PRACTICE & PROBLEM SOLVING

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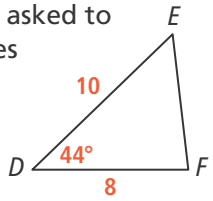
Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

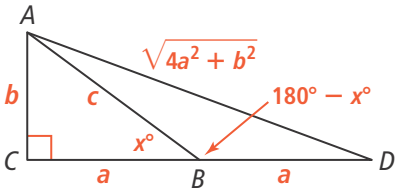
13. Construct Arguments How is the Law of Cosines used to find missing angle measures if the side lengths of a triangle are given? Explain.

14. Error Analysis Tavon is asked to find *EF*. What error does Tavon make?



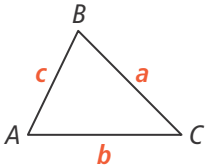
$EF^2 = DF^2 + DE^2 - 2(DF)(DE)\cos D$
$EF^2 = 8^2 + 10^2 - 2(8)(10)\cos 44°$
$EF^2 \approx 64 + 100 - 160 \cdot 0.7193$
$EF \approx 48.91$

15. Higher Order Thinking Use the diagram to show that for acute angle $x°$, $\cos(180 - x)° = -\frac{a}{c}$. *Hint:* Apply the Law of Cosines to $\triangle ABD$ and write an equation involving $\cos(180 - x)°$. Then, for $\triangle ABC$, use the relationship $a^2 + b^2 = c^2$.



16. Generalize Suppose you know two of the side lengths of a triangle and the measure of one of the angles. How do you choose whether to find the third side length using the Law of Sines or the Law of Cosines? Explain.

17. Look for Relationships Consider $\triangle ABC$.

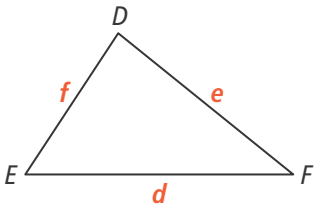


a. How would you find $m\angle A$ if you were given *a*, *b*, and *c*? Include an equation in your explanation.

b. How would you find *a* if you were given $m\angle A$, *b*, and *c*? Include an equation in your explanation.

PRACTICE

For Exercises 18 and 19, use $\triangle DEF$. Find an equation for each length. SEE EXAMPLE 1

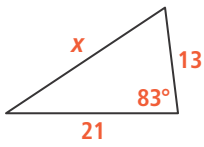


18. length *e*

19. length *f*

For Exercises 20–23, find *x* to the nearest tenth. SEE EXAMPLE 2

20.



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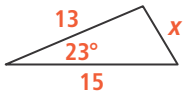

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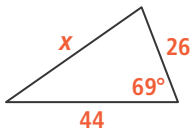

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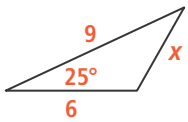
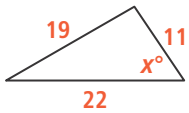


For Exercises 24–27, find *x* to the nearest tenth. SEE EXAMPLE 3

24.



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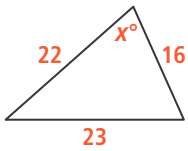

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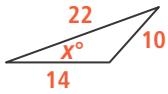

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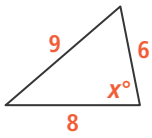
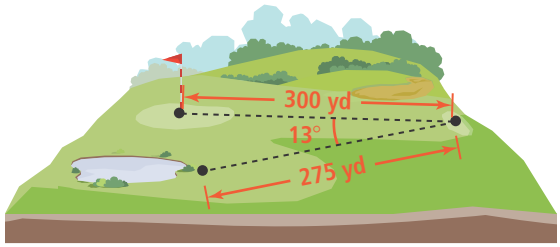


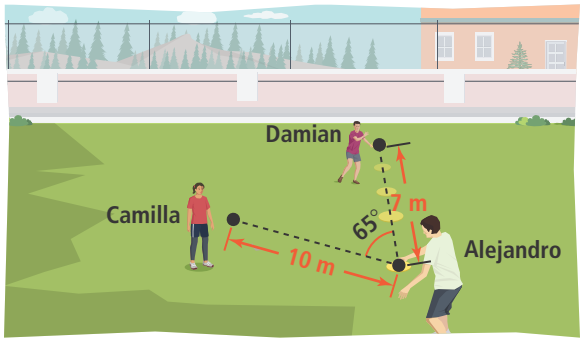
28. A golfer hits from the tee for a 300-yard hole. Her drive carries 275 yards but is 13° off line from the hole. How much farther must the golfer now hit the ball to reach the hole? SEE EXAMPLE 4



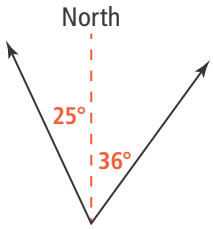
PRACTICE & PROBLEM SOLVING

APPLY

29. Model With Mathematics Alejandro, Camilla, and Damian are practicing for a game of ultimate, which is played on a field with a flying disc. Alejandro has the disc and Camilla is in the end zone, but Alejandro can only throw accurately for distances of 7.5 m or less. He throws the disc to Damian, because Damian can throw with accuracy up to 9.5 m. Is Camilla within Damian's range of accuracy? Explain.

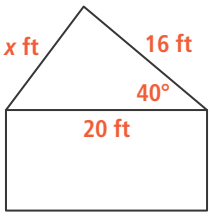


30. Mathematical Connections Two rescue workers leave at the same time to find an injured hiker. The first walks 25° west of north at 3.5 mi/h, and the second walks 36° east of north at 2.5 mi/h.



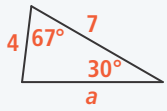
After 2 hours, the second worker finds the hiker and radios the first worker for help. If the first worker jogs directly to the second worker at 6 mi/h, how long will it take for her to arrive?

31. Make Sense and Persevere An architect proposes the plan shown for a new roof with a 40° incline on one side. The owner of the house thinks that 40° is not steep enough and wants the incline to be 50°. If the length of the adjacent side does not change, by how much does the length, x ft, of the opposite side increase? What is the new angle of incline for the opposite side?



ASSESSMENT PRACTICE

32. Which equation is true for the triangle shown? Select all that apply.



Ⓐ $a^2 = 16 + 49 - 28 \cos 30°$

Ⓑ $16 = a^2 + 49 - (14a)\cos 30°$

Ⓒ $49 = a^2 + 16 - (4a)\cos 67°$

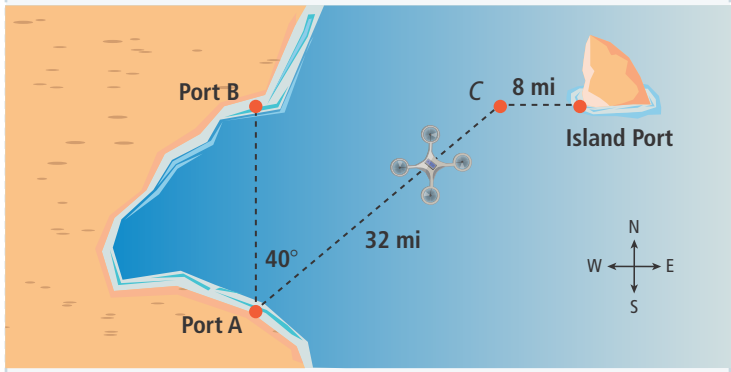
Ⓓ $a^2 = 49 + 16 - 56 \cos 67°$

33. SAT/ACT A triangle has sides with lengths 12 cm and 15 cm. The measure of the included angle is 46°. What is the length of the third side, to the nearest tenth of a centimeter?

Ⓐ 24.9 cm Ⓒ 13.0 cm

Ⓑ 10.5 cm Ⓓ 10.9 cm

34. Performance Task A medical supply drone leaves Port A traveling 40 degrees east of north. After flying 32 mi on that course to point C, the drone turns 50° to the right to fly due east. It then flies another 8 mi, where it makes a drop at Island Port.



Part A The drone can fly a total distance of 75 miles before it needs to recharge. Can it fly directly back to Port A from Island Port? Explain.

Part B Port B is 24 miles due north of Port A. What is the distance from Island Port to Port B? Can the drone fly to Port B?

Part C Port B appears to be directly west of Island Port. Is it? If so, explain. If not, what direction is it from Island Port?