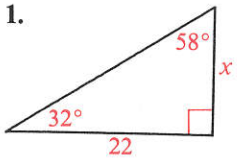
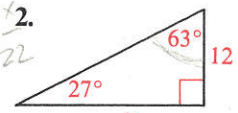
Written Exercises

Find x correct to the nearest tenth. Use the table on page 271.

A **1.**



2.



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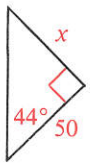

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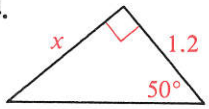

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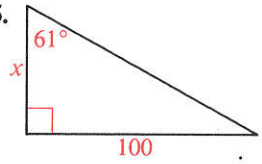

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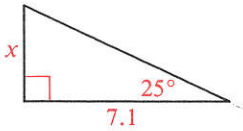
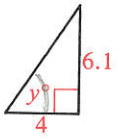
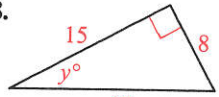


Find $y°$ correct to the nearest degree.

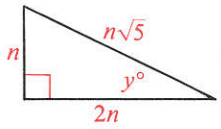
7.



8.

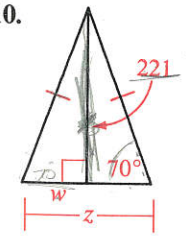


9.

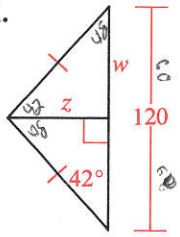


Find w, then z, correct to the nearest integer.

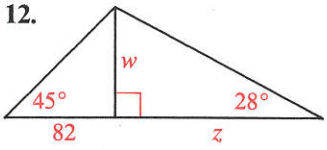
B **10.**



11.



12.



13. A rhombus has diagonals of length 4 and 10. Find the angles of the rhombus to the nearest degree.

14. The sides of a rectangle are 20 and 40. Find, to the nearest degree, the measure of an acute angle formed at the intersection of the diagonals.

15. A natural question to consider is the following:

$$\text{Does } \tan A + \tan B = \tan (A + B)?$$

Try 35 for the measure of A and 25 for the measure of B.

a. $\tan 35° + \tan 25° \approx$? $+$? $=$?

b. $\tan (35° + 25°) = \tan$? $° \approx$?

c. What is your answer to the general question raised in this exercise, *yes* or *no*?

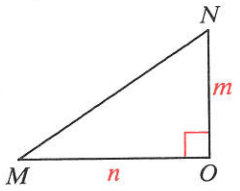
16. The shorter diagonal of a rhombus with a 70° angle is 124 cm long. How long (to the nearest centimeter) is the longer diagonal?

17. Complete the proof by supplying reasons and completing statements.

Given: $\angle M$ and $\angle R$ are complementary angles.

Prove: $\tan M \cdot \tan R = 1$

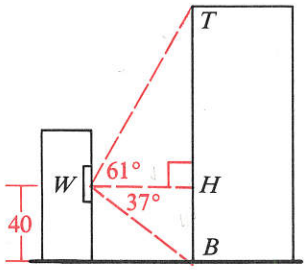
Plan for Proof: Draw right $\triangle MNO$ with $\angle M$ at one vertex and a right angle at O. The other acute angle, $\angle N$, is complementary to $\angle M$, so $\angle N \cong \angle R$. Show that $\tan M \cdot \tan N = 1$ and conclude that $\tan M \cdot \tan R = 1$.



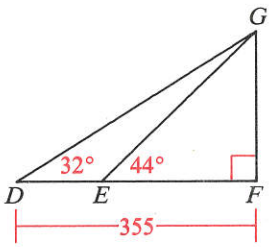
Proof:

1. $\angle N$ is a complement of $\angle M$. (Why?)
2. $\angle R$ is a complement of $\angle M$. (Why?)
3. $m\angle N = m\angle R$ (Why?)
4. $\tan N = \tan R$ (Why?)
5. $\tan M = \frac{m}{n}$ and $\tan N =$? (Definition of tangent)
6. $\tan M \cdot \tan N = \frac{m}{n} \cdot \frac{n}{m} = 1$ (Multiplication and Substitution Properties)
7. $\tan M \cdot \tan R = 1$ (Why?)

C **18.** A person at window W, 40 ft above street level, sights points on a building directly across the street. H is chosen so that $\overline{WH}$ is horizontal. T is directly above H, and B is directly below. By measurement, $m\angle TWH = 61$ and $m\angle BWH = 37$. How far above street level is T?



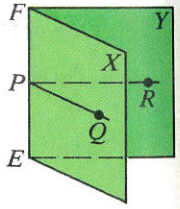
Ex. 18



Ex. 19

19. Use the figure to find EF to the nearest integer.

20. In the diagram, half-planes X and Y with the same edge $\overleftrightarrow{FE}$ form **dihedral angle** X-FE-Y. If $\overrightarrow{PR} \perp \overleftrightarrow{FE}$ and $\overrightarrow{PQ} \perp \overleftrightarrow{FE}$, then $\angle RPQ$ is called a *plane angle* of this dihedral angle. The measure of a dihedral angle is defined to be the measure of any of its plane angles, so the measure of this dihedral angle is $m\angle RPQ$.



In the cube shown at the right, find, to the nearest degree, the measure of the dihedral angle containing the two shaded triangles.