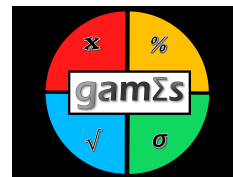
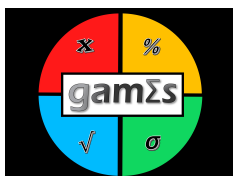


GAMES Practice Problems – Introduction to Derivatives



- The cost, C (in dollars), to produce q litres of soda is $C = f(q)$. Identify the units of the input and output quantities in the following:
 - $f(200) = 600$
 - $f'(200) = 2$
- A reaction time in T seconds is a function of the quantity of catalyst present in kilograms, so $T = f(a)$. State the units of the input and the output for the following expressions.
 - $f(5) = 18$
 - $f'(5) = -3$
- Suppose you have $C(r)$ remaining on your mortgage with a borrowing rate of r percent.
 - What are the units of $C(r)$?
 - What are the units of $C'(r)$?
 - What is the sign of $C'(r)$?
- Consider: $B = \frac{r}{r_0}B_0$ when $r < r_0$ and $B = \frac{r_0}{r}B_0$ where r_0, B_0 are positive constants.
 - Sketch a graph using Excel. Suppose $r_0 = 1, B_0 = 10$
 - Is B a continuous function of r ?
 - Is B a differentiable function of r ?
- Dosage for drugs, D , is measured in milligrams (mg) and depends on a patient's weight, W in kilograms (kg). The function of this relationship is: $D = f(W)$
 - Express the relationship $f(60) = 40$ in a sentence with units.
 - Express the relationship $f'(60) = 6$ in a sentence with units.
 - Estimate the dosage for a 65 kg person.
- Identify any x -values at which the absolute value function $f(x) = 8|x + 6|$, is
 - not continuous
 - not differentiable
- $f(x) = 4e^x - 9x^2 + 5$
- $f(x) = 2x^6\sqrt{x} = \frac{-5}{x^3\sqrt{x}}$
- $f(x) = \frac{7x^2 + 7x + 5}{\sqrt{x}}$
 - Find $f'(x)$
 - Find $f'(3)$

10. $f(t) = 7t^{-7}$
- (a) Find $f'(x)$
- (b) Find $f'(3) = -49$
11. Find f' when $f(x) = 3e^x + e^2$
12. Find f' when $f(x) = (3x^2 - 2)(6x + 3)$
13. Find f' when $f(x) = \frac{4x + 3}{3x + 2}$
14. Find h' when $h(x) = \frac{e^x}{3 + 2x}$
15. $P = \frac{V^2 R}{(R + r)^2}$ where r is varying, R, V are constant.



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