

# Unit 1: Unit Pricing and Currency Exchange

Solving proportions:

$$\frac{8}{15} = \frac{a}{40}$$

If Marianne can complete 7 reports in 12 hours, how long would it take her to complete 16 reports?

$$\frac{\text{reps}}{\text{time}} = \frac{\text{reps}}{\text{time}}$$

$$\frac{7}{12} = \frac{16}{x}$$

$$7x = 12(16)$$

$$\frac{7x}{7} = \frac{192}{7} \quad x = 27.42... \approx 27.4 \text{ hrs.}$$

Unit Prices:  $\frac{\$}{1}$

If 18 oranges costs \$5.69, what is the unit price per orange?

$$\frac{\$5.69}{18} = \$0.3161\dots$$

$$\approx \$0.32 \text{ per orange}$$

0.8 kg  
↑

Which is the better buy: ① 800 g of sugar for \$4.50

② 1.5 kg of sugar for \$10.00

$$\frac{\$4.50}{0.8 \text{ kg}} = \$5.625/\text{kg} \quad \leftarrow \text{Lower unit price} \\ \therefore \text{better buy}$$

$$\frac{\$10.00}{1.5 \text{ kg}} = \$6.666\dots/\text{kg}$$

### Setting a Price:

The wholesale cost of a certain brand of hoodies is \$38.00/hoodie.

To cover the costs and make a profit, Sasha marks them up by 75%. Sasha must also charge customers GST of 5%, and PST of 6%. How much would a customer pay for one hoodie?

$$\text{Mark-up} = 0.75 \times \$38.00 = \$28.50$$

$$\text{Reg price} = \$38.00 + 28.50 = \$66.50$$

$$\text{GST} = 0.05 \times 66.50 = \$3.33$$

$$\text{PST} = 0.06 \times 66.50 = \$3.99$$

$$\text{Customer pays } 66.50 + 3.33 + 3.99 = \$73.82$$

**On Sale:**

A set of skis that has a regular price of \$875.99 has been discounted by \$262.80. Calculate the % of the discount on the skis. Round to the nearest percent.

$$\frac{\$262.80}{\$875.99} = 0.300\dots$$

↪

$$= 30\% \text{ discount}$$

The regular price of a certain pair of ski pants is **\$170.00**. The store is running a sale where all ski wear is **45% off**. Suppose you buy one pair of ski pants. Calculate the total selling price if GST is 5% and PST is 6%:

$$\text{Discount} = 0.45 \times \$170.00 = \$76.50$$

$$\begin{aligned} \text{Sale price} &= \$170.00 - 76.50 = \$93.50 \\ \text{or} \\ &= 0.55 \times \$170.00 = \$93.50 \end{aligned}$$

$$\text{GST} = 0.05 \times 93.50 = \$4.68$$

$$\text{PST} = 0.06 \times 93.50 = \$5.61$$

$$\text{Customer pays } 93.50 + 4.68 + 5.61 = \$103.79$$

## Currency Exchange Rates:

If one Canadian dollar is worth \$0.87625 US dollars:

- a) How many US dollars (to the nearest penny) would you receive for \$500 CDN

$$\frac{1 \text{ CAD}}{500 \text{ CAD}} = \frac{0.87625 \text{ USD}}{X}$$

$$X = \$438.13 \text{ USD}$$

- b) How much would you pay in Canadian dollars (to the nearest penny) for an item priced at \$45.50 US?

$$\frac{1 \text{ CAD}}{X} = \frac{0.87625 \text{ USD}}{45.50 \text{ USD}}$$

$$\frac{0.87625 X}{0.87625} = \frac{45.50}{0.87625}$$

$$X = \$51.93 \text{ CAD}$$



## Unit 2: Earning an Income

### Wages and Salaries:

Kelli works as a salesperson in a clothing store. Her hourly wage is \$12.50 per hour. Calculate her gross pay for a week in which she worked 37.5 hours.

$$\begin{aligned}\text{Total pay} &= 37.5 \text{ h} \times \$12.50/\text{h} \\ &= \$468.75\end{aligned}$$

Jason earned \$904.40 in one week in which he worked 40 hours. Calculate his hourly rate.

$$\text{Hourly rate} = \frac{\$904.40}{40 \text{ h}} = \$22.61 / \text{hr}$$

x 1.5

Carrie earns \$20.00/hr and receives time and a half for overtime hours.

- a) What is Carrie's overtime rate?

$$\$20.00 \times 1.5 = \$30.00/\text{hr}$$

- b) Calculate Carrie's gross pay in a week where she worked 37.5 regular hours and 6 overtime hours.

$$\begin{aligned}\text{Gross} &= \text{regular pay} + \text{OT pay} \\ &= 37.5 \times \$20.00 + 6 \times \$30.00 \\ &= 750 + 180 \\ &= \$930.00\end{aligned}$$

**Alternative ways to earn money (piecework, commission):**

Tracy assembles bird houses and is paid by piecework. She gets paid \$15.00 for every birdhouse she completes. Calculate Tracy's gross pay in a week where she assembled 65 birdhouses.

$$\begin{aligned} \text{Gross} &= 65 \times \$15 \\ &= \$975.00 \end{aligned}$$

Max's job at a used car lot pays him a base salary of \$1000 per month, plus 1.2% commission on his gross sales. If Max's gross sales in June were \$43,605.00, how much money did he earn in June?

$$\text{Commission earned} = 0.012 \times 43\,605 = \$523.26$$

$$\text{Earnings} = \$1000 + 523.26 = \$1523.26$$

**Additional Earnings (tips, bonuses):**

As a waiter, Jake earns an average of 18% tips on his customer bills. He also earns \$12.00 per hour for the hours he works. In one week he worked 30 hours and billed \$2650.00 in customer bills. How much money did Jake earn that week?

$$\text{Tips earnings} = 0.18 \times 2650.00 = \$477.00$$

$$\text{Wages} = 30 \times \$12.00 = \$360.00$$

$$\text{Total earnings} = 477 + 360 = \$837.00$$

A car dealership offers their top salesperson every month a bonus of 1% of their gross sales. If Pat was the top salesperson in January with gross sales of \$80,450.00, how much was their bonus?

$$\begin{aligned}\text{Bonus earnings} &= 0.01 \times 80\,450.00 \\ &= \$804.50\end{aligned}$$

### Deductions and Net Pay:

Kerry has a gross income of \$975.00 per week. Their before tax deductions include union dues of 2% and a company pension plan contribution of 3.5%. Calculate the amount of these before tax deductions and determine Kerry's taxable income.

$$\text{Union dues} = 0.02 \times 975.00 = \$19.50$$

$$\text{Company pension plan} = 0.035 \times 975.00 = \$34.13$$

$$\begin{aligned} \text{Taxable Income} &= 975.00 - 19.50 - 34.13 \\ &= \$921.37 \end{aligned}$$



Sheila has a gross monthly income of \$3000.00. Her before tax deductions total \$150.00. Her provincial tax rate is 4.6% and her federal tax rate is 15.5%. She pays 1.8% for EI contributions and 4.95% for CPP. Calculate Sheila's monthly net pay.

$$\text{Taxable Income} = 3000 - 150 = \$2850.00$$

$$\text{Prov tax} = 0.046 \times 2850 = \$131.10$$

$$\text{Fed tax} = 0.155 \times 2850 = \$441.75$$

$$\text{EI} = 0.018 \times 2850 = \$51.30$$

$$\text{CPP} = 0.0495 \times 2850 = \$141.08$$

$$\text{Net} = 2850 - 765.23 = \$2084.77$$

765.23

## **Unit 3: Length, Area, Volume**

### **Systems of Measurement:**

Convert:

33 inches into “feet and inches”

8.4 yards into feet

You are building a fence around a rectangular garden that is 14'6" long and 8'9" wide. Calculate the total amount of fencing you will need in feet.

## **Converting Measurements:**

Convert:

28 yards into metres

45 inches into cm

Brooklyn owns an American truck with an odometer that reads in miles. Her employer pays her \$0.38 per km when she uses her truck for company business. How much will her employer pay her for using her truck on a business trip in which she travelled 1265 miles?

**Surface Area:**

Bailey is tiling a 40" by 40" shower stall. The tiles reach the 8 foot ceiling on 3 sides.

a) How many square inches of tiles will Bailey need to tile the 3 walls plus the floor?

b) If each tile is 8" by 8", how many tiles will Bailey need for this job?

**Volume:**

One bale of hay measure 15" x 24" x 36". Calculate the total volume of hay in 200 bales – in cubic feet.

## **Unit 4: Mass, Temperature, and Volume**

### **Temperature Conversions:**

Convert:

74°C into Fahrenheit

-10°F into Celsius



**Mass in the Imperial System:**

Xavier needs 3 pounds 4 ounces of lobster, 2 pounds 6 ounce of crab meat, 1 pound 11 ounces of oysters and 2 pounds 14 ounces of shrimp for a seafood recipe. Calculate the total weight of seafood he needs and state your answer in "*pounds and ounces*".

A small elevator has a load restriction of 1 ton. Is it safe to load 50 boxes that each weigh 34 pounds each and have the workman who weighs 210 lb ride in the elevator with the load?

**Mass in the Systeme International:**

What is the total mass of a loaded truck if the truck alone weighs 2.3 tonnes and it is loaded with 12 skids of boxes and each skid weighs 250 kg?

If one kg of beef costs \$10.80, what is the price per pound?

**Making Conversions:**

How many bushels of flax seed are there in 3.2 tonnes if the conversion factor is 39.368 bu/t?

Convert:

96 lbs into kg

72 ounces into grams

## Unit 5: Angles and Parallel Lines

### Measuring, Drawing and Estimating Angles:

Classify these angles according to their size:

- a)  $190^\circ$  reflex
- b)  $22^\circ$  acute
- c)  $180^\circ$  straight
- d)  $90^\circ$  right
- e)  $110^\circ$  obtuse

$90^\circ$

$180^\circ$

What is the complement and supplement of each angle:

$70^\circ$

$20^\circ$   
 $110^\circ$

$35^\circ$

$55^\circ$   
 $145^\circ$

$100^\circ$

no compl.  
 $80^\circ$



What is the true bearing of a ship traveling  $25^\circ$  south of due east?

### Angle Bisectors and Perpendicular Lines:

If an angle of  $220^\circ$  is bisected, what is the measure of the resulting smaller angles?

$$220 \div 2 \Rightarrow 110^\circ \text{ each}$$

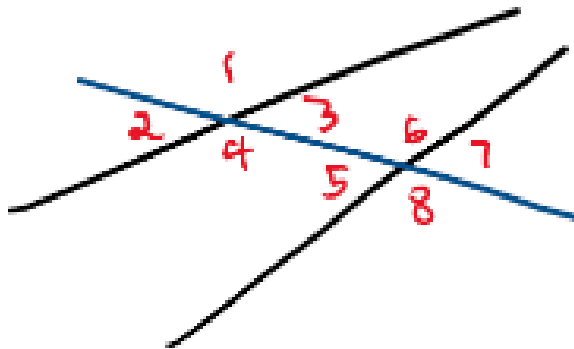
If an angle is bisected and each smaller angle measures  $32^\circ$ , what was the measure of the angle that was bisected?

$$32 \times 2 = 64^\circ$$

## Non-parallel Lines and Transversals:

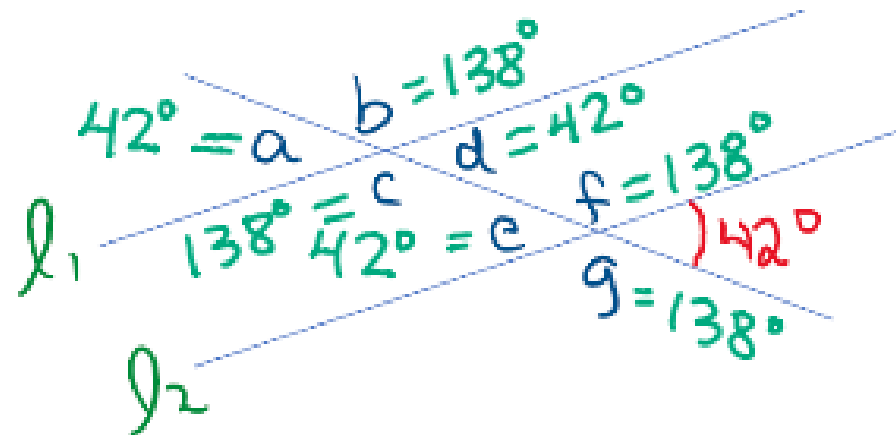
Using the diagram below, list the pairs of angles that are:

- a) Corresponding angles  $1 \hat{=} 6, 3 \hat{=} 7, 2 \hat{=} 5, 4 \hat{=} 8$
- b) Alternate interior angles  $3 \hat{=} 5, 4 \hat{=} 6$
- c) Alternate exterior angles  $2 \hat{=} 7, 1 \hat{=} 8$
- d) Interior angles on the same side of the transversal  $3 \hat{=} 6, 4 \hat{=} 5$



**Parallel Lines and Transversals:**

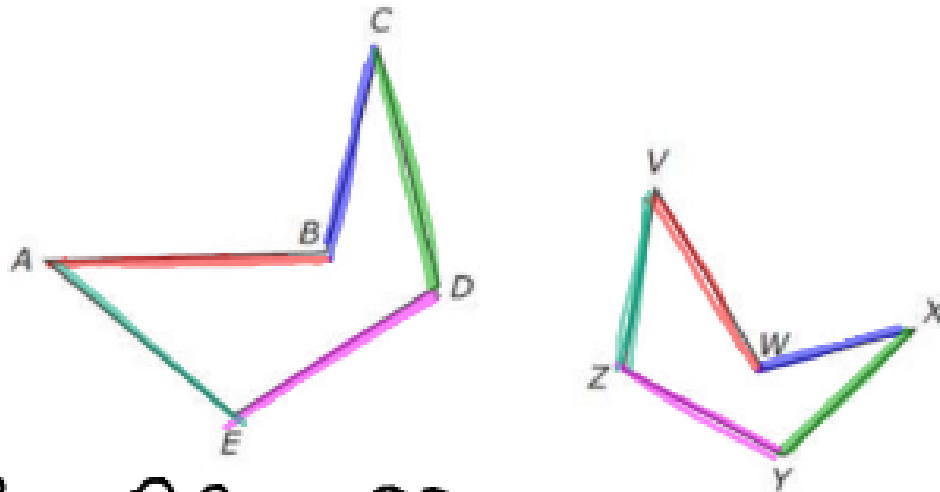
Line 1 is parallel to line 2. What are the measures of angles a, b, c, d, e, f, and g? State reasons.



## Unit 6: Similarity of Figures

Similar Polygons:

$ABCDE \sim VWXYZ$  in the diagram below. List the pairs of corresponding angles and corresponding sides.



$$\frac{AB}{VW} = \frac{BC}{WX} = \frac{CD}{XY} = \frac{DE}{YZ} = \frac{EA}{ZV}$$

$$\angle A = \angle V$$

$$\angle B = \angle W$$

$$\angle C = \angle X$$

$$\angle D = \angle Y$$

$$\angle E = \angle Z$$

The scale of a model train to the actual train is 2:65. If the model is 50 cm long, how long is the actual train? Calculate the length in cm and convert your answer to metres.

2 : 65

model                      real train

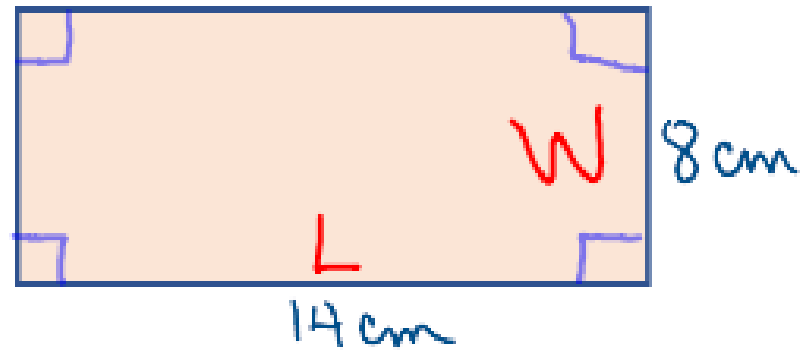
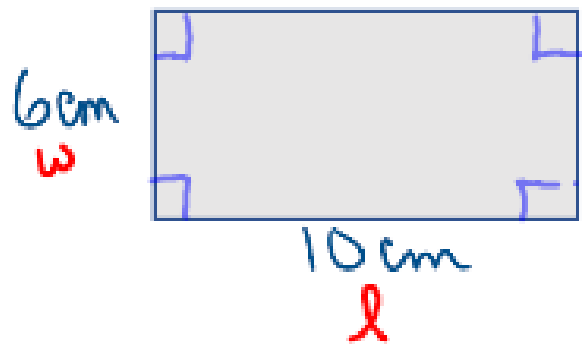
$\frac{2}{65} = \frac{50}{L}$

real train

$$2L = 65(50)$$
$$2L = 3250$$
$$\frac{2L}{2} = \frac{3250}{2}$$
$$L = 1625 \text{ cm} = 16.25 \text{ m}$$

Determining if 2 Polygons are Similar:

Are the two rectangles similar? Why or why not?



Corresp. angles are equal because they are all  $90^\circ$ .

$$\frac{l}{L} = \frac{w}{W}$$

$$\frac{10}{14} \stackrel{?}{=} \frac{6}{8}$$

$$\frac{10}{14} = 0.714 \dots$$

$$\frac{6}{8} = 0.75$$

The sides are not proportional.

**NOT SIMILAR**

### Drawing Similar Polygons:

Calculate the dimensions of a box that was made using a scale factor of 5 from a scale model with dimensions of 6 cm by 4 cm by 10 cm.

*make  
larger*

*small*

$$6 \text{ cm} \times 5 = 30 \text{ cm}$$

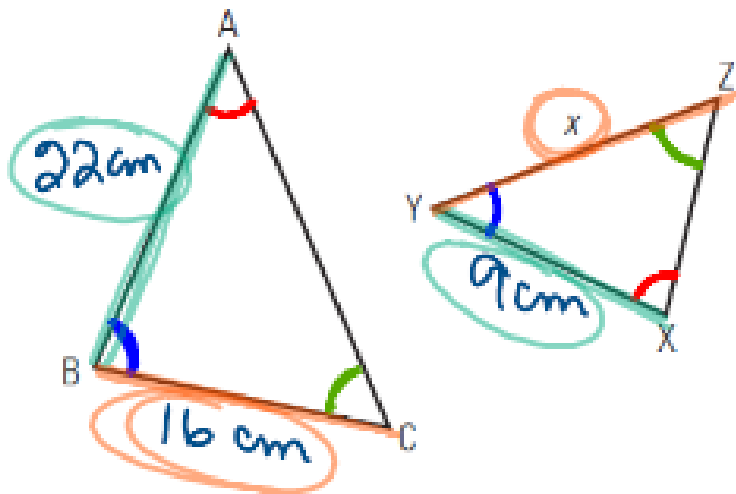
$$4 \text{ cm} \times 5 = 20 \text{ cm}$$

$$10 \text{ cm} \times 5 = 50 \text{ cm}$$



### Similar Triangles:

Triangle ABC is similar to triangle XYZ. Find the length of the missing side to the nearest tenth of a cm:



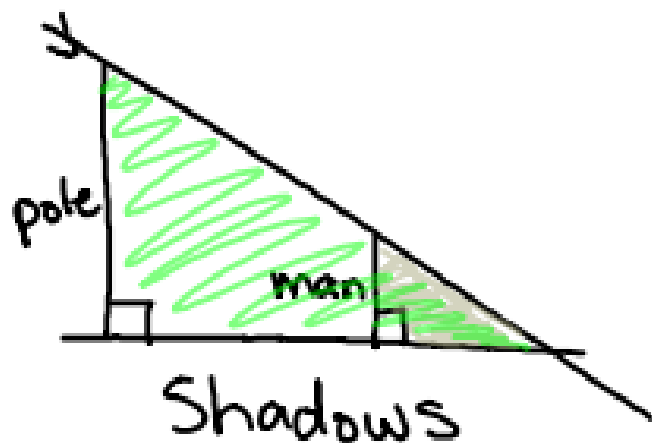
$$\frac{22}{9} = \frac{16}{x}$$

$$22x = 9(16)$$

$$\frac{22x}{22} = \frac{144}{22}$$

$$x = 6.54 \approx 6.5 \text{ cm}$$

A pole that is 8-m tall casts a shadow that is 15 m long. How tall is a man who casts a shadow that is 3.5 m long? Round your answer to the nearest hundredth of a metre.



$$\frac{\text{pole height}}{\text{man's height}} = \frac{\text{pole's shadow}}{\text{man's shadow}}$$

$$\frac{8\text{m}}{h} = \frac{15\text{m}}{3.5\text{m}}$$

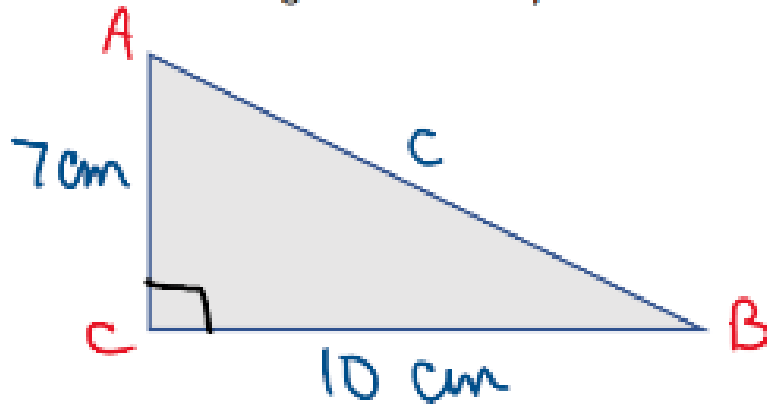
$$15h = 8(3.5)$$

$$\frac{15h}{15} = \frac{28}{15} \quad h = 1.\overline{86} \approx 1.87\text{m}$$

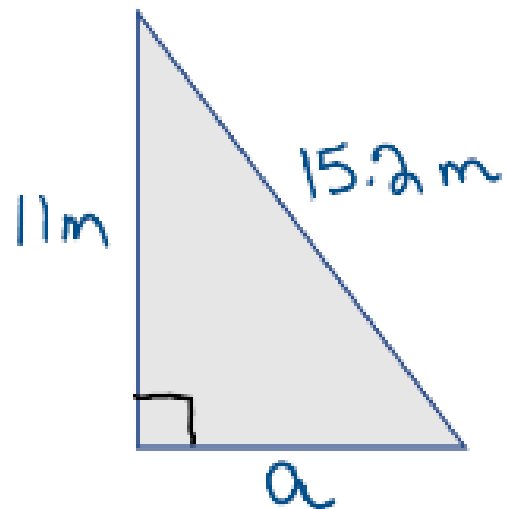
## Unit 7: Trigonometry of Right Triangles

The Pythagorean Theorem:

Solve for the missing side. Round your answer to one decimal:

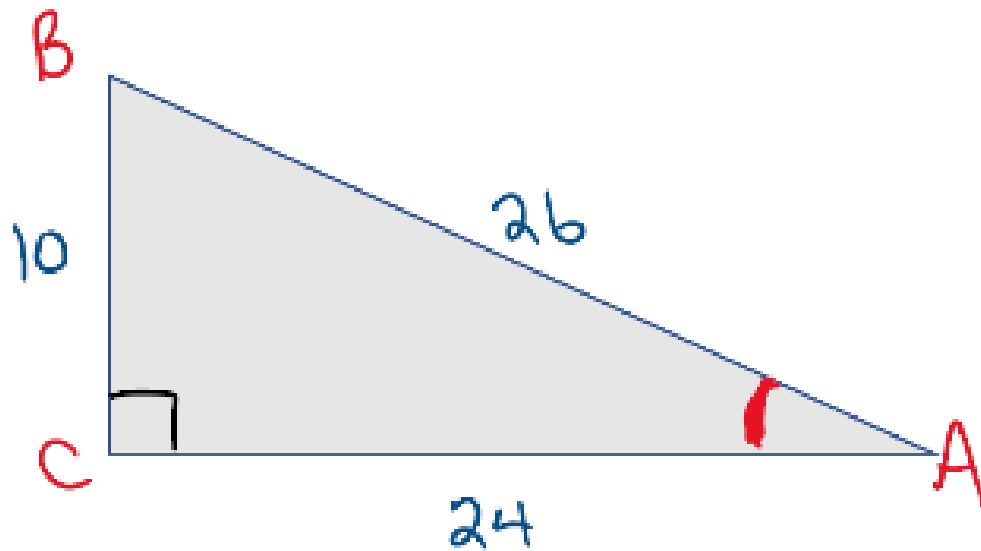


Solve for the missing side. Round your answer to one decimal:

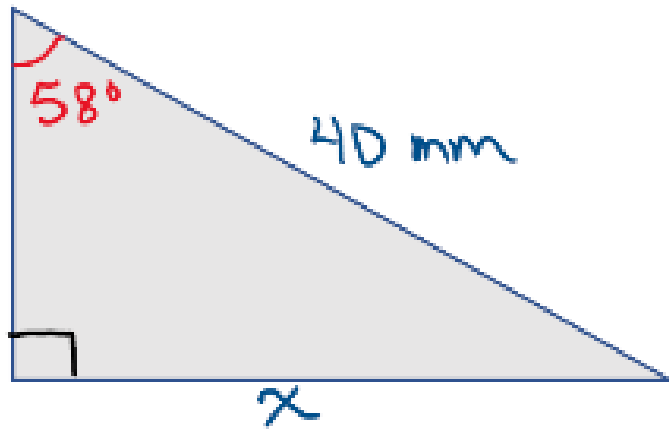


**Trigonometry:**

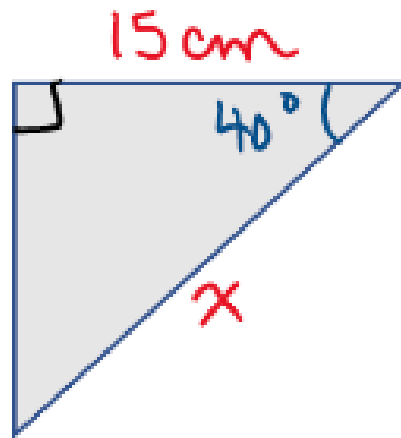
Use the right triangle below to state the sine, cosine and tangent of angle A, first as a fraction, then convert to a decimal.



Use the sine ratio to solve for the missing side



Use the cosine ratio to solve for the missing side:



Use the tangent ratio to solve for the missing side:

