

Cost per unit:

$$\text{average cost} = \bar{C}(x) = \frac{C(x)}{x}$$
$$\text{marginal average cost} = \bar{C}'(x) = \frac{d}{dx}\bar{C}(x)$$

The total cost of manufacturing tables is $C(x) = 100 + 50x$

- A. Find the average cost per unit if 20 tables are produced.

If it costs you \$50 to make 10 things the average cost to make 1 thing is \$5

total cost over how many there are ($\$50/10$) that gives you the top equation

- B. Find the marginal average cost if you make 50 tables

That means is how much will my average cost change if I make one more.

That is the bottom equation.

- C. Using parts (A) and (B) estimate the average cost per table if you made 51

We know what the average cost is for 50 from part A. We know how much the average cost will change if we make one more from

B. So you add the two numbers together for part C.

Cost per unit: **average cost** = $\bar{C}(x) = \frac{C(x)}{x}$

marginal average cost = $\bar{C}'(x) = \frac{d}{dx}\bar{C}(x)$

The total cost of manufacturing tables is $C(x) = 100 + 50x$

- A. Find the average cost per unit if 20 tables are produced.

If it costs you \$50 to make 10 things the average cost to make 1 thing is \$5
total cost over how many there are (\$50/10) that gives you the top equation

$$\bar{C}(x) = \frac{C(x)}{x} = \frac{100 + 50x}{x}$$

$$\bar{C}(20) = \frac{100 + 50(20)}{20} = \frac{1100}{20} = \boxed{\$55}$$

Total cost for 20 tables

- B. Find the marginal average cost if you make 20 tables

That means is how much will my average cost change if I make one more.
That is the bottom equation.

$$\bar{C}'(x) = \frac{d}{dx} \bar{C}(x) = \frac{d}{dx} \frac{100 + 50x}{x} = \frac{d}{dx} \left(\frac{100}{x} + \frac{50x}{x} \right) = \frac{d}{dx} (100x^{-1} + 50)$$

From last step *get to a form we can take the derivative of*

$$\frac{d}{dx} (100x^{-1} + 50) = \frac{d}{dx} (100x^{-1}) + \frac{d}{dx} 50 = 100(-1)x^{-1-1} + 0 = -\frac{100}{x^2}$$

- C. Using parts (A) and (B) estimate the average cost per table if you made 51

We know what the average cost is for 50 from part A. We know how much the average cost will change if we make one more from B. So you add the two numbers together for part C.

Average cost for 20 *about how much it would cost to make one more than 20*

$$\bar{C}(20) + \bar{C}'(20)$$

$$55 + (-.25) = \boxed{\$54.75}$$