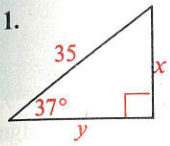
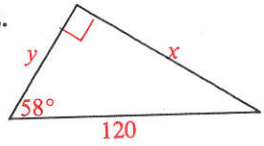
Written Exercises

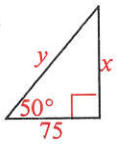
In these exercises, use the table on page 271. Find lengths correct to the nearest integer and angle measures to the nearest degree.

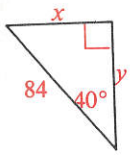
In Exercises 1–9, find the values of the variables.

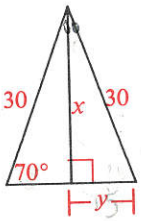
A

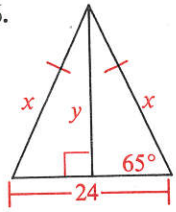
1. 

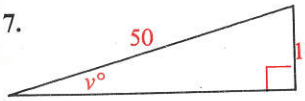
2. 

3. 

4. 

5. 

6. 

7. 

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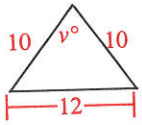
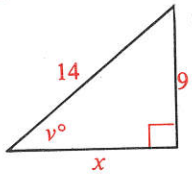
9. 

10. **a.** Use the Pythagorean Theorem to find the value of x in radical form.
b. Use the sine table to find $v°$.
c. Use the cosine table and the answer in (b) to find the value of x.
d. Are the x values from (a) and (c) in reasonable agreement?



B

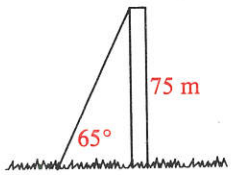
11. The base of an isosceles triangle is 32 cm long and the legs are 24 cm long. Find the measure of a base angle. (*Hint:* Draw the altitude to the base.)

12. The base of an isosceles triangle is 42 cm long and the legs are 25 cm long. Find the measure of the vertex angle.

13. An isosceles triangle with legs 60 cm long has a 42° base angle. Find the lengths of the altitude and the base.

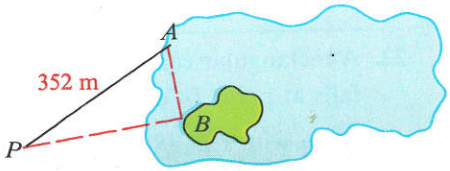
14. Points A, B, and C are three consecutive vertices of a regular decagon whose sides are 16 cm long. How long is diagonal $\overline{AC}$?

15. A guy wire is attached to the top of a 75 m tower and meets the ground at a 65° angle. How long is the wire?

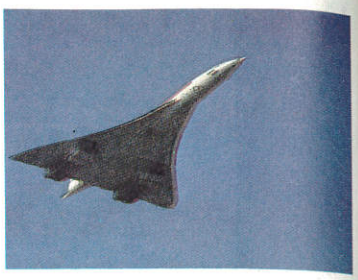


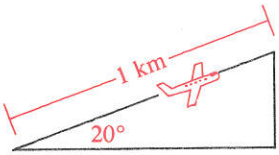
Ex. 15

16. To find the distance from point A on the shore of a lake to point B on an island in the lake, surveyors locate point P with $m\angle PAB = 65$ and $m\angle APB = 25$. They find $PA = 352$ m. Find AB.

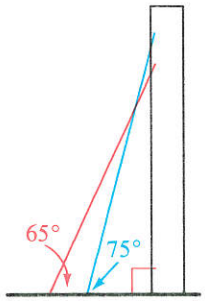


17. A certain jet is capable of a steady 20° climb. How much altitude does the jet gain when it moves 1 km through the air? Answer to the nearest 50 m.



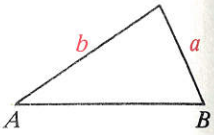


18. A 6 m ladder reaches higher up a wall when placed at a 75° angle than when placed at a 65° angle. How much higher, to the nearest tenth of a meter?



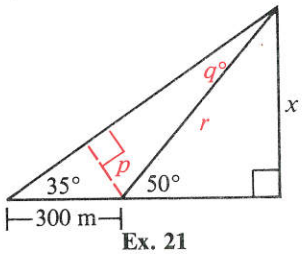
In Exercises 19 and 20, write the statements, but not the supporting reasons, of the proof.

C **19.** Prove that in any triangle with acute angles A and B: $\frac{a}{\sin A} = \frac{b}{\sin B}$. (*Hint:* Draw a perpendicular from the third vertex to $\overline{AB}$. Label it p.)

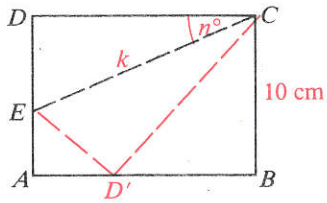


20. Prove: Where E is any acute angle, $(\sin E)^2 + (\cos E)^2 = 1$. (*Hint:* From any point on one side of $\angle E$, draw a perpendicular to the other side.)

21. The diagram in black is given. One way to determine the length x is to draw the red segment and compute the values, in the order named, of p, $q°$, r, and x. Find x.



Ex. 21



Ex. 22

22. A rectangular card is 10 cm wide. The card is folded so that the vertex D falls at point D' on $\overline{AB}$ as shown. Crease $\overline{CE}$ with length k makes an $n°$ angle with $\overline{CD}$. Show: $k = \frac{10}{\sin (2n)° \cos n°}$