D. Yes, the distance will be the same. This time, the scale factor from the small to the large triangle is 4. This gives the distance between Stake 3 and Tree 1 as 120 ft. From this, we subtract the 30 ft from Stake 3 to Stake 1 to get 90 ft across the river.

**Corresponding ACE Answers**

**Applications**

22. Jalen is correct in his reasoning. Similarity between shapes does not depend on orientation. If you increase the size of the smaller rectangle by $\frac{7}{3}$, then rotate it $90^\circ$, the result would be the larger rectangle.

23. Melanie is correct. In order for the shapes to be similar, they must have consistent scale factors, which they do not.

   Evan is incorrect. Evan’s reasoning highlights the differences between polygons in general and the specific case of triangles. With triangles you can determine similarity just by comparing corresponding angles, but this does not always work with other figures.

   Wyatt is incorrect. Wyatt’s thinking is a common mistake for many students. Wyatt thinks that an additive relationship of the sides indicates similarity, rather than a multiplicative relationship.

24. Jeff is correct in his reasoning. When a scale factor is applied in a figure, it is applied to lengths. Jeff’s perimeter is four times as great as the perimeter of the original parallelogram.

   Janine applied a scale factor of $\frac{1}{2}$, and Trisha applied a scale factor of 2.

25. About 98.9 feet; Compare the corresponding ratio of the similar triangles:

   $$\frac{x}{10} = \frac{400 + 45}{45}$$ 

   and solve for $x$, the height of the cliff.

26. All the triangles are equilateral; the large triangle has all three sides measuring 12 inches. The measure of all three sides of the medium triangle is 8 inches, and the measure of all sides of the smallest triangle is 4 inches.
27. All three triangles are isosceles, as can be seen by the medium triangle with sides 9 m, 18 m, and 18 m. The triangles are all similar because each smaller triangle is nested in the larger triangle. Note the base of each triangle is half the length of its legs. The large isosceles triangle has a leg of 30 m, so its base is 15 m. Also, the smallest triangle has one leg of 12 m, so its other leg is also 12 m and its base is 6 m.

28. First, determine the length of the base of the large triangle. The length of the base should be 36 cm. You can determine the missing side of the small triangle by dividing 39 cm by the scale factor of 3, which should result in the missing side for the small triangle, 13 cm.

Connections

40. B

41. \( a = 12 \text{ cm} \)

42. \( b = 9 \text{ cm} \)

Extensions

53. a. Song’s conjecture is incorrect. After the first reduction, her copy will be
4 1/2 in. x 6 in. When she enlarges it, it will be 50% larger than the copy, which is 6 3/4 in. x 9 in.

b. No. After the enlargement, her copy will be 13 1/2 in. x 18 in. Reducing this by 50% produces a copy 6 3/4 in. x 9 in. This is the same size as in part (a), but still smaller than the original.

c. Yes. The results are similar. Using the method in part (a), the scale factor is 1/2, then the copy is enlarged by a scale factor of 3/2. The sides of the final copy are 1/2 x 3/2, or 3/4 the original size. If the process is reversed, the same result occurs because 3/2 x 1/2 = 3/4.

d. Song should choose to enlarge the original by 400%, or a scale factor of 4. This would “undo” the reduction by 25% or scale factor of 1/4 because 4 x 1/4 = 1.

e. Answers will vary, but two likely responses include the second copy being smaller than the original. Also, similarly to part (c), reversing the order of a reduction and enlargement has no effect on the final copy.

f. Answers will vary. Possible answers may include: Reversing the order of the scale factors results in the same final copy; Two reductions result in a copy smaller than either of the reductions would produce on its own; Two enlargements result in a copy larger than either of the enlargements would produce on its own; A reduction paired with an enlargement could result in a copy larger than, smaller than, or the same size as the original. You can make a copy the same size as the original if you apply an enlargement or reduction and its reciprocal.

ACE Answers: Inv. 3 Stretching and Shrinking