Section 6.4: Areas of Surfaces of Revolution - Worksheet

#28. Find the surface area obtained by revolving the given curve about the given axis.

(a) The curve $y = 2x^3$, $0 \leqslant x \leqslant 1$, revolved about the x-axis.

(b) The curve $y = \sqrt{3x-5}$, $2 \leqslant x \leqslant 3$, revolved about the x-axis.

(c) The curve $x = \sqrt{16y - y^2}$, $0 \leqslant y \leqslant 8$, revolved about the y-axis.

(d) The curve $x = 2\sqrt[3]{y}$, $0 \leqslant y \leqslant 1$, revolved about the x-axis.

(e) The curve $y = \sqrt{9 + 8x - x^2}$, $3 \leqslant x \leqslant 7$, revolved about the x-axis.

(f) The curve $x = \frac{3}{5}y^{5/3}$, $0 \leqslant y \leqslant 1$, revolved about the y-axis.

(g) The curve $y = x^{3/2}$, $1 \leqslant x \leqslant 4$, revolved about the y-axis.

#29. Let L be the line segment joining the points $(0, 7)$ and $(2, 1)$. Find the areas of the surfaces obtained when L is revolved about the following lines.

(a) x-axis (b) y-axis (c) $y = -1$ (d) $x = -3$

#30. Consider the curve of equation $y = \frac{e^x + e^{-x}}{2}$, $0 \leqslant x \leqslant 1$.

(a) Find the length of the curve.

(b) Find the area of the surface obtained by revolving the curve about the x-axis.

#31. Consider the curve of equation $x^2 + y^4 = 16$ for $x, y \geqslant 0$.

(a) Set-up an integral computing the length of the curve using (i) integration with respect to x and (ii) integration with respect to y.

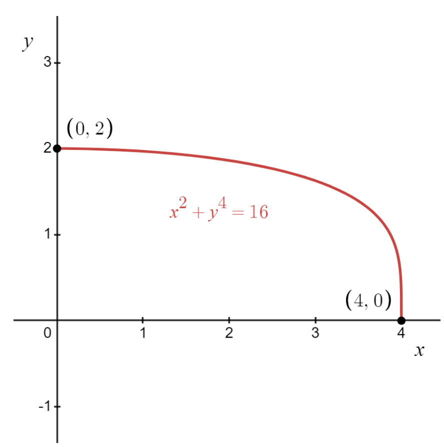
(b) Set-up integrals computing the areas of the surfaces obtained by revolving the curve about the following axes.

i. x-axis.

ii. y-axis.

iii. $y = -2$.

iv. $x = 6$.



#32. Use integration to find the surface area of a sphere of radius R.