PRACTICE & PROBLEM SOLVING

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Practice Tutorial

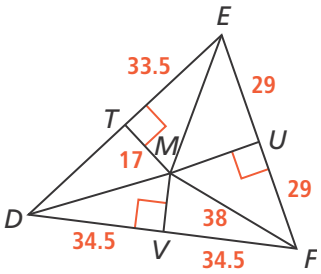
Additional Exercises Available Online

UNDERSTAND

10. **Construct Arguments** Write a Proof of Theorem 5–6: In $\triangle ABC$, let the angle bisectors of $\angle A$ and $\angle B$ intersect at point P. Show that P is equidistant from each side of $\triangle ABC$, and that $\overline{CP}$ bisects $\angle C$.

11. **Higher Order Thinking** A right triangle has vertices $X(0, 0)$, $Y(0, 2a)$, $Z(2b, 0)$. What is the circumcenter of the triangle? Make a conjecture about the diameter of a circle that is circumscribed about a right triangle.

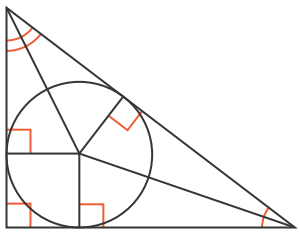
12. **Error Analysis** What is the error that a student made in finding the perimeter of $\triangle DTM$? Correct the error.



$DT = 34.5$, $TM = 17$, $DM = 34.5$.
The perimeter of ΔDTM is $34.5 + 17 + 34.5 = 86$. ✗

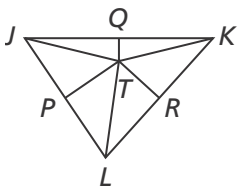
13. **Mathematical Connections** A triangle with incenter P has side lengths x, y, and z. The distance from P to each side is a. Write an expression for the area of the triangle. Use the distributive property to factor your expression.

14. **Reason** In a right triangle with side lengths of 3, 4, and 5, what is the radius of the inscribed circle? Show your work. (Hint: Let r be the radius. Label the lengths of each segment formed by the perpendiculars to the sides.)

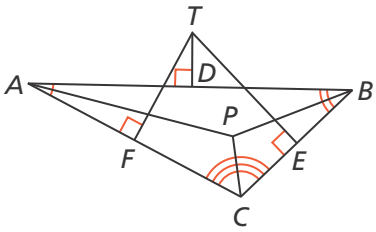


PRACTICE

15. The perpendicular bisectors of $\triangle JKL$ are $\overline{PT}$, $\overline{QT}$, and $\overline{RT}$. Name three isosceles triangles. SEE EXAMPLE 1



Use the diagram below for Exercises 16–18. Points *D*, *E*, and *F* are the midpoints of the sides of $\triangle ABC$. SEE EXAMPLES 2 AND 4

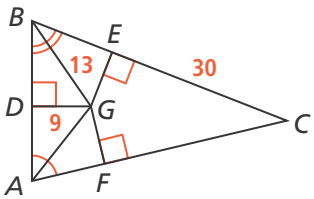


16. Which point is the center of a circle that contains A, B, and C?

17. Which point is the center of a circle that intersects each side of $\triangle ABC$ at exactly one point?

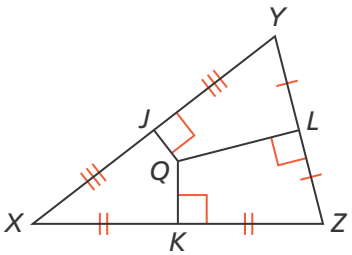
18. The perpendicular bisector of $\overline{AB}$ is m and the perpendicular bisector of $\overline{BC}$ is n. Lines m and n intersect at T. If $TA = 8.2$, what is TC? SEE EXAMPLE 3

Find the values. SEE EXAMPLE 5



19. EG **20.** GF

If $XY = 24$, $XZ = 22$, and $JQ = 5$, find the values. Round to the nearest tenth.



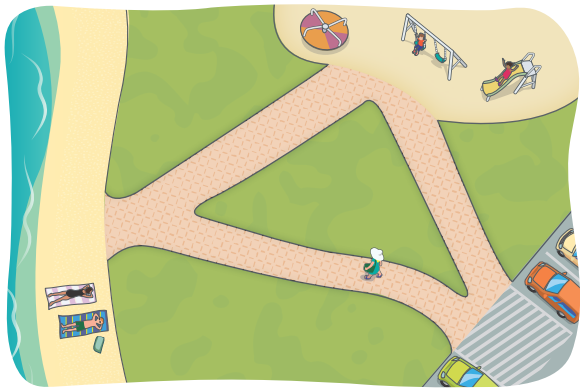
21. The radius of the circumscribed circle of $\triangle XYZ$

22. QK

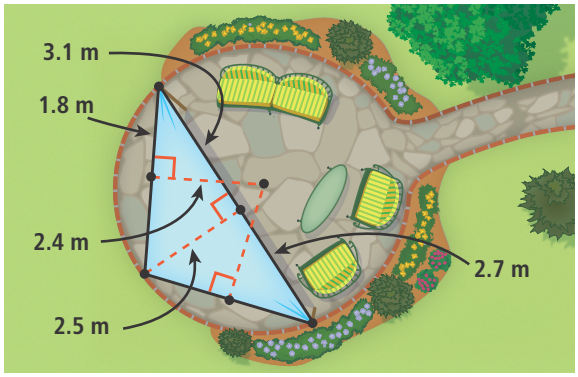
PRACTICE & PROBLEM SOLVING

APPLY

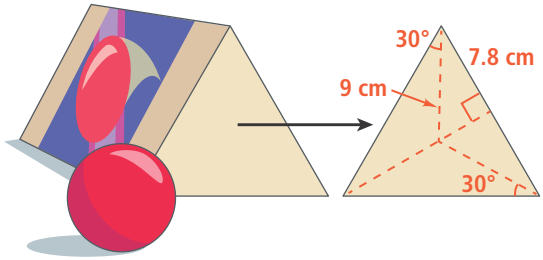
23. Model With Mathematics A maintenance crew wants to build a shed at a location that is the same distance from each path. Where should the shed be located? Justify your answer with a diagram.



24. Reason What is the area of the patio **not** covered by the sunshade? Round to the nearest tenth, and explain how you found your answer.



25. Make Sense and Persevere A ball manufacturer wants to stack three balls, each with an 8-centimeter diameter, in a box that is an equilateral triangular prism. The diagram shows the dimensions of the bases. Will the balls fit in the box? Explain how you know.



ASSESSMENT PRACTICE

26. In $\triangle ABC$, $\overline{AB}$ has midpoint M, and ℓ is the perpendicular bisector of $\overline{AB}$ and the angle bisector of $\angle ACB$. Which of the following must be true? Select all that apply.

Ⓐ The radius of the inscribed circle of $\triangle ABC$ is AM.

Ⓑ $AC = CB$

Ⓒ Both the circumcenter and incenter of $\triangle ABC$ are on ℓ.

Ⓓ The circumcenter of $\triangle ABC$ is inside the triangle.

27. SAT/ACT Circle O intersects $\overline{AB}$ only at F, $\overline{BC}$ only at G, and $\overline{AC}$ only at H. Which equation is true?

Ⓐ $AH = AC$

Ⓑ $m\angle OFB = 90$

Ⓒ $OB = OC$

Ⓓ $OF = OC$

Ⓔ $\angle BAO \cong \angle ABO$

28. Performance Task Edison High School is designing a new triangular pennant. The school mascot will be inside a circle, and the circle must touch each side of the pennant. The circle should fill as much of the pennant as possible.

Part A Using a straightedge and compass, draw at least 4 different types of triangles for the pennant. Construct an inscribed circle in each triangle.

Part B Make a table about your pennants. Include side lengths, type of triangle, circle radius and area, triangle area, and ratio of circle area to triangle area.

Part C What type of triangle do you recommend that they use? Justify your answer.