MATH FOR BUSINESS: CALCULUS, SPRING 2017 - PROBLEM SET 1

Name: _____

Use this worksheet as the cover sheet for your write-up: write your name on this page, and staple this sheet to the front of your homework packet.

You will receive no credit for submitting solutions that the grader cannot read and understand—be sure to write legibly!

Problem 1. If $f(x) = 3x^2 - x + 2$, find the following:

(1) $f(2)$ (4) $f(-a)$ (7) $f(a^2)$
(2) $f(-2)$ (5) $f(a+1)$ (8) $[f(a)]^2$
(3) $f(a)$ (6) $2f(x)$ (9) $f(a+h)$

Problem 2. Evaluate the difference quotient for the given functions:

(1) For $f(x) = x^2 + 1$ evaluate $\frac{f(4+h)-f(4)}{h}$.
(2) For $f(x) = x^3$ evaluate $\frac{f(a+h)-f(a)}{h}$.
(3) For $f(x) = \frac{1}{x}$ evaluate $\frac{f(x)-f(a)}{x-a}$.

Problem 3. Evaluate $f(-3)$, $f(0)$, and $f(2)$ for each of the following functions. Then sketch their graphs.

(1) $f(x) = \begin{cases} x+2 & \text{if } x < 0, \\ 1-x & \text{if } x \geq 0. \end{cases}$

(2) $f(x) = \begin{cases} x+1 & \text{if } x \leq -1, \\ x^2 & \text{if } x > -1. \end{cases}$

(3) $f(x) = \begin{cases} x^2 & \text{if } x < 0, \\ x^3 & \text{if } x \geq 0. \end{cases}$

Problem 4. Determine whether $f(x)$ is even, odd, or neither:

(1) $f(x) = \frac{x}{x^2+1}$
(2) $f(x) = x|x|$
(3) $f(x) = 1 + 3x^2 - x^4$

Problem 5. If $f(x) = x^2 - 5x$ and $g(x) = 3x + 12$, write the formula for each of the following functions:

(1) $A(x) = f(x) + g(x)$.
(2) $B(x) = f(x) - g(x)$.
(3) $D(x) = \frac{f(x)}{g(x)}$.

Date: January 27th, 2017.

Problem 6. If $h(n) = 2 - 5n$, $p(n) = n^2 - 3$, $u(n) = h(p(n))$, and $v(n) = p(h(n))$, compute $u(2)$ and $v(2)$.

Problem 7. Given that $y = x^2$, graph the following functions using the principles of transformations learned in class:

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

Problem 8. Find the slop and y-intercepts of the linear functions:

(1) $f(x) = -2x + 14$,
(2) $P(v) = 3v - 1$.

Problem 9. Suppose that the taxes a company pays is approximately:

$$T(p) = 0.26p + 15.4,$$

where p is the company's profits in thousands of dollars. What is the rate of change and what does it measure in the context?