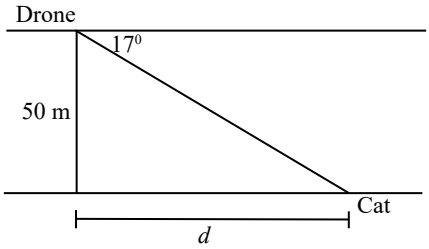


Notice that the angle of depression from the drone to the cat (15^o) is equal to the angle of elevation from the cat to the drone, θ, because they are alternate interior angles. From the sketch, we see that the length of the opposite side is 50 meters and the unknown length (d) is the adjacent side. Thus, we should use the tangent function, to $\tan\theta = \frac{\text{Opposite}}{\text{Adjacent}}$, find d.

$$\tan 15^\circ = \frac{50\,\text{m}}{d}$$
$$d = \frac{50\,\text{m}}{\tan 15^\circ}$$
$$d \approx 186.6\,\text{m}$$

Therefore, the horizontal distance between the cat and the drone is approximately 186 meters.

9.R.1 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. The sum of the measures of two complementary angles is equal to the measure of one right angle.

2. The sum of the measures of complementary angles is greater than the sum of the measures of supplementary angles.

3. Adjacent angles are two angles that share a side.

4. If two lines in a plane are not parallel, then they are perpendicular.

5. A triangle with sides of 4 inches, 4 inches, and 3 inches is an isosceles triangle.

6. A triangle with three angles that each measure less than 90 degrees is an acute triangle.

Practice

7. Name the type of angle formed by the hands on a clock.

a.  **b.**  **c.**  **d.** 

a. at six o'clock

b. at three o'clock

c. at one o'clock

d. at five o'clock

8. Assume that $\angle 1$ and $\angle 2$ are complementary.

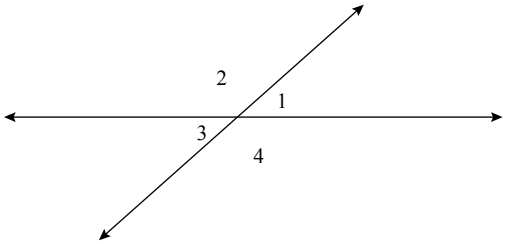
a. If $m\angle 1 = 15°$, what is $m\angle 2$?

b. If $m\angle 1 = 3°$, what is $m\angle 2$?

c. If $m\angle 1 = 45°$, what is $m\angle 2$?

d. If $m\angle 1 = 75°$, what is $m\angle 2$?

9. The figure shows two intersecting lines.



a. If $m\angle 1 = 30°$, what is $m\angle 2$?

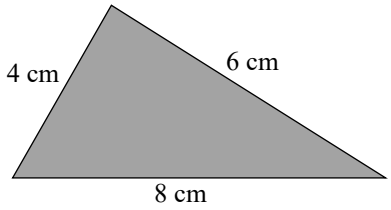
b. Is $m\angle 3 = 30°$? Give a reason for your answer other than the fact that $\angle 1$ and $\angle 3$ are vertical angles.

c. Name two pairs of congruent angles.

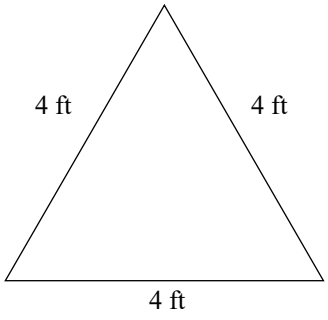
d. Name four pairs of adjacent angles.

Classify each triangle in the most precise way possible, given the indicated lengths of its sides and/or measures of its angles.

10.



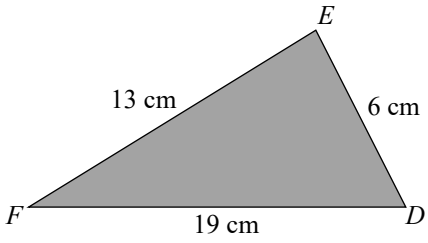
11.



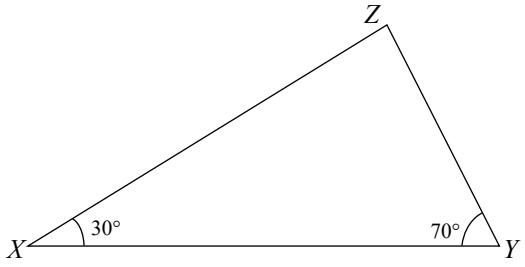
Applications

Solve.

12. Suppose the lengths of the sides of $\angle DEF$ are as shown in the figure. Is this possible? Explain your reasoning.



13. In the triangle shown, $m\angle X = 30°$ and $m\angle Y = 70°$.



a. What is $m\angle Z$?

b. What kind of triangle is $\angle XYZ$?

c. Which side is opposite $\angle X$?

d. Which sides include $\angle X$?

e. Is $\angle XYZ$ a right triangle?

Writing & Thinking

14. Explain, in your own words, the relationships between vertex, ray, angle, and line.