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Fourth Old Midterm 3 #1

Use the graph given to find...

(a) $\log(6.3 \times 3.2)$

(b) Solve $10^x = 10/73$

(c) Find a value c so that the average rate of change of 10^x between $x = 0.3$ and $x = c$ is 5

Fourth Old Midterm 3 #2

Compute the following derivatives.

(a) $\frac{d}{dx} (5x^4 - 4x + 2) =$

(b) $\frac{d^2}{dx^2} (2e^{5x} - 3x^2) =$

(c) $\frac{d}{dx} (x^e + e^x + e^k) =$
[k is a constant]

Fourth Old Midterm 3 #3

The depth of a certain lake decreases with time as runoff brings silt in to fill the lake. Suppose $f(t)$ gives the depth, in meters, of the lake t years after the year 2010. Suppose $f(7) = 100$ and $f'(7) = -3$. Use the tangent line approximation to estimate...

(a) The expected depth of the lake in the year 2020.

(b) When (what year) will the depth of the lake be 70 meters?

Fourth Old Midterm 3 #4

This question is about the function

$$f(x) = x^3 + 3x^2 + 4x + 3$$

- (a) What is the slope of the graph $y = f(x)$ at $x = -2$?
- (b) What is the equation of the tangent line to the graph at $x = -2$?
[give answer in the form $y = mx + b$]
- (c) On what interval is the graph of $y = f(x)$ concave up?
- (d) For what value(s) of x does the graph have slope 4?

Fourth Old Midterm 3 #5

The height of a rocket above the ground in meters after t seconds is $h(t) = 400 + 20t - 5t^2$.

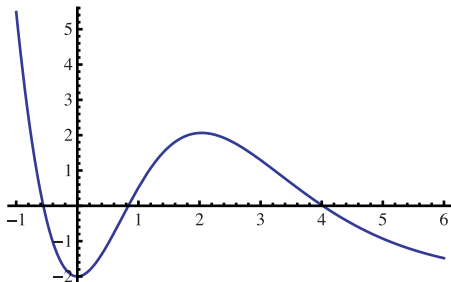
- (a) What was the velocity of the rocket after t seconds?
- (b) What was the acceleration of the rocket after t seconds?
- (c) What was the initial speed of the rocket?
- (d) After how many seconds was the velocity 15 m/s?
- (e) What was the average speed of the rocket between $t = 0$ and $t = 2$ seconds?

Review:

1. Where is $f(x) = 3x^2 + 18x - 4$ increasing?

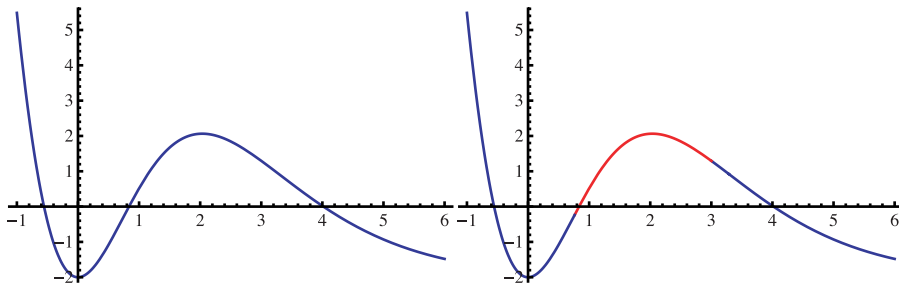
- (A) $x < -3$ (B) $x > -3$ (C) $x < 3$ (D) $x > 3$ (E) $x = 3$ **D**

2. Where is $f(x)$ increasing?



- (A) $x < 0$ (B) $x > 2$ (C) $x < 2$ (D) $0 < x < 2$ (E) $x > 0$ **D**

Continuing Review



3. Where is $f''(x) < 0$?

Answer: **A**

- (A) $1 < x < 3$ (B) $x > 3$ (C) $x > 2$ (D) $0 < x < 2$ (E) $x < 1$

4. Where is $f'(x)$ decreasing?

Answer: **A**

- (A) $1 < x < 3$ (B) $x > 3$ (C) $x > 2$ (D) $0 < x < 2$ (E) $x < 1$