Exam

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Set up an integral for the area of the surface generated by revolving the given curve about the indicated axis.

1) $y = x^4,\ 0 \le x \le 2;$ x–axis 1) _____

2) $xy = 3,\ 1 \le y \le 2;$ y–axis 2) _____

3) $y = \tan x,\ 0 \le x \le \pi/4;$ x–axis 3) _____

Use your grapher to find the surface's area numerically.

4) $y = \sin x,\ 0 \le x \le \pi/4;$ x–axis 4) _____

5) $x^{1/2} + y^{1/3} = 3,\ 1 \le x \le 4;$ x–axis 5) _____

6) $y = \sin x,\ 0 \le x \le \pi/6;$ x–axis 6) _____

Solve.

7) Find the lateral surface area of the cone generated by revolving the line segment $y = x/4,\ 0 \le x \le 3$ about the y–axis. 7) _____

8) Find the lateral (side) surface area of the cone generated by revolving the line segment $y = x/4,\ 0 \le x \le 3$, about the x–axis. 8) _____

9) Find the surface area of the cone frustum generated by revolving the line segment $y = (x/2) + (1/2),\ 1 \le x \le 5$, about the y–axis. 9) _____

Find the area of the surface generated by revolving the curve about the indicated axis.

10) $y = \dfrac{(x^2+2)^{3/2}}{3},\ 1 \le x \le \sqrt{5};$ y–axis 10) _____

11) $x = y^3/5,\ 0 \le y \le 2;$ y–axis 11) _____

12) $y = \sqrt{7x - x^2},\ 0.5 \le x \le 1.5;$ x–axis 12) _____

Find the area of the surface generated by revolving the curves about the indicated axis.

13) $x = t + \sqrt{30},\ y = \dfrac{t^2}{2} + \sqrt{30}t,\ -\sqrt{30} \le t \le \sqrt{30};$ y–axis 13) _____

14) $x = 5\cos^3 t,\ y = 5\sin^3 t,\ 0 \le t \le 2\pi;$ y–axis 14) _____

15) $x = \sin t,\ y = 4 + \cos t,\ 0 \le t \le 2\pi;$ x–axis 15) _____

Solve the problem.

16) A dome is in the form of a partial sphere, with a hemisphere of radius 20 feet on top and the remaining part of the sphere extending 10 feet to the ground from the center of the sphere. Find the surface area of the dome to the nearest square foot. 16) _____

17) The line segment joining the origin to the point (2, 3) is revolved about the x–axis to generate a cone of height 2 and base radius 3. Find the cone's surface area using the parametrization $x = 2t$, $y = 3t$, $0 \le t \le 1$. 17) _____

18) A company applies a clear glaze finish on the outside of the ceramic bowls it produces. The bowl corresponds to the bottom half of a sphere which is created by rotating the circle $x^2 + y^2 = 36$ around the x–axis. The finish is to be 0.2 cm thick, and the company wants to create 3000 bowls. Use the fact that 1 L = 1000 cm^3 to calculate how many liters of finish are required. Assume that all specifications for the bowl are in cm. 18) _____

Answer Key
Testname: 150C06S08

1) $2\pi\int_0^2 x^4\sqrt{1+16x^6}\,dx$

2) $6\pi\int_1^2 \frac{1}{y}\sqrt{1+9y^{-4}}\,dx$

3) $2\pi\int_0^{\pi/4} \tan x\sqrt{1+\sec^4 x}\,dx$

4) 2.42

5) 210.41

6) 1.15

7) $36\pi\sqrt{17}$

8) $\frac{9}{16}\pi\sqrt{17}$

9) $40\pi\sqrt{5}$

10) 16π

11) $\frac{2072}{675}\pi$

12) 7π

13) $\frac{2660}{3}\pi$

14) 60π

15) $16\pi^2$

16) 3770 ft^2

17) $3\pi\sqrt{13}$

18) 135.72 L of finish