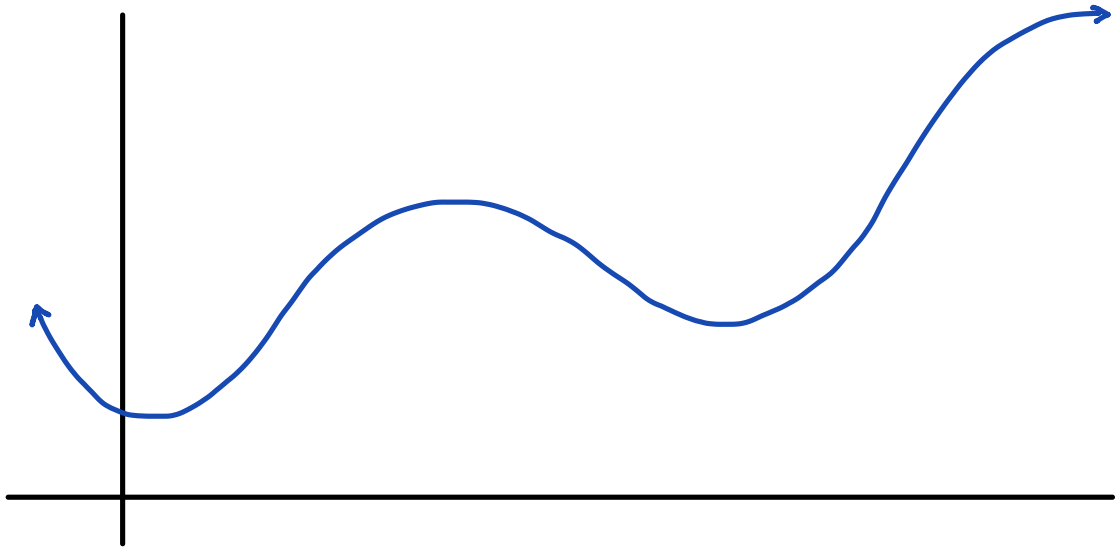
CH 8.1 ARC LENGTH

GOAL: Using calculus techniques we will learn how to find the length of certain curves... This is called ARC LENGTH

PART 1: WHAT IS ARC LENGTH?



PART 2: HOW CAN WE FIND ARC LENGTH?

* Using calculus techniques, we can derive a formula for ARC LENGTH.

ARC LENGTH FORMULA

PART 3: SOME EXAMPLES

Ex 1. Find the **ARC LENGTH** of $y = 4\sqrt{x^3}$ on the interval $0 \le x \le 1$. Graph the function and indicate the length that was found.

sol:

Ex 2 Write the **ARC LENGTH** of each curve (on the specified interval) as a <u>definite integral</u> with respect to the indicated variable.

A $y=\sin(x)$ on $0\le x\le \pi$ (w.r.t x)

Sol:

B $y=2x^4$ on $0\le x\le 1$ (w.r.t x)

Sol:

C $y=2x^4$ on $0\le x\le 1$ (w.r.t y)

Sol:

Ex 3. Find the **ARC LENGTH** of the curve $y = \frac{1}{2}x + 1$ on $0 \le x \le 4$.
Verify your answer using geometry!

Sol:

Ex 4. Find the exact length of the curve $y = \frac{x^3}{3} + \frac{1}{4x}$ for $1 \le x \le 3$

Sol: