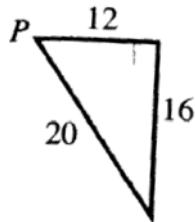
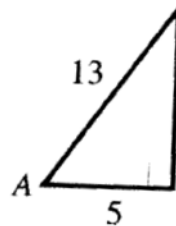


1. Determine the following trigonometric ratios (leave your answer as a simplified fraction)

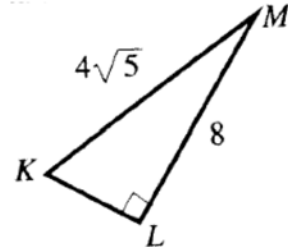
a)  $\cos P =$



b)  $\tan A =$



c)  $\sin M =$



2. Use a calculator to determine the value of each trigonometric ratio to four decimal places.

a)  $\sin 68 =$

b)  $\tan 30 =$

c)  $\cos 22 =$

d)  $\sin 7 =$

3. In each case determine the indicated acute angle to the nearest degree.

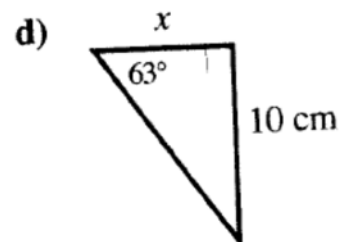
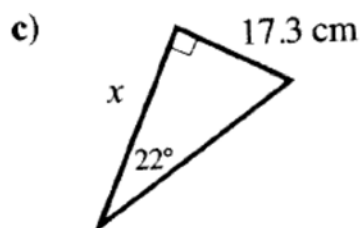
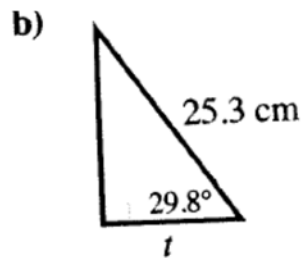
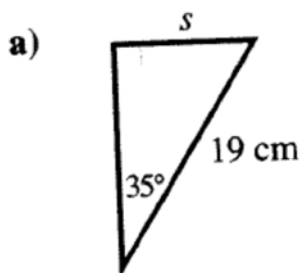
a)  $\sin A = 0.6789$

b)  $\cos X = 0.1234$

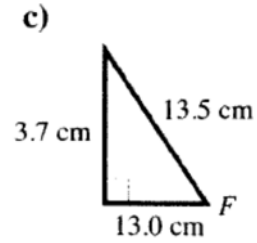
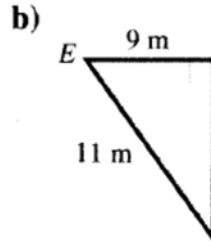
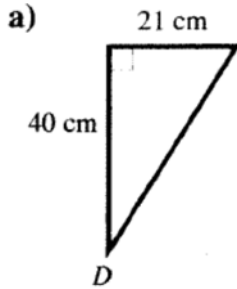
c)  $\tan P = 0.55$

d)  $\cos M = \frac{7}{24}$

4. Determine the length of the indicated side to the nearest tenth (1 decimal place).

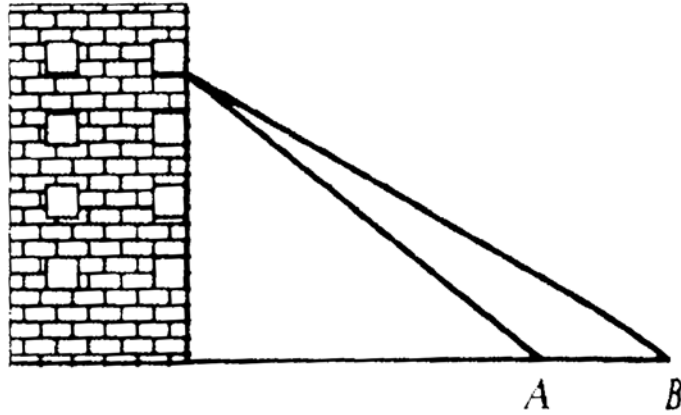


5. Determine the measure of the indicated angle to the nearest degree.



6. Jacob has been given the task of determining the height of a building. He walks 30 m away from the base of the building and uses a clinometer to measure the angle of elevation to the top of the building to be  $58^\circ$ . Calculate the height of the building to the nearest metre.
7. From the top of a vertical cliff 120 metres above sea level, Susan measures the angle of depression of a boat in the water to be  $37^\circ$ . To the nearest metre, determine the distance between the boat and the base of the cliff.

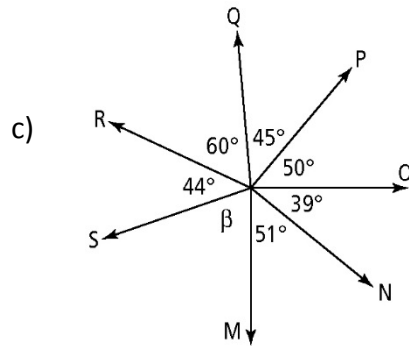
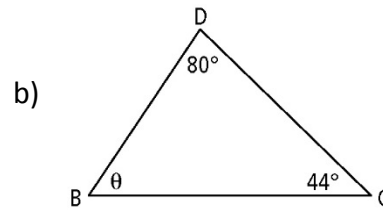
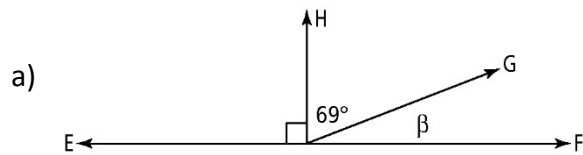
8. The diagram shows two marathon runners, *A* and *B*, heading towards the finish line of a race. From an apartment window 80 metres above the ground and 20 metres behind the finish line (the finish line is 20 m to the RIGHT of the building), Tony measures the angle of depression of the runners to be  $28^\circ$  and  $24^\circ$  respectively.



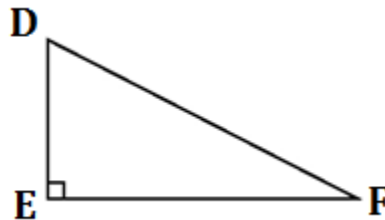
- a) Calculate the distance between the runners to the nearest metre.

- b) *A* is travelling at a constant speed of 4.5 m/s while *B* is travelling at a constant speed of 5.1 m/s. Which runner will finish the race first?

9. For each diagram, determine the measure of the unknown angle.



10. Use the diagram to help answer the questions.



- Name the angle at vertex F in two different ways.
- What are two different ways to express the hypotenuse in  $\triangle DEF$ ?
- Express the Pythagorean relationship for  $\triangle DEF$  in two ways.
- What is an expression for  $\sin F$ ?
- Write the equation for  $\tan D$ .
- If  $\sin D = \frac{d}{e}$ , what is an expression for  $d$ ?

**Answers:**

1. a)  $\frac{3}{5}$  b)  $\frac{12}{5}$  c)  $\frac{1}{\sqrt{5}}$  OR  $\frac{\sqrt{5}}{5}$  2. a) 0.9272 b) 0.5774 c) 0.9272 d) 0.1219 3. a)  $43^\circ$  b)  $83^\circ$  c)  $29^\circ$  d)  $73^\circ$   
 4. a) 10.9 cm b) 22.0 cm c) 42.8 cm d) 5.1 cm 5. a)  $28^\circ$  b)  $35^\circ$  c)  $16^\circ$  6. 48 m 7. 159 m  
 8. a) 29 m b) A takes 29 sec, B takes 31 seconds so A finishes first. 9. a)  $21^\circ$  b)  $56^\circ$  c)  $71^\circ$  10. a)  $\angle F$  or  $\angle DFE$  or  $\angle EFD$   
 b)  $e$  or  $DF$  or  $FD$  c)  $f^2 + d^2 = e^2$  or  $(DE)^2 + (EF)^2 = (DF)^2$  d)  $\sin F = \frac{DE}{DF}$  or  $\sin F = \frac{f}{e}$  e)  $\tan D = \frac{EF}{DE}$  or  $\tan D = \frac{d}{f}$  f)  $d = e \times \sin D$