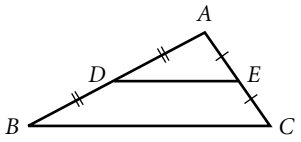
NAME _____ CLASS _____ DATE _____

Practice

8.6 Area and Volume Ratios

1. In $\triangle ABC$, D and E are midpoints. What fraction of the area of $\triangle ABC$ is $\triangle ADE$?

_____



The ratio of the corresponding sides of two similar triangles is $\frac{3}{5}$. Find the ratio of the following:

2. their altitudes _____

3. their perimeters _____

4. their areas _____

The side lengths of two squares are 4 cm and 9 cm. Find the ratio of the following:

5. their diagonals _____

6. their perimeters _____

7. their areas _____

Two spheres have radii of 6 cm and 8 cm. Find the ratio of the following:

8. the circumferences of their great circles _____

9. their surface areas _____

10. their volumes _____

The ratio of the base areas of two similar cones is $\frac{16}{25}$. Find the ratio of the following:

11. the circumference of their bases _____

12. their heights _____

13. their volumes _____

14. Two cubes have volumes of 3375 and 1331. What is the ratio of their heights? _____

15. Suppose that the triangles from Exercise 1 are bases of two prisms with the same height. What is the ratio of the volume of the prism with $\triangle ADE$ as a base to the volume of the prism with $\triangle ABC$ as a base? _____

Answers

3. No; no sides are given, so you would have to use the AA Similarity Postulate. Although $m\angle O = 58°$ and $m\angle R = 58°$, the AA Similarity Postulate does not apply here.

4. Yes; $\frac{TU}{WX} = \frac{UV}{XY} = 2$ and $m\angle U = m\angle X = 90°$, so $\triangle TUV \sim \triangle WXY$ by SAS Similarity Theorem.

5. $\triangle ABC \sim \triangle GHI$ by SSS Similarity Theorem because $\frac{AB}{GH} = \frac{BC}{DF} = \frac{AC}{GI} = 1.2$. $\triangle DEF$ is not similar to $\triangle ABC$ (and therefore is not similar to $\triangle GHI$) since $\frac{AB}{DE} = 3$ but $\frac{AC}{DF} = \frac{12}{5} \neq 3$.

6. $\triangle JKL \sim \triangle PQR$ by AA Similarity Postulate because $m\angle P = 25°$. $\triangle MNO$ is not similar to $\triangle JKL$ (and therefore is not similar to $\triangle PQR$) since $\frac{JK}{MN} = \frac{3}{2}$ but $\frac{KL}{NO} = 1 \neq \frac{3}{2}$.

Lesson 8.4

1. $x = 6$ 2. $x = 36$ 3. $x = 3$

4. $x = 4$ 5. $x = 2$ 6. $x \approx 5.76$ or -0.26

7. $\triangle ABC \sim \triangle BDC \sim \triangle ADB$ by the AA Similarity Postulate

8. $\angle EDA \cong \angle DAC$, so $ED \parallel AC$.

   Thus $\frac{BE}{BA} = \frac{BD}{BC}$ by the Side-Splitting Theorem, and so $\triangle BED \sim \triangle BAC$ by SAS.

Lesson 8.5

1. $h = 63$ ft 2. $h = 24$ ft 3. $h = 26\frac{2}{3}$

4. $h = 32$ ft 5. $x = 4.8$ 6. $x = 12$

7. $x = 2.7$ 8. $x = 3$

Lesson 8.6

1. $\frac{\text{Area of } \triangle ADE}{\text{Area of } \triangle ABC} = \frac{1}{4}$ 2. $\frac{3}{5}$ 3. $\frac{3}{5}$ 4. $\frac{9}{25}$

5. $\frac{4}{9}$ 6. $\frac{4}{9}$ 7. $\frac{16}{81}$ 8. $\frac{3}{4}$ 9. $\frac{9}{16}$ 10. $\frac{27}{64}$

11. $\frac{4}{5}$ 12. $\frac{4}{5}$ 13. $\frac{64}{125}$ 14. $\frac{15}{11}$ 15. $\frac{1}{4}$

Practice — Chapter 9

Lesson 9.1

1. 0.35 2. 8.17 3. 29.32 4. 11.52

5. 3.14 6. 0.87 7. 1.83 8. 2.62 9. 5.24

10. 3.18 11. 6.48 12. 38.64 13. 61.4°

14. 25.2° 15. 17.2° 16. 71.6° 17. 45.8°

18. 145.4° 19. 94.13° 20. 85.94°

21. 114.59° 22. 85.94° 23. 100.27°

24. 114.59° 25. 20° 26. 280° 27. 170°

28. 230°

Lesson 9.2

1. $\overline{FH}$ 2. $\overline{KM}$ and $\overline{KH}$ 3. 1.73; 1.73

4. ≈ 11.62; ≈ 11.62 5. ≈ 12.49; ≈ 12.49

6. ≈ 60.79; ≈ 60.79 7. ≈ 13.67; ≈ 27.35

8. ≈ 18.33; ≈ 36.66 9. 5 10. 16

Lesson 9.3

1. 65° 2. 30° 3. 50° 4. 101° 5. 17.5°

6. 100° 7. 40° 8. 145° 9. 180° 10. 80°

11. 40° 12. 35°