

MATH 234: HOMEWORK 2

DUE: FRIDAY, JULY 1 VIA ILLINOIS COMPASS

1. Find the derivative with respect to x of $f(x) = -\frac{2}{3x^4}$.
2. Find the derivative with respect to x of $g(x) = \frac{2x - (x^2 + 1)^7}{3}$.
3. Find the derivative with respect to x of $h(x) = \frac{5}{x^3 - 4x^2 + 2}$.

4. Compute:

$$\frac{d}{du}\sqrt{u^4 - 7}$$

5. Compute:

$$\frac{d}{ds}(p^2s^4 - q^4r^3s^2)$$

6. Find the second derivative with respect to x of $f(x) = 3x^2 + 6x - 4$.
7. Compute:

$$\left. \frac{d}{dx}(-4 + 3\sqrt{x})^4 \right|_{x=4}$$

8. Which of the following is the best description of $f'(t)$?
 - (A) It is approximately equal to $\frac{f(t+h) - f(t)}{h}$, as t gets very small.
 - (B) It is a function which gives the slope of the secant line through any two points.
 - (C) $f'(t)$ measures the rate of change of $f(t)$ per unit change in t .
 - (D) $f'(t) = \frac{f(t)}{t}$.
 - (E) When considered as a function, the derivative is the best approximation of the tangent line of $f(x)$.

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9. On February 1st, a flu epidemic hits the University. The number of people sick at time t (measured in days) is given by the function $P(t)$. The rate at which the epidemic is spreading on February 3 is 110 newly infected people per day. How is the information in the immediately preceding sentence best represented mathematically?

(A) $P'(3) = 110$.

(B) $\left. \frac{d}{dt}P(t) \right|_{t=110}$.

(C) $P(3) = 110$.

(D) None of the above.

10. At time $t = 0$, a seed is planted. After t weeks, the height of the plant is given by $f(t) = 0.3t^2 + 0.6t + 0.5$ inches. At what rate is the plant growing after 8 weeks?