Name:
Stu#: SOLUTIONS

(1) [4 points] Let $f(x) = 3 + 4x - x^2$. Evaluate and simplify the difference quotient

$$\frac{f(2+h) - f(2)}{h}$$

$$= \frac{1}{h}\left[3 + 4(2+h) - (2+h)^2 - \left(3 + 4(2) - (2)^2\right)\right]$$

$$= \frac{1}{h}\left[\cancel{3} + \cancel{8} + \cancel{4h} - \cancel{4} - \cancel{4h} - h^2 - \cancel{3} - \cancel{8} + \cancel{4}\right]$$

$$= \frac{-h^2}{h}$$

$$= \boxed{-h}$$

(2) [3 points] Determine the domain of

$$f(t) = 2\sqrt{t} + 5\sqrt[3]{t}$$

$\sqrt{t}$: must have $t \geq 0$

$\sqrt[3]{t}$: t can be any real number

$\therefore$ domain is $[0, \infty)$.

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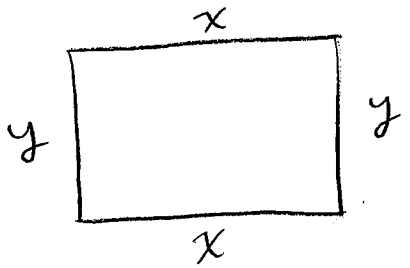
(3) [4 points] A rectangle has perimeter 20 m. Express the area of the rectangle as a function of the length x of one of its sides.



$2x + 2y = 20$

$\therefore x + y = 10$

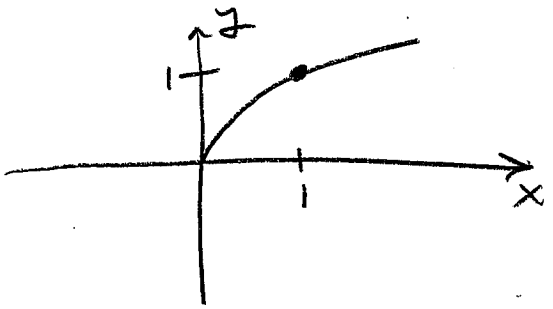
$y = 10 - x$

$A = xy$

$\therefore$ $\boxed{A = x(10-x)}$

(4) [4 points] Neatly sketch the graph of $y = \sqrt{x-2}$ by applying a function transformation to one of the standard functions discussed in class. Be sure to label and indicate the scale on the axes.

① $y = \sqrt{x}$:



② $y = x - 2$: