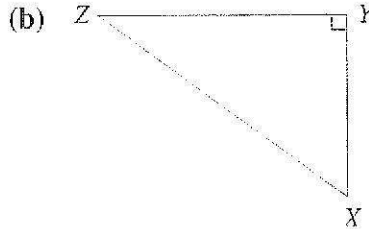
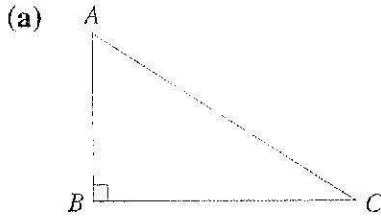


**Exercise 10.1** ↗

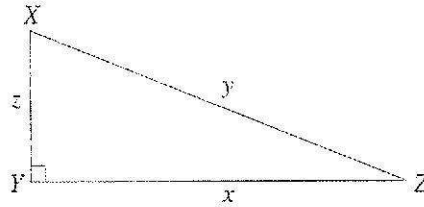
answers on p. 437

1. In each of the following triangles, name the hypotenuse.



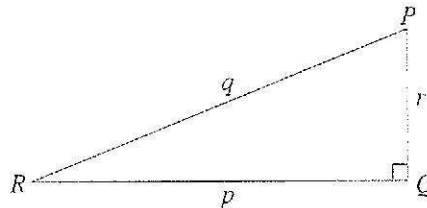
2. In  $\triangle XYZ$ ,  $\hat{Y} = 90^\circ$ . Find

- (a)  $y$  if  $z = 6$  and  $x = 8$ ,
- (b)  $z$  if  $y = 20$  and  $x = 16$ ,
- (c)  $x$  if  $z = 10$  and  $y = 26$ .



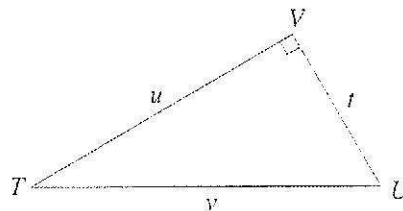
3. In  $\triangle PQR$ ,  $\hat{Q} = 90^\circ$ . Find

- (a)  $p$  if  $q = 25$  and  $r = 7$ ,
- (b)  $q$  if  $p = 8$  and  $r = 15$ ,
- (c)  $r$  if  $q = 65$  and  $p = 16$ .



4. In  $\triangle TUV$ ,  $\hat{V} = 90^\circ$ . Find

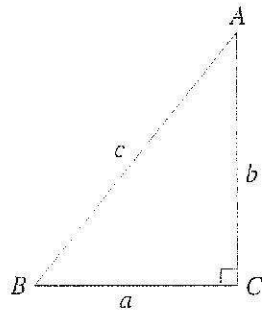
- (a)  $t$  if  $u = 35$  and  $v = 37$ ,
- (b)  $u$  if  $v = 41$  and  $t = 40$ ,
- (c)  $v$  if  $t = 5$  and  $u = 12$ .



5. Determine which of the following triangles are right-angled and state the right angle.

- (a) In  $\triangle ABC$ ,  $AB = 8$  cm,  $BC = 9$  cm and  $AC = 7$  cm.
- (b) In  $\triangle PQR$ ,  $PQ = 15$  cm,  $QR = 25$  cm and  $PR = 20$  cm.
- (c) In  $\triangle XYZ$ ,  $XY = 36$  cm,  $YZ = 39$  cm and  $XZ = 15$  cm.
- (d) In  $\triangle STU$ ,  $ST = 9$  cm,  $TU = 15$  cm and  $SU = 20$  cm.
- (e) In  $\triangle CDE$ ,  $CD = 8$  cm,  $DE = 15$  cm and  $CE = 17$  cm.
- (f) In  $\triangle LMN$ ,  $LM = 20$  cm,  $MN = 21$  cm and  $NL = 29$  cm.

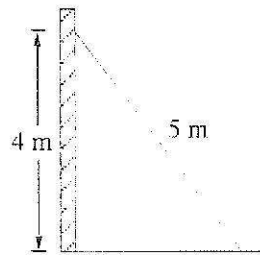
6.



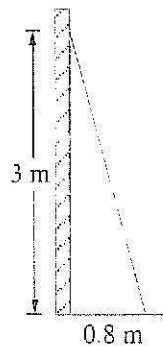
In  $\triangle ABC$ ,  $\hat{C} = 90^\circ$ . Find, correct to 3 significant figures, the value of

- (a)  $a$  if (i)  $b = 3.3$  and  $c = 8.8$ ,  
 (ii)  $b = 19.6$  and  $c = 32.3$ ,  
 (iii)  $b = 1.2$  and  $c = 10.8$ ,  
 (iv)  $b = 144$  and  $c = 300$ ,
- (b)  $b$  if (i)  $a = 19.9$  and  $c = 38$ ,  
 (ii)  $a = 44.4$  and  $c = 62$ ,  
 (iii)  $a = 3.6$  and  $c = 9.1$ ,  
 (iv)  $a = 28.2$  and  $c = 32.3$ ,
- (c)  $c$  if (i)  $a = 24.8$  and  $b = 7.68$ ,  
 (ii)  $a = 59.9$  and  $b = 31.9$ ,  
 (iii)  $a = 100$  and  $b = 40$ ,  
 (iv)  $a = 1.24$  and  $b = 3.82$ .

7. A window-cleaner has a ladder which is 5 metres long. He places it so that it reaches a windowsill 4 metres from the ground. How far from the wall is the foot of the ladder?

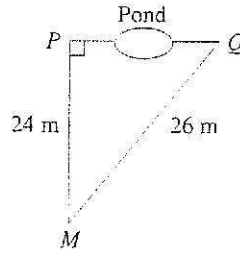


8.

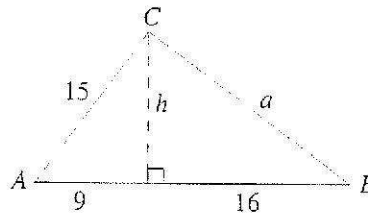


A ladder leans against the wall and reaches a height of 3 m. If the foot of the ladder is 0.8 m from the wall, find, in metres, the length of the ladder. Give your answer correct to 1 decimal place.

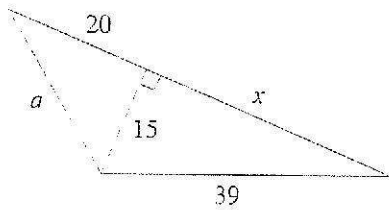
9.  $P$  and  $Q$  are on the opposite sides of a pond.  $M$  is a point such that  $PM$  and  $QM$  can be measured. It is found that  $PM = 24$  m,  $QM = 26$  m and  $\hat{QPM} = 90^\circ$ . Calculate the distance between  $P$  and  $Q$ .



10. In the figure on the right, find  $h$  and  $a$ .

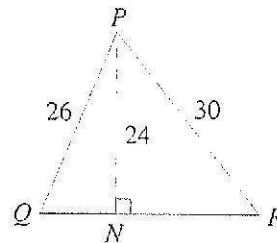


- 11.

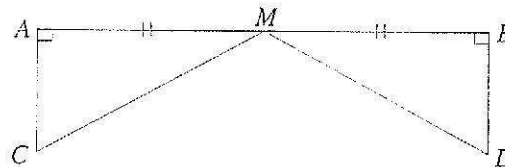


In the figure on the left, find  $x$  and  $a$ .

12. Calculate the length of  $QR$  in  $\triangle PQR$ .

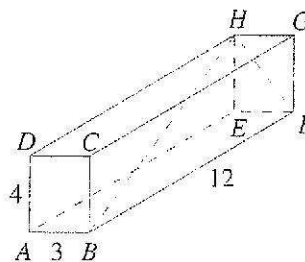


13. A bridge  $AB$  with supports  $MC$  and  $MD$  is built across a river. If  $AB = 15$  m,  $AC = 4$  m and  $AM = MB$ , find the length of the support  $MC$ .

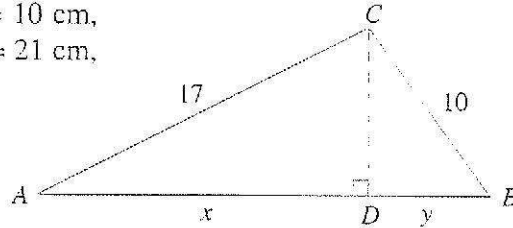


14. The rectangular solid on the right has edges with measurements indicated.

- (a) Which angle of  $\triangle HFB$  is a right angle?  
 (b) Calculate the length of diagonal  $BH$ . (*Hint*: Calculate the length of  $HF$  first.)



15. The shortest side of a right-angled triangle is 6 cm. If the difference between the other two sides is 2 cm, find the perimeter of the triangle.
16. The longest side of a right-angled triangle is 13 cm. If the perimeter of the triangle is 30 cm, find the shortest side.
17. In  $\triangle ABC$ , if  $AC = 17$  cm,  $CB = 10$  cm,  $AD = x$  cm,  $DB = y$  cm and  $AB = 21$  cm, find the value of  $(x - y)$ .



## 10.2 INDIRECT MEASURE

When we measure the width of a table or a room with a ruler or a tape, we call this direct measurement. Sometimes, it is impossible, dangerous, or inconvenient to make direct measurement, for example, in finding the height of a building. Then we use a method called indirect measurement.

### *Examples*

(a)

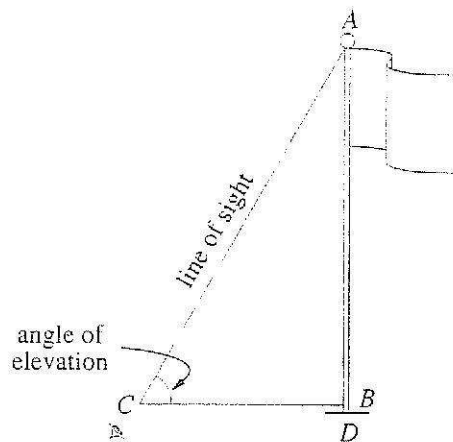


Fig. 10.1

In Fig. 10.1,  $CA$  is the line of sight from your eye to the point  $A$  of the flagpole and  $CB$  is a horizontal line at your eye level.  $\hat{ACB}$  is called the angle of elevation of  $A$  from  $C$ . To find the height of the flagpole  $AD$ , you first measure the angle of elevation. (The method will be explained later.) Then find  $CB$  by direct measurement.

## Exercise 10.1 (p 253)

1. (a)  $AC$                       (b)  $XZ$
2. (a) 10                      (b) 12                      (c) 24
3. (a) 24                      (b) 17                      (c) 63
4. (a) 12                      (b) 9                      (c) 13
5. (b) Right-angled triangle;  $\hat{P}$   
     (c) Right-angled triangle;  $\hat{X}$   
     (e) Right-angled triangle;  $\hat{D}$   
     (f) Right-angled triangle;  $\hat{M}$
6. (a) (i) 8.16    (ii) 25.7    (iii) 10.7    (iv) 263  
     (b) (i) 32.4    (ii) 43.3    (iii) 8.36    (iv) 15.7  
     (c) (i) 26.0    (ii) 67.9    (iii) 108    (iv) 4.02
7. 3 m                      8. 3.1 m                      9. 10 m
10.  $h = 12, a = 20$                       11.  $x = 36, a = 25$
12.  $QR = 28$                       13. 8.5 m
14.  $\hat{BFH} = 90^\circ, BH = 13$                       15. 24 cm
16. 5 cm                      17. 9 cm