
Instructions: You have 25 minutes for this quiz. You **MUST** show work for credit. No credit for answers only. If in doubt, ask for clarification. Quiz has two problems. When appropriate, use at least two decimal places.

1. (8pts) Start with the function $y = f(x) = 2x^2 - x + 1$. Compute and simplify as far as possible:

(a) (1pts)

$$f(0) = 1$$

(b) (2pts)

$$f(x^2) = 2(x^2)^2 - x^2 + 1 = 2x^4 - x^2 + 1$$

(c) (5pts)

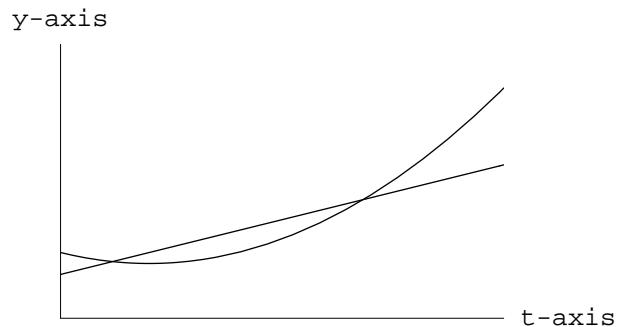
$$\begin{aligned} f(x+2) - f(x) &= 2(x+2)^2 - (x+2) + 1 - (2x^2 - x + 1) \\ &= 2(x^2 + 4x + 4) - x - 2 + 1 - 2x^2 + x - 1 \\ &= 8x + 6 \end{aligned}$$

2. (12pts) Two new internet stocks have just been issued. One company, called **bozo.com**, has its stock price t hours after initial offering modeled by the function

$$b(t) = \frac{1}{10}t^2 - 2t + 60 \text{ dollars.}$$

Another company, called **rockon.com**, has its stock price t hours after initial offering modeled by the function

$$r(t) = 2t + 40 \text{ dollars.}$$



The graphs of these two functions are pictured; this is a graph for the first 50 hours after initial offering.

- (a) (2pts) Label each graph in the picture with the appropriate function $b(t)$ or $r(t)$.
Parabolic graph is **bozo.com** and linear graph is **rockon.com**.
- (b) (1pts) (True or False) The function $b(t)$ is increasing on the domain $0 \leq t \leq 50$?
FALSE
- (c) (2pts) (True or False) The price of **rockon.com** is increasing at a rate greater than 3 cents/minute?
TRUE. Rate of increase is slope of line, which is $\$2/\text{hr} = \$0.0333/\text{min} = 3.33 \text{ cents/minute}$.
- (d) (2pts) What is the initial offering price of each stock (i.e. its price at time zero)?
 $b(0)=\$60$ and $r(0)=\$40$.
- (e) (5pts) During the first 50 hours after initial offering, what percentage of the time will the price of **rockon.com** exceed the price of **bozo.com**?
First find WHEN the two stocks have the same price by simultaneously solving:

$$\begin{aligned} b(t) &= r(t) \\ \frac{1}{10}t^2 - 2t + 60 &= 2t + 40 \\ \frac{1}{10}t^2 - 4t + 20 &= 0 \\ t &= \frac{4 \pm \sqrt{(-4)^2 - 4(1/10)(20)}}{2/10} = 5.85786, 34.1421. \end{aligned}$$

This means rockon exceeds bozo for $34.1421 - 5.85786 = 28.2842$ hours, which means for $100(28.2842/50)\% = 56.57\%$ of the time.