adjacent}}{\text{hypotenuse}}$	The hypotenuse is $r$ , the side opposite the angle marked $\theta$ is $q$ , and the side adjacent to $\theta$ is $p$ .	The opposite and the adjacent sides are relative to the non-right angle chosen.
$\frac{q}{p}$	$\frac{q}{r}$	$\frac{p}{r}$		

3 Complete this table for  $\theta$  for each of the triangles in question 1.

$\frac{\text{opposite}}{\text{adjacent}}$	$\frac{\text{opposite}}{\text{hypotenuse}}$	$\frac{\text{adjacent}}{\text{hypotenuse}}$

## The trigonometric ratios

The ratios from Example 2 are given names.

- The ratio  $\frac{\text{opposite}}{\text{adjacent}}$  is the **tangent** of the angle marked  $\theta$ .

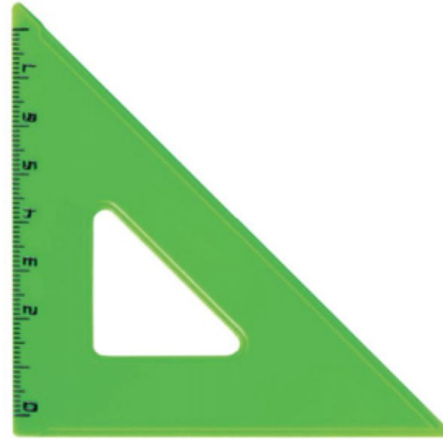
This is written as  $\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$ .

- The ratio  $\frac{\text{opposite}}{\text{hypotenuse}}$  is the **sine** of the angle marked  $\theta$ .

This is written as  $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$ .

- The ratio  $\frac{\text{adjacent}}{\text{hypotenuse}}$  is the **cosine** of the angle marked  $\theta$ .

This is written as  $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$ .

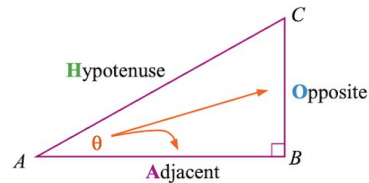


The trigonometric ratios can be remembered using a mnemonic: SOH CAH TOA.

**SOH**      $\sin \theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$

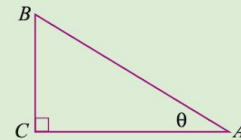
**CAH**      $\cos \theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$

**TOA**      $\tan \theta = \frac{\text{Opposite}}{\text{Adjacent}}$



### EXAMPLE 3

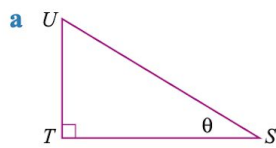
In triangle  $ABC$ , find expressions for  $\tan \theta$ ,  $\cos \theta$ , and  $\sin \theta$ .



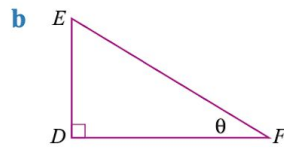
Solve	Think	Apply
$\tan \theta = \frac{BC}{AC}$	$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$	Locate the hypotenuse opposite the right angle. Identify the opposite and adjacent sides relative to the chosen angle.
$\sin \theta = \frac{BC}{AB}$	$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$	
$\cos \theta = \frac{AC}{AB}$	$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$	

4 For each triangle, find an expression for:

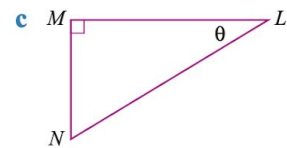
i  $\tan \theta$



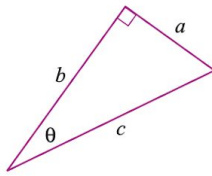
ii  $\sin \theta$



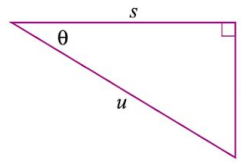
iii  $\cos \theta$



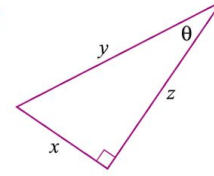
d



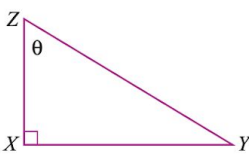
e



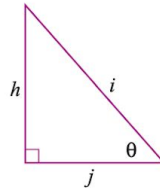
f



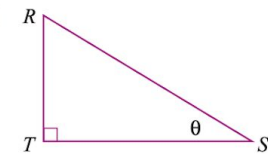
g



h

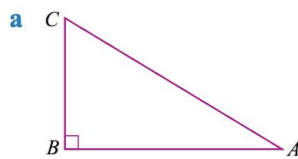


i

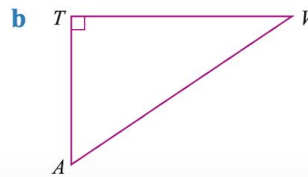


5 For each triangle, find an expression for:

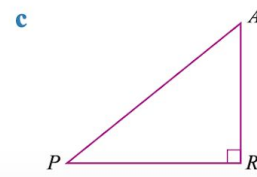
i  $\sin A$



ii  $\cos A$



iii  $\tan A$



Check your answers

EXERCISE 5B

- 1 a i  $AB$   
 b i  $RQ$   
 c i  $XZ$   
 d i  $r$   
 e i  $n$   
 f i  $EF$   
 g i  $y$   
 h i  $UV$   
 i i  $TU$   
 j i  $g$   
 k i  $v$   
 l i  $m$

- ii  $BC$   
 ii  $PR$   
 ii  $XY$   
 ii  $p$   
 ii  $m$   
 ii  $ED$   
 ii  $x$   
 ii  $TV$   
 ii  $SU$   
 ii  $h$   
 ii  $u$   
 ii  $k$

- iii  $AC$   
 iii  $PQ$   
 iii  $ZY$   
 iii  $q$   
 iii  $l$   
 iii  $FD$   
 iii  $z$   
 iii  $UT$   
 iii  $ST$   
 iii  $k$   
 iii  $w$   
 iii  $l$

2 a b                      b a                      c a                      d b

3	<u>opposite adjacent</u>	<u>opposite hypotenuse</u>	<u>adjacent hypotenuse</u>
a	$\frac{BC}{AC}$	$\frac{BC}{AB}$	$\frac{AC}{AB}$
b	$\frac{PR}{PQ}$	$\frac{PR}{RQ}$	$\frac{PQ}{RQ}$
c	$\frac{XY}{ZY}$	$\frac{XY}{XZ}$	$\frac{ZY}{XZ}$
d	$\frac{p}{q}$	$\frac{p}{r}$	$\frac{q}{r}$
e	$\frac{m}{l}$	$\frac{m}{n}$	$\frac{l}{n}$
f	$\frac{ED}{FD}$	$\frac{ED}{EF}$	$\frac{FD}{EF}$
g	$\frac{x}{z}$	$\frac{x}{y}$	$\frac{z}{y}$
h	$\frac{TV}{UT}$	$\frac{TV}{UV}$	$\frac{UT}{UV}$
i	$\frac{SU}{ST}$	$\frac{SU}{TU}$	$\frac{ST}{TU}$
j	$\frac{h}{k}$	$\frac{h}{g}$	$\frac{k}{g}$
k	$\frac{u}{w}$	$\frac{u}{v}$	$\frac{w}{v}$
l	$\frac{k}{l}$	$\frac{k}{m}$	$\frac{l}{m}$

- 4 a i  $\frac{UT}{TS}$                       ii  $\frac{UT}{US}$                       iii  $\frac{TS}{US}$
- b i  $\frac{ED}{DF}$                       ii  $\frac{ED}{EF}$                       iii  $\frac{DF}{EF}$
- c i  $\frac{MN}{ML}$                       ii  $\frac{MN}{LN}$                       iii  $\frac{LM}{LN}$
- d i  $\frac{a}{b}$                       ii  $\frac{a}{c}$                       iii  $\frac{b}{c}$
- e i  $\frac{t}{s}$                       ii  $\frac{t}{u}$                       iii  $\frac{s}{u}$
- f i  $\frac{x}{z}$                       ii  $\frac{x}{y}$                       iii  $\frac{z}{y}$
- g i  $\frac{XY}{XZ}$                       ii  $\frac{XY}{YZ}$                       iii  $\frac{XZ}{YZ}$
- h i  $\frac{h}{j}$                       ii  $\frac{h}{i}$                       iii  $\frac{j}{i}$
- i i  $\frac{RT}{ST}$                       ii  $\frac{RT}{RS}$                       iii  $\frac{ST}{RS}$
- 5 a i  $\frac{BC}{CA}$                       ii  $\frac{BA}{AC}$                       iii  $\frac{CB}{BA}$
- b i  $\frac{TV}{AV}$                       ii  $\frac{AT}{AV}$                       iii  $\frac{TV}{TA}$
- c i  $\frac{PR}{AP}$                       ii  $\frac{AR}{AP}$                       iii  $\frac{PR}{AR}$