Practice: Find the area of a regular octagon with side length 2.
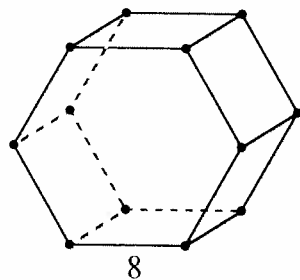
Ans: $8 + 8\sqrt{2}$

1.1 The circles are concentric. The smaller circle has radius 3 and the larger circle has radius 5. Find the area of the shaded region.
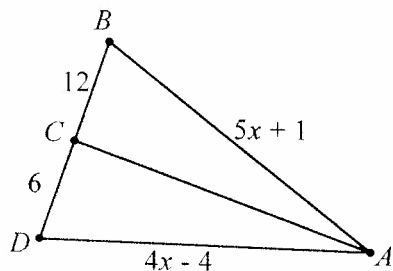
Ans: $\dfrac{44}{9}\pi$
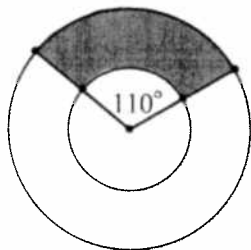
1.2 The volume of the right hexagonal prism is $384\sqrt{3}$. If each base edge is 8, find the surface area of the prism.
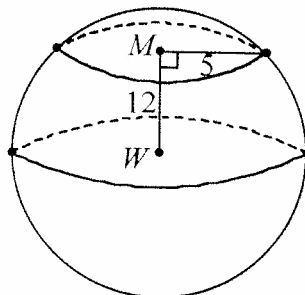
Ans: $192 + 192\sqrt{3}$

8

1.3 $\overrightarrow{AC}$ bisects $\angle BAD$. Find the perimeter of $\triangle ABD$.

Ans: 42

1.4 Circles M and W are parallel. The distance between the great circle W and circle M is 12 units. The radius of circle M is 5 units. Find the volume of the sphere.
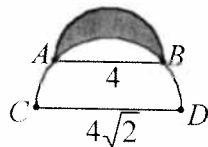
Ans: $\dfrac{8788}{3}\pi$

1.5 A triangle with vertices of $(0, 3)$, $(3, 5)$, and $(0, 10)$ is rotated around the y-axis. What is the volume of the resulting figure?

Ans: 21π

2.1 $\overline{AB}$ is a diameter of the smaller semicircle and $AB = 4$. $\overline{CD}$ is the diameter of the larger semicircle and $CD = 4\sqrt{2}$. Find the area of the shaded region.
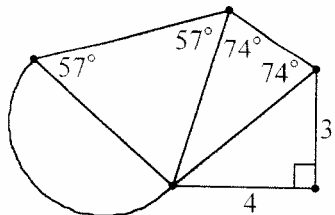
Ans: 4

2.2 Andrea paints a $4 \times 4 \times 4$ wooden cube chartreuse and Wendi cuts it into 64 unit cubes with her awesome ninja skills. How many of them have 2 or more sides painted?
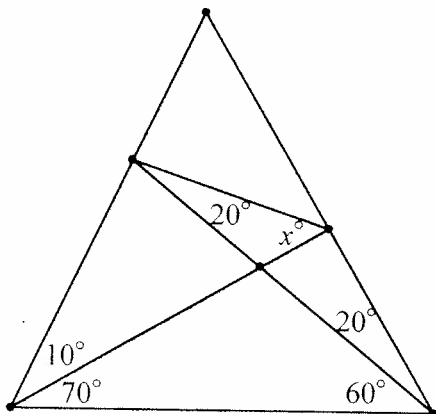
Ans: 32

2.3 Find the length of the radius of the semicircle.

2.4 Solve for x.

2.5 Find the area of a triangle with vertices $(1, 1)$, $(2, 4)$ and $(6, 3)$.
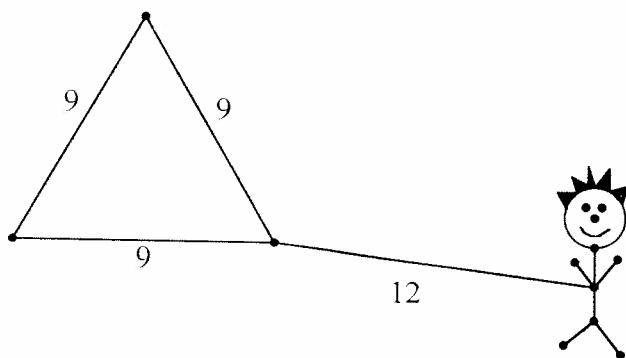
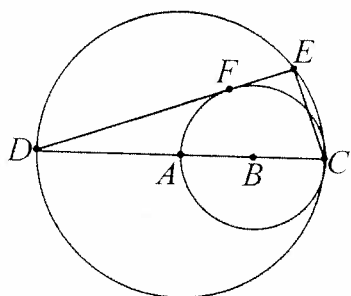3.1 Find the dimensions of all rectangles with integer side lengths such that the area is numerically two times the perimeter.
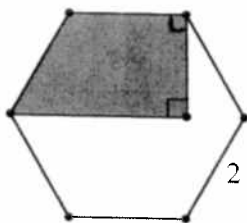
3.2 Find the area in which Mr. Taylor can roam.

3.3 In the diagram, $\overline{DC}$ is a diameter of the larger circle centered at A, and $\overline{AC}$ is a diameter of the smaller circle centered at B. If $\overline{DE}$ is tangent to the smaller circle at F, and $DC = 12$, find DE.
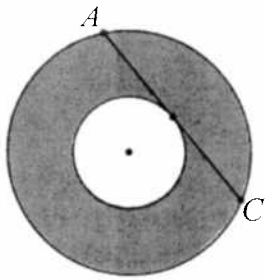
3.4 The hexagon in the diagram is regular with side length 2. Find the area of the shaded region.

3.5 Find the area of the annulus if $AC = 2048$ and the chord $\overline{AC}$ is tangent to the smaller circle.
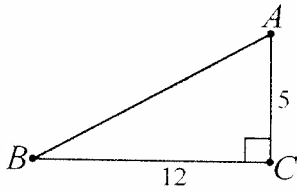
Ans: $1048576\,\pi$

4.1 Assume that a hot air balloon is in the form of a perfect sphere. The balloon is rising into the sky at a rate of 502 meters per second. Assuming that gravitational pull creates an acceleration of –9.8 meters per second and that the x velocity is zero, find the volume of the air inside the balloon if the diameter is 6 m
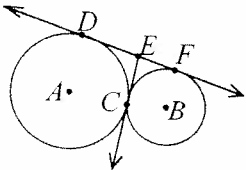
Ans: $36\pi\,\text{m}^3$

4.2 Find $\sin A + \sin B - \cos A - \cos B$

Ans: 0

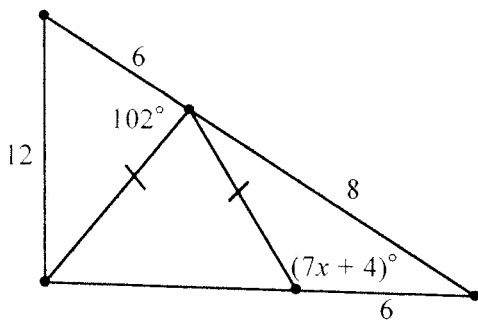4.3 $CE = 3$. Find the length of the common external tangent $\overline{DF}$

Ans: 6

4.4 Find the coordinates of the centroid of a triangle whose vertices are $(24, 6)$, $(5, 13)$, and $(1, 8)$.
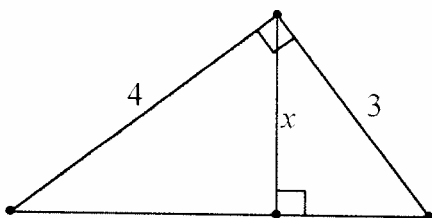
Ans: $(10, 9)$

4.5 Write an inequality or pair of inequalities to describe the possible values of x.

Ans: $-\dfrac{4}{7} < x < 14$

E1: Find x.

Ans: $\dfrac{12}{5}$

E2: If possible find the value(s) of the real common solution of y for the pair of equations
$$x^2 + y^2 - 16 = 0$$
$$x^2 - 3y + 12 = 0$$

Ans: 4

E3: Find x.

Ans: $\sqrt{73 - 24\sqrt{3}}$