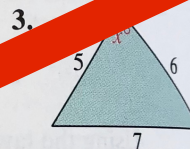
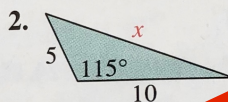
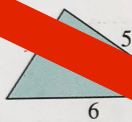


Given:	Use:	To find:
SAS	law of cosines	the third side and then one of the remaining angles.
SSS	law of cosines	any two angles.
ASA or AAS	law of sines	the remaining sides.
SSA	law of sines	an angle opposite a given side and then the third side. (Note that 0, 1, or 2 triangles are possible.)

When you use the law of sines, remember that every acute angle and its supplement have the same sine value. Class Exercises 4–7 show how you can tell which angle is correct for a given triangle.

CLASS EXERCISES

In Exercises 1–3, state an equation that you can use to solve for x .



In Exercises 4–7, consider $\triangle XYZ$ with $x = 4$, $y = 8$, and $\angle Z = 50^\circ$.

- Use the law of cosines to find z to the nearest hundredth.
- Use the law of sines to find the measure of $\angle Y$ to the nearest tenth of a degree. Then find the measure of $\angle X$.
- Since $x < z < y$, what can you say about the measures of $\angle X$, $\angle Y$, and $\angle Z$?
- Do your answers to Exercises 5 and 6 agree? If not, find your error.

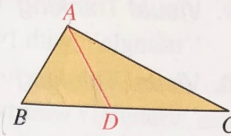
WRITTEN EXERCISES

Solve each triangle. Give lengths to three significant digits and angle measures to the nearest tenth of a degree.

- A**
- $a = 8$, $b = 5$, $\angle C = 60^\circ$
 - $x = 9$, $y = 40$, $z = 41$
 - $p = 3$, $q = 8$, $\angle R = 50^\circ$
 - $a = 8$, $b = 7$, $c = 13$
 - $t = 16$, $s = 14$, $\angle R = 120^\circ$
 - $a = 6$, $b = 10$, $c = 7$
 - $d = 5$, $e = 9$, $\angle F = 115^\circ$
 - $x = 10$, $y = 11$, $z = 12$

In Exercises 9 and 10, use the method of Example 3, page 351, to find AD in the diagram at the right.

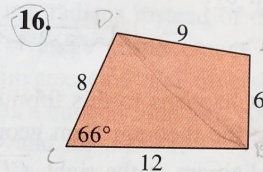
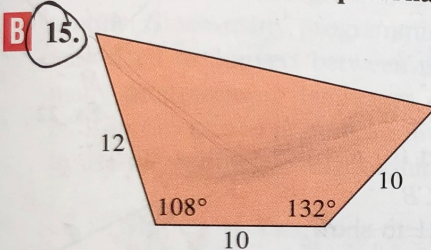
9. $AB = 8, BD = 7, DC = 5, AC = 10$
 10. $AB = 5, BD = 5, DC = 3, AC = 7$



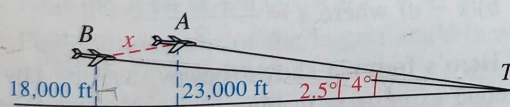
In Exercises 11 and 12, find the length of the median from A in the given $\triangle ABC$. Give your answers in simplest radical form.

11. $a = 8, b = 4, c = 6$
 12. $a = 12, b = 13, c = 5$
 13. A parallelogram has a 70° angle and sides 6 cm and 10 cm long. How long are its diagonals?
 14. An isosceles trapezoid has a height of 4 cm and bases 3 cm and 7 cm long. How long are its diagonals?

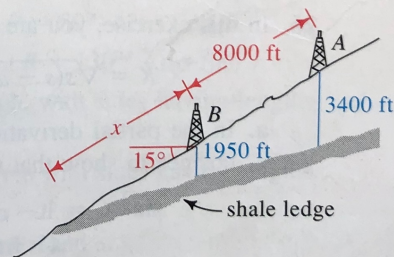
Find the area of each quadrilateral to the nearest square unit.



17. **Aviation** Two airplanes, at points A and B in the diagram at the left below, have elevations of 23,000 ft and 18,000 ft, respectively. Both are flying east toward an airport control tower at T . From T , the angle of elevation of the airplane at A is 4° , and the angle of elevation of the airplane at B is 2.5° . How far apart (in mi) are the airplanes? (5280 ft = 1 mi)



Ex. 17



Ex. 18

18. **Geology** In the diagram at the right above, an oil well at A was drilled 3400 ft before it hit a ledge of shale. The same ledge was only 1950 ft deep when drilled from a well at B , which is 8000 ft directly downhill from A . The hill is inclined at 15° to the horizontal.
- If you assume that the ledge lies in a plane, how far down the hill from B would you expect the shale ledge to emerge?
 - What is the angle between the ledge and the hill?