

Closing Thurs: Sup. 1-3, Sup. 4  
 Closing Tues: Sup. 5  
 Closing Next Thurs: Sup. 6-7  
 Today: finish Sup. 5, start Sup. 6

**Directly from Sup. 5 HW:**

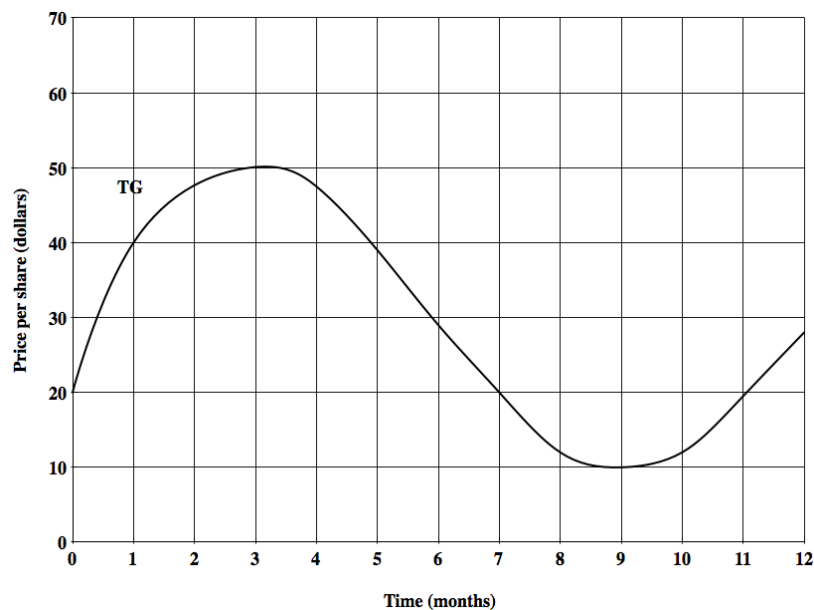
2(a): Compute  $TG(3) - TG(1)$

2(b): Compute the overall rate of change in value at  $t = 6$ .

*Include units.*

**Entry Task (from Sup. 5 HW)**

Value vs time of a stock is given



$t$  = time (in months)

TG = stock value (in dollars)

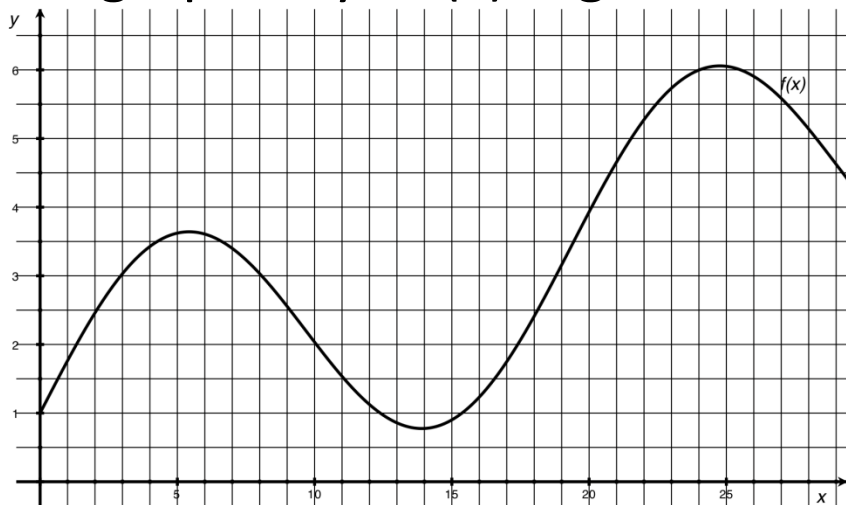
$TG(t)$  = “value after  $t$  months”

2(c): Compute the value of

$$\frac{TG(1.1) - TG(1)}{0.1}$$

### Sup. 5 / Problem 4:

The graph of  $y = f(x)$  is given.



(a) Compute  $\frac{f(8)}{8}$

(b) Compute  $\frac{f(19) - f(10)}{9}$

(c) Find  $x$  such that  $\frac{f(x) - f(0)}{x} = 0.3$

(d) Find  $x$  such that  $f(x) - f(15) = 2$

(h) As  $x$  takes on every value from  $x = 2$  to  $x = 8$ , which best describes the values of  $\frac{f(x+0.1) - f(x)}{0.1}$ ?

- i) They increase.
- ii) They increase, then decrease.
- iii) They decrease.
- iv) They decrease, then increase.

## Supplement 6: Revenue, Cost, Profit

Story: You own a cupcake business.

You charge \$1.50 per cupcake.

Each day, your rent/utilities are \$120 and your salaries for employees are \$180. It costs you \$0.50 to produce each cupcake.

We will answer the questions:

a) How many cupcakes should you produce and sell to “break even”?

b) How many should you produce and sell to make a profit of \$100?

### **Key Concepts we will introduce:**

1. Total Revenue (TR)
2. Total Costs (TC)
3. Fixed Costs (FC)
4. Variable Costs (VC)

*Note:*

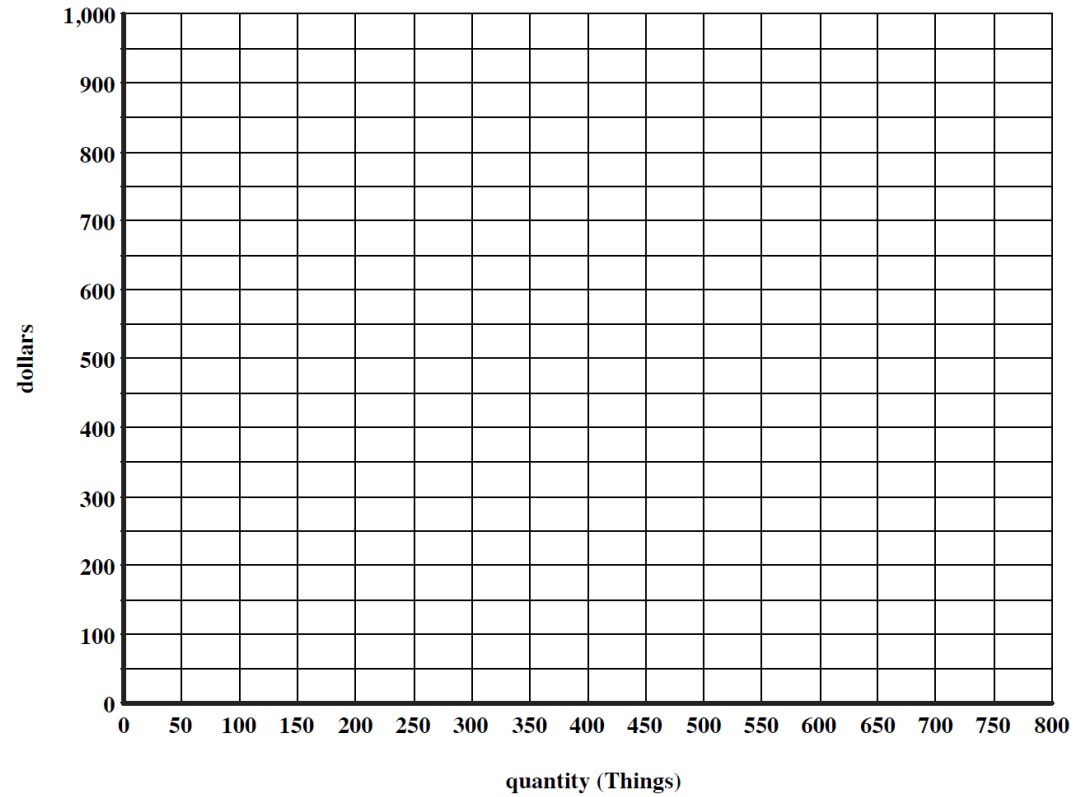
We will use  $q$ , or  $x$ , for the number of items produce or sold (quantity).

### **1. Total Revenue (TR)**

total amount of money you receive from selling  $q$  items

## 2. Total Cost (TC)

total amount of money you pay to produce  $q$  items.



## Summary:

$$TR(q) = (\text{Price/item}) * (\text{items sold})$$

$$FC = \text{Fixed Costs}$$

$$VC(q) = (\text{Cost/item}) * (\text{items made})$$

= production cost for q items

$$TC(q) = FC + VC(q)$$

$$P(q) = \text{Profit to make/sell } q \text{ items}$$
$$= TR(q) - TC(q)$$

= Vert. gap between TR & TC