## PRACTICE AND PROBLEM SOLVING

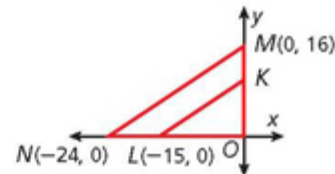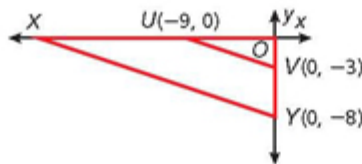**10. Advertising** A promoter produced this design for a street festival. She now wants to make the design smaller to use on postcards. Sketch the design after a dilation with scale factor $\frac{1}{2}$.
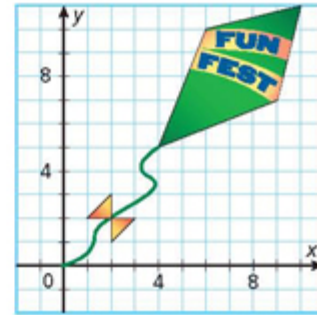
**11.** Given that $\triangle UOV \sim \triangle XOY$, find the coordinates of $X$ and the scale factor.

**12.** Given that $\triangle MON \sim \triangle KOL$, find the coordinates of $K$ and the scale factor.

**13.** Given: $D(-1, 3)$, $E(-3, -1)$, $F(3, -1)$, $G(-4, -3)$, and $H(5, -3)$
Prove: $\triangle DEF \sim \triangle DGH$

**14.** Given: $M(0, 10)$, $N(5, 0)$, $P(15, 15)$, $Q(10, -10)$, and $R(30, 20)$
Prove: $\triangle MNP \sim \triangle MQR$

**H.O.T. Multi-Step** Graph the image of each triangle after a dilation with the given scale factor. Then verify that the image is similar to the given triangle.

**15.** $J(-2, 0)$ and $K(-1, -1)$, and $L(-3, -2)$ with scale factor 3

**16.** $M(0, 4)$, $N(4, 2)$, and $P(2, -2)$ with scale factor $\frac{1}{2}$

**H.O.T. 17. Critical Thinking** Consider the transformation given by the mapping $(x, y) \rightarrow (2x, 4y)$. Is this transformation a dilation? Why or why not?
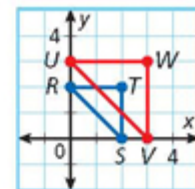
**18. ///ERROR ANALYSIS///** Which solution to find the scale factor of the dilation that maps $\triangle RST$ to $\triangle UVW$ is incorrect? Explain the error.

**A** To go from $\triangle RST$ to $\triangle UVW$, the coordinates of each point of $\triangle RST$ are multiplied by $\frac{3}{2}$, so the scale factor is $\frac{3}{2}$.

**B** The scale factor is the ratio of corresponding measures. Since $\frac{RT}{UW} = \frac{2}{3}$, the scale factor is $\frac{2}{3}$.
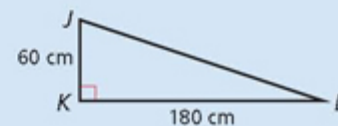
**H.O.T. 19. Write About It** A dilation maps $\triangle ABC$ to $\triangle A'B'C'$. How is the scale factor of the dilation related to the similarity ratio of $\triangle ABC$ to $\triangle A'B'C'$? Explain.

**Real-World Connections**

**20. a.** In order to build a skateboard ramp, Miles draws $\triangle JKL$ on a coordinate plane. One unit on the drawing represents 60 cm of actual distance. Explain how he should assign coordinates for the vertices of $\triangle JKL$.
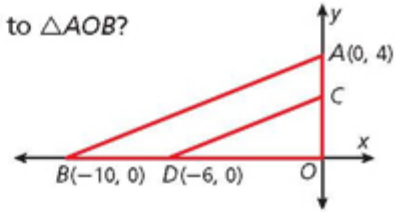
**b.** Graph the image of $\triangle JKL$ after a dilation with scale factor 3.

21. Which coordinates for $C$ make $\triangle COD$ similar to $\triangle AOB$?

    (A) $(0, 2.4)$     (C) $(0, 3)$
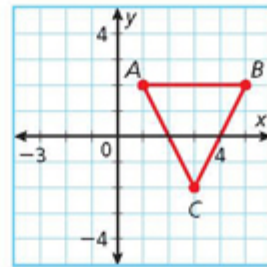    (B) $(0, 2.5)$     (D) $(0, 3.6)$



22. A dilation with scale factor 2 maps $\triangle RST$ to $\triangle R'S'T'$. The perimeter of $\triangle RST$ is 60. What is the perimeter of $\triangle R'S'T'$?

    (F) 30          (G) 60          (H) 120          (J) 240

23. Which triangle with vertices $D$, $E$, and $F$ is similar to $\triangle ABC$?

    (A) $D(1, 2)$, $E(3, 2)$, $F(2, 0)$
    (B) $D(-1, -2)$, $E(2, -2)$, $F(1, -5)$
    (C) $D(1, 2)$, $E(5, 2)$, $F(3, 0)$
    (D) $D(-2, -2)$, $E(0, 2)$, $F(-1, 0)$



24. **Gridded Resonse** $\overline{AB}$ with endpoints $A(3, 2)$ and $B(7, 5)$ is dilated by a scale factor of 3. Find the length of $\overline{A'B'}$.

## CHALLENGE AND EXTEND



**H.O.T.** 25. How many different triangles having $\overline{XY}$ as a side are similar to $\triangle MNP$?

26. $\triangle XYZ \sim \triangle MPN$. Find the coordinates of $Z$.

27. A rectangle has two of its sides on the $x$- and $y$-axes, a vertex at the origin, and a vertex on the line $y = 2x$. Prove that any two such rectangles are similar.

28. $\triangle ABC$ has vertices $A(0, 1)$, $B(3, 1)$, and $C(1, 3)$. $\triangle DEF$ has vertices $D(1, -1)$ and $E(7, -1)$. Find two different locations for vertex $F$ so that $\triangle ABC \sim \triangle DEF$.
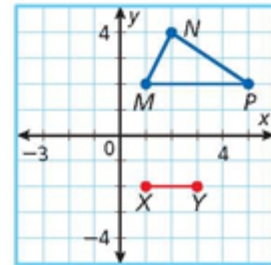
## FOCUS ON MATHEMATICAL PRACTICES

**H.O.T.** 29. **Error Analysis** Jonah says that $\triangle RST$ shown is similar to a triangle in the coordinate plane with vertices $D(6, 6)$, $E(1, 6)$, and $F(1, 10)$. Charles says that the two triangles are not similar. Who is correct? Explain your answer.

**H.O.T.** 30. **Problem Solving** $\overline{JK}$ has length 10. $\overline{J'K'}$ is a dilation of $\overline{JK}$ and has endpoints $J'(5, 16)$ and $K'(12, -8)$. Find the scale factor of the dilation and show your work. Is the dilation an enlargement or a reduction? How do you know?