Corresponding ACE Answers

Applications

7. a. 
   - base: 2.5
   - height: 2.5

b. 
   - base: 1.5
   - height: 2

c. 
   - base: 9
   - height: 3

8. a. Rectangles H and P, Triangles R and Q, and Parallelograms M and N
   b. The scale factor from H to P is 2, from R to Q is $\frac{3}{2}$, and from N to M is $\frac{3}{2}$.

9. angle $A = 67^\circ$

10. angle $Q = 64^\circ$

11. angle $P = 67^\circ$

12. side $AB = 38$ in.

13. side $AC = 45$ in.

14. perimeter $ABC = 129$ in.

15. C

16. F

17. C

18. H

19. 192 cm$^2$

20. 10

21. 10 cm by 14 cm
Connections

39.  a. 4 cm by 6 cm

b. 2 cm by 3 cm; Possible explanation: When you reduce a figure by 50%, you need to make each side length half of the corresponding side length of the original. Since the first reduction of 50% resulted in a rectangle with dimensions of 4 centimeters and 6 centimeters, you need to find half of 4 centimeters and half of 6 centimeters. The dimensions should be 2 centimeters and 3 centimeters.

c. The rectangle is $\frac{1}{16}$ the size of the original rectangle. The dimensions of the new rectangle are $\frac{1}{4}$ the lengths of the original rectangle.

Note: One thing students often have difficulty with conceptually is that multiplying by a number smaller than 1 reduces the original. Multiplication is usually taught as a “makes larger” operation in the elementary grades. This concept makes the new world of rational numbers harder for students to enter.

Suppose you take a piece of rope that is 12 m long and reduce its length by a factor of 0.5 (or $\frac{1}{2}$). The new length of the rope is 6 m. Suppose you reduced the new length of the rope by a factor of 0.5 again. The length of the rope is 3 m. A physical model of what is happening to the rope is shown.

![Rope Reduction Model]

Extensions

48. $\sqrt{100}$

49. G

50. The side length of the square is 12 units.

51. $\sqrt{f}$

52. Answers will vary. Possible answers: For rep-tiles, when we used a scale factor of 2, we needed 4 (the square of 2) tiles to make the larger tile. In Problem 3.3, when we needed a rectangle whose area was $\frac{1}{4}$ of the original, we used a scale factor of $\frac{1}{2} = \sqrt{\frac{1}{4}}$. In Problem 2.3, when we compared the areas of similar rectangles, we found that they grew by the square of the scale factor.

ACE Answers: Inv. 3 Stretching and Shrinking