

# 2:04 | Finding Unknown Sides Using Tangent

Name: \_\_\_\_\_

Class: \_\_\_\_\_

## Examples

Find  $x$  correct to 1 decimal place.

1  $\frac{x}{9} = 23$

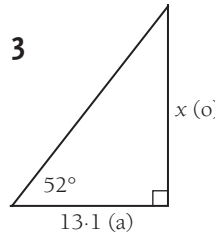
$$x = 9 \times 23$$

$$= 207$$

2  $\frac{x}{8.4} = \tan 37$

$$x = 8.4 \tan 37$$

$$\doteq 6.3$$



$$\frac{x}{13.1} = \tan 52$$

$$x = 13.1 \tan 52$$

$$\doteq 16.8$$

## Exercise

1 Complete the following.

a If  $\frac{x}{5} = 4$ , then  $x = \quad \times 4$ .

b If  $\frac{x}{5} = \tan 30$ , then  $x = \quad \times \tan 30$ .

c If  $\frac{x}{7.3} = 12$ , then  $x = \quad \times 12$ .

d If  $\frac{x}{25} = \tan 19$ , then  $x = \quad \times \tan 19$ .

2 Find  $x$  correct to 1 decimal place.

a  $\frac{x}{5} = \tan 15$

b  $\frac{x}{6.5} = \tan 42$

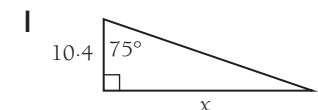
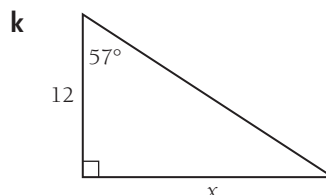
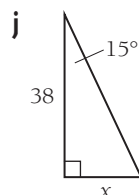
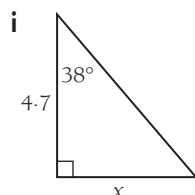
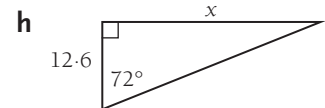
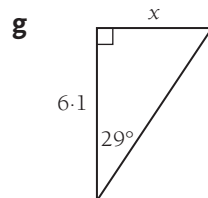
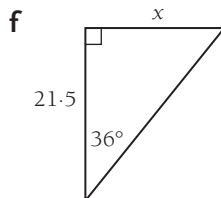
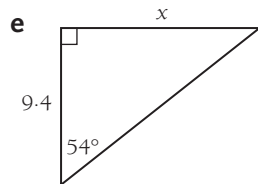
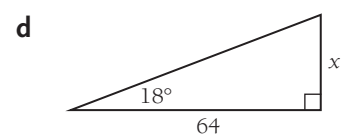
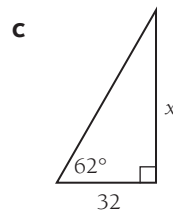
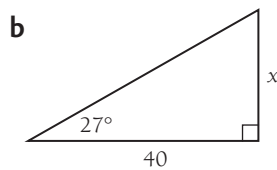
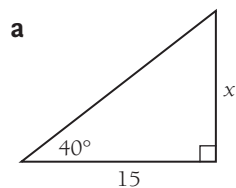
c  $\frac{x}{54} = \tan 62$

d  $\frac{x}{16.2} = \tan 40$

e  $\frac{x}{40} = \tan 28$

f  $\frac{x}{1.8} = \tan 54$

3 Find  $x$  correct to 1 decimal place.



# 2:05 | Finding Unknown Angles Using Tangent

Name: \_\_\_\_\_ Class: \_\_\_\_\_

## Examples



If  $\tan 35 = 0.700$ , then  $35 = \tan^{-1} 0.700$ .  
 This shows that  $\tan$  and  $\tan^{-1}$  are opposites.  
 For  $\tan^{-1}$  we then use **2nd F** or **SHIFT tan** on the calculator.

Find  $\theta$  to the nearest degree.

1  $\tan \theta = 0.6$   
 $\theta = \tan^{-1} 0.6$

Press **2nd F** or **SHIFT tan** 0.6 **=**.

$\therefore \theta = 30.963 \approx 31$

2  $\tan \theta = \frac{5}{9}$   
 $\theta = \tan^{-1} \frac{5}{9}$

Press **2nd F** or **SHIFT tan** 5 **a<sup>b/c</sup>** 9 **=**.

$\therefore \theta = 29.054 \approx 29$

3  $\tan \theta = \frac{8.3}{7.6}$

$\theta = \tan^{-1} \left( \frac{8.3}{7.6} \right)$  Press **2nd F** or **SHIFT tan** ( 8.3 **÷** 7.6 ) **=**.

$\therefore \theta = 47.520 \approx 48$

## Exercise

1 Complete the table.

$\theta$	$\tan \theta$
47	
	1.150
18	
	1.881
	0.268
78	

2 Find  $\theta$  to the nearest degree.

a  $\tan \theta = 0.85$

b  $\tan \theta = 1.5$

c  $\tan \theta = 0.123$

d  $\tan \theta = 3$

e  $\tan \theta = 0.6$

f  $\tan \theta = 0.44$

g  $\tan \theta = 0.92$

h  $\tan \theta = 0.246$

i  $\tan \theta = 2.3$

3 Find  $\theta$  to the nearest degree.

a  $\tan \theta = \frac{3}{5}$

b  $\tan \theta = \frac{1.5}{4.8}$

c  $\tan \theta = \frac{7}{20}$

d  $\tan \theta = \frac{6.2}{3.4}$

e  $\tan \theta = \frac{8}{7}$

f  $\tan \theta = \frac{0.5}{1.7}$

g  $\tan \theta = \frac{11}{15}$

h  $\tan \theta = \frac{12.6}{21.7}$

i  $\tan \theta = \frac{17}{8}$

# 2:07A | Finding Unknown Sides Using Sine and Cosine

Name: \_\_\_\_\_

Class: \_\_\_\_\_

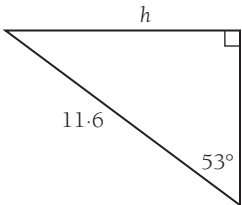
## Examples

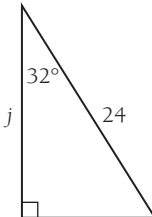


$$\text{Sine ratio} = \frac{\text{opposite length}}{\text{hypotenuse}}$$

$$\text{Cosine ratio} = \frac{\text{adjacent length}}{\text{hypotenuse}}$$

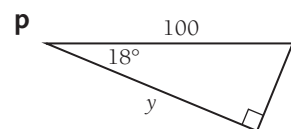
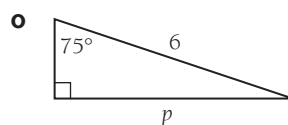
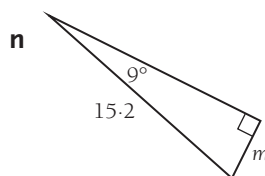
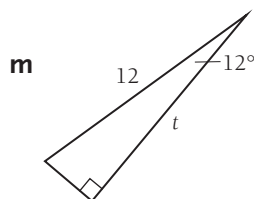
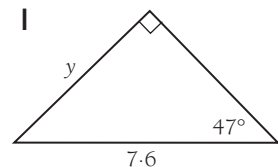
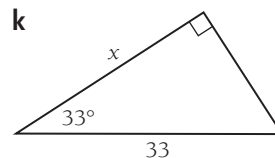
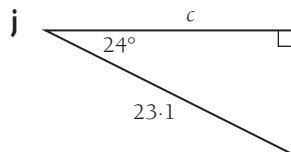
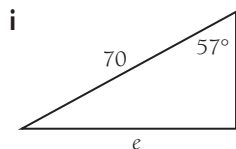
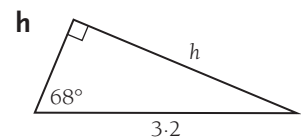
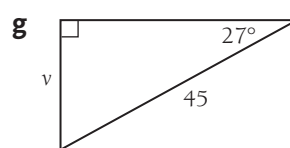
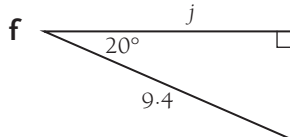
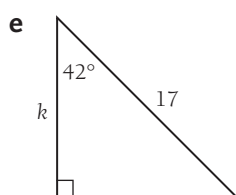
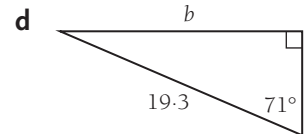
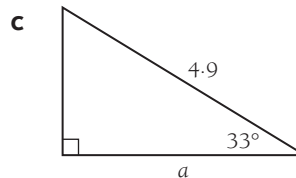
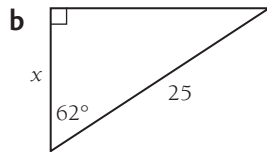
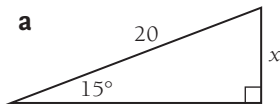
Find the value of the pronumeral, correct to 1 decimal place.

1   $\frac{h}{11.6} = \sin 53$   
 $h = 11.6 \sin 53$   
 $\doteq 9.3$

2   $\frac{j}{24} = \cos 32$   
 $j = 24 \cos 32$   
 $\doteq 20.4$

## Exercise

1 In each triangle, state whether you need to use sine or cosine to calculate the pronumeral.



2 Find the value of the pronumeral in each triangle in Question 1, correct to 1 decimal place.

# 2:07B | Finding the Hypotenuse

Name: \_\_\_\_\_ Class: \_\_\_\_\_

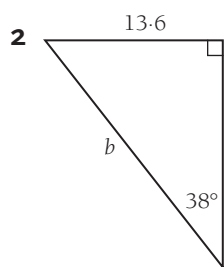
## Examples



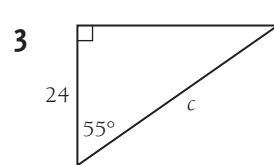
When finding the hypotenuse, we use sine or cosine and *divide* by the ratio. (When finding a short side, we *multiplied* by the ratio.)

Find the value of the pronumeral, correct to 2 decimal places.

1  $\frac{4}{a} = \cos 40$   
 $\frac{a}{4} = \frac{1}{\cos 40}$   
 $a = \frac{4}{\cos 40}$   
 $\doteq 5.22$



$\frac{13.6}{b} = \sin 38$   
 $\frac{b}{13.6} = \frac{1}{\sin 38}$   
 $b = \frac{13.6}{\sin 38}$   
 $\doteq 22.09$



$\frac{24}{c} = \cos 55$   
 $\frac{c}{24} = \frac{1}{\cos 55}$   
 $c = \frac{24}{\cos 55}$   
 $\doteq 41.84$

## Exercise

1 Complete the following to find the value of the pronumeral.

a  $\frac{10}{x} = 5$   
 $\frac{x}{10} =$   
 $x =$

b  $\frac{10}{x} = \sin 30$   
 $\frac{x}{10} =$   
 $x =$

c  $\frac{7.3}{y} = \cos 27$   
 $\frac{y}{7.3} =$   
 $y \doteq$

d  $\frac{65}{a} = \sin 40$   
 $\frac{a}{65} =$   
 $a \doteq$

e  $\frac{4.5}{h} = \cos 60$   
 $\frac{h}{4.5} =$   
 $h =$

f  $\frac{36}{c} = \sin 72$   
 $\frac{c}{36} =$   
 $c \doteq$

g  $\frac{20}{j} = \sin 15$   
 $\frac{j}{20} =$   
 $j \doteq$

h  $\frac{15.2}{m} = \cos 39$   
 $\frac{m}{15.2} =$   
 $m \doteq$

2 Find the length of the hypotenuse.

