

**Math 122 - #10**  
**Arc Length**

Find the length of the curve:

1.  $f(x) = \frac{2}{3}(x - 7)^{3/2}$  on  $[7, 14]$

2.  $f(x) = \frac{2}{3}(x - 6)^{3/2}$  on  $[6, 12]$

3.  $y = \frac{x^3}{6} + \frac{1}{2x}$  on  $[1/2, 2]$

4.  $y = \frac{2}{3}x^{3/2} + 1$  on  $[0, 1]$

5.  $y = \frac{x^4}{8} + \frac{1}{4x^2}$  on  $[1, 2]$

6. Find the surface area if  $y = \sqrt{9 - x^2}$  for  $-2 \leq x \leq 2$  is rotated about the  $x$ -axis.

7. Find the surface area if  $y = x^3$  for  $1 \leq x \leq 2$  is rotated about the  $x$ -axis.

8. Find the surface area if  $y = \sqrt{x}$  for  $1 \leq x \leq 4$  is rotated about the  $x$ -axis.

Answers

1.  $\frac{2}{3}(16\sqrt{2} - 1)$

2.  $\frac{2}{3}(7\sqrt{7} - 1)$

3.  $\frac{33}{16}$

4.  $\frac{2}{3}(2\sqrt{2} - 1)$

5.  $\frac{33}{16}$

6.  $24\pi$

7.  $\frac{\pi}{27}(145^{3/2} - 10^{3/2})$

8.  $\frac{\pi}{6}(17^{3/2} - 5^{3/2})$