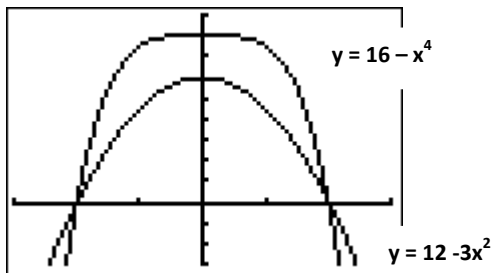


4. Find the area of the shaded region analytically.

4. _____



$[-3, 3]$ by $[-6, 18]$

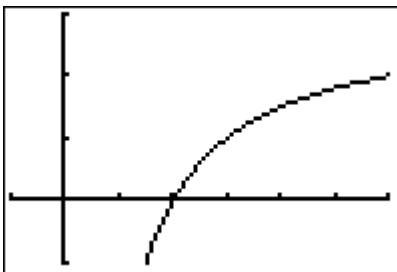
5. Find the area of the region enclosed by the line $y = 3x + 4$ and the parabola $y = x^2 - 3x - 12$.

5. _____

6. Find the area enclosed by $y = \sqrt{x}$, $y = 6 - 2x$ and the x-axis.

6. _____

7. Find the volume generated by revolving the shaded region about the x-axis



7. _____

8. A curve is given by $y = \left(9 - x^{\frac{2}{3}}\right)^{\frac{3}{2}}$ for $1 \leq x \leq 8$.

Find the exact length of the curve analytically by antidifferentiation.

8. _____

9. A curve is given by $\int_0^y \sqrt{9t^2 + 6t} dt$ for $1 \leq y \leq 5$. Find the exact length of the curve analytically by antidifferentiation.

9. _____

10. Find the length of the nonsmooth curve $y = (x)^{\frac{2}{5}}$ for $-1 \leq x \leq 1$.
(Round your answer to the nearest 0.001.)

10. _____

11. A right cylindrical tank is filled with sea water. The tank has a radius of 6 feet and a height of 12 feet. If the water level is now 3 feet below the top of the tank, how much work will be required to pump the sea water to the top of the tank? (The weight-density of seawater is 64 lb/ft^3 .)

11. _____

12. Let R be the region in the first quadrant enclosed by the y -axis and the graphs of $y = 2 + \sin(x)$ and $y = \sec(x)$.

(a) Find the area of R .

12a. _____

(b) Find the volume of the solid generated when R is revolved about the x – axis.

12b. _____

(c) Find the volume of the solid whose base is R and whose cross sections cut by planes perpendicular to the x -axis are squares.

12c. _____