Math 121 F09N05 - Quiz 1 Name:
Sep 21 2009 Stu#: SOLUTIONS

(1) [5 points] Let $f(x) = 3x - x^2$. Evaluate and simplify the difference quotient $\frac{f(3+h) - f(3)}{h}$.

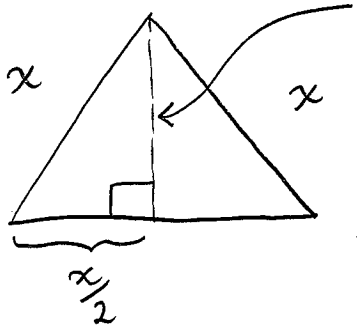
$$\frac{f(3+h) - f(3)}{h} = \frac{1}{h}\left[3(3+h) - (3+h)^2 - 3(3) + (3)^2\right]$$

$$= \frac{1}{h}\left[9 + 3h - 9 - 6h - h^2 - 9 + 9\right]$$

$$= \frac{1}{h} \cdot h\left[3 - 6 - h\right]$$

$$= \boxed{-3 - h}$$

(2) [5 points] Express the area $A$ of an equilateral triangle as a function of a side $x$.




$$\sqrt{x^2 - \left(\frac{x}{2}\right)^2} = \frac{\sqrt{3}}{2}x$$

$$\therefore A = \frac{1}{2}bh$$

$$= \frac{1}{2} \cdot x \cdot \frac{\sqrt{3}}{2}x$$

$$= \boxed{\frac{\sqrt{3}}{4}x^2}$$

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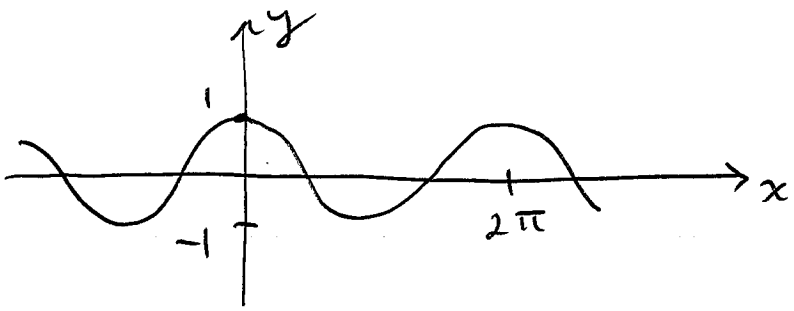
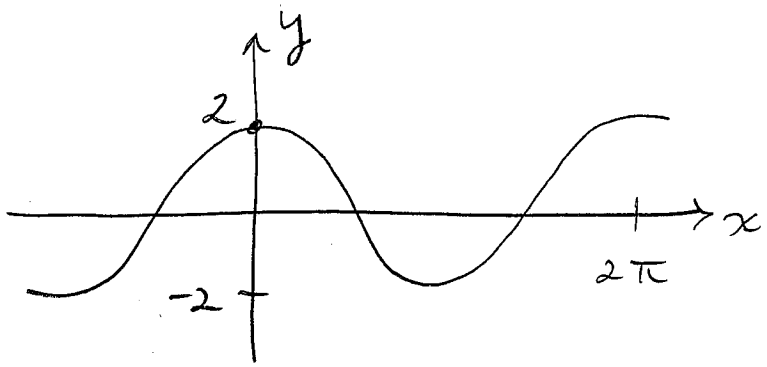
(3) [5 points] Neatly sketch the graph of $y = 1+2\cos(x)$ by starting with the graph of $y = \cos(x)$ and applying transformations. Make sure you label and indicate the scale on the axes.

① $y = \cos(x)$




② $y = 2\cos(x)$




③ $y = 1+2\cos(x)$