Practice with Similar Figures

11. Two similar pyramids have heights of 2 m and 5 m. Find the ratio of their volumes.

12. Two similar cylinders have volume of 27π m^3 and 64π m^3. Find the ratio of their surface areas.

13. Two similar prisms have surface area of 4π cm^2 and 49π cm^2. Find the ratio of their volumes.

14. Two solids are similar, with volumes of 16 in^3 and 2 in^3. If the larger solid has surface area of 12 in^2, what is the surface area of the smaller solid?

15. Two solids are similar, with surface areas of 4π cm^2 and 25π cm^2. If the smaller solid has volume of 16π cm^3, what is the volume of the larger solid?

16. A clown's face on a balloon is 4 in. high when the balloon holds 108 in.^{3} of air. How much air must the balloon hold for the face to be 8 in. high?

17. The similarity ratio of two regular octagons is 5:9. The area of the smaller octagon is 100 ft^2. Find the area of the larger octagon.

18. The areas of two equilateral triangles are 27 yd^2 and 75 yd^2. Find their similarity ratio and the ratio of their perimeters.

19. Mulch to cover an 8-ft by 16-ft rectangular garden costs $48. At the same rate, what would be the cost of mulch to cover a 12-ft by 24-ft rectangular garden?

20. A solid chocolate rabbit is 6 in. high and weighs 0.25 lb. A similar chocolate rabbit is 12 in. high. How much does it weigh?

21. Find the similarity ratio of two spheres with volumes of 20π m^3 and 16π m^3.

22. A glass sphere weighs 0.4 lb. How much does another such sphere weigh if its circumference is seven times as large?

23. A figure with an area of 7.5 square units is dilated so that the area of the image is 91.875 square units. What is the scale factor used in the dilation?

24. A figure with a perimeter of 30 feet and area of 56 square feet is dilated using a scale factor of 3.25. What is the perimeter and area of the enlarged figure?

25. The area of a figure is 21 square units. It is dilated using a scale factor of 0.5. What is the area of the image?

Practice with Similar Figures

11. Two similar pyramids have heights of 2 m and 5 m. Find the ratio of their volumes. $\dfrac{2^3}{5^3} = \dfrac{8}{125}$

12. Two similar cylinders have volume of 27π m^3 and 64π m^3. Find the ratio of their surface areas.

$$\dfrac{27\pi}{64\pi} = \sqrt[3]{\dfrac{27}{64}} = \dfrac{3}{4} \qquad A = \dfrac{3^2}{4^2} = \dfrac{9}{16}$$

13. Two similar prisms have surface area of 4π cm^2 and 49π cm^2. Find the ratio of their volumes.

$$\sqrt{\dfrac{4\pi}{49\pi}} = \dfrac{2}{7}(\text{sides}) \qquad \dfrac{2^3}{7^3} = \dfrac{8}{343}$$

14. Two solids are similar, with volumes of 16 in^3 and 2 in^3. If the larger solid has surface area of 12 in^2, what is the surface area of the smaller solid?

$$\dfrac{16}{2} = \dfrac{8}{1} \qquad \text{sides} = \dfrac{2}{1} \qquad S.A = \dfrac{4}{1} \qquad \dfrac{4}{1} = \dfrac{12}{x} = 3\,in^2.$$

15. Two solids are similar, with surface areas of 4π cm^2 and 25π cm^2. If the smaller solid has volume of 16π cm^3, what is the volume of the larger solid?

$$\dfrac{4\pi}{25\pi} = \sqrt{\dfrac{4}{25}} = \dfrac{2}{5} \qquad \dfrac{2^3}{5^3} = \dfrac{16\pi}{x} \qquad 8x = 125\cdot16\pi \qquad x = 250\pi cm^3$$

16. A clown's face on a balloon is 4 in. high when the balloon holds 108 in.^{3} of air. How much air must the balloon hold for the face to be 8 in. high?

$$\left(\dfrac{1}{2}\right)^3 = \dfrac{1}{8} \qquad \dfrac{1}{8} = \dfrac{108}{x} \qquad x = 864\,in^3$$

17. The similarity ratio of two regular octagons is 5:9. The area of the smaller octagon is 100 ft^2. Find the area of the larger octagon.

$$\dfrac{5^2}{9^2} = \dfrac{100}{x} \qquad 25x = 8100 \qquad x = 324\,ft^2$$

18. The areas of two equilateral triangles are 27 yd^2 and 75 yd^2. Find their similarity ratio and the ratio of their perimeters.

$$\dfrac{\sqrt{27}}{\sqrt{75}} = \dfrac{3\sqrt{3}}{5\sqrt{3}} = \dfrac{3}{5} \text{ both} \qquad \sqrt{\dfrac{9}{25}}$$

19. Mulch to cover an 8-ft by 16-ft rectangular garden costs \$48. At the same rate, what would be the cost of mulch to cover a 12-ft by 24-ft rectangular garden?

$$\dfrac{48}{x} = \dfrac{8\cdot16}{12\cdot24} = \dfrac{4}{9} \qquad 48\cdot9 = 4x \qquad \$108 = x$$

20. A solid chocolate rabbit is 6 in. high and weighs 0.25 lb. A similar chocolate rabbit is 12 in. high. How much does it weigh?

$$\dfrac{6}{12} = \dfrac{1}{2} \qquad \left(\dfrac{1}{2}\right)^3 = \dfrac{.25}{x} \qquad \dfrac{1}{8} = \dfrac{.25}{x} \qquad x = 2\,lb$$

21. Find the similarity ratio of two spheres with volumes of 20π m^3 and 16π m^3.

$$\dfrac{20\pi}{16\pi} \qquad \sqrt[3]{\dfrac{5}{4}}$$

22. A glass sphere weighs 0.4 lb. How much does another such sphere weigh if its circumference is seven times as large?

$$.4\cdot343$$

23. A figure with an area of 7.5 square units is dilated so that the area of the image is 91.875 square units. What is the scale factor used in the dilation?

$$\sqrt{\dfrac{91.875}{7.5}}$$

24. A figure with a perimeter of 30 feet and area of 56 square feet is dilated using a scale factor of 3.25. What is the perimeter and area of the enlarged figure?

$$\dfrac{30}{x} = \dfrac{1}{3.25} \qquad x = 97.50\,ft \qquad \dfrac{1}{3.25^2} = \dfrac{56}{x} \qquad 56\cdot3.25^2$$

25. The area of a figure is 21 square units. It is dilated using a scale factor of 0.5. What is the area of the image?

$$\dfrac{1}{4}\text{ of }21 = 5.25\,un^2$$