

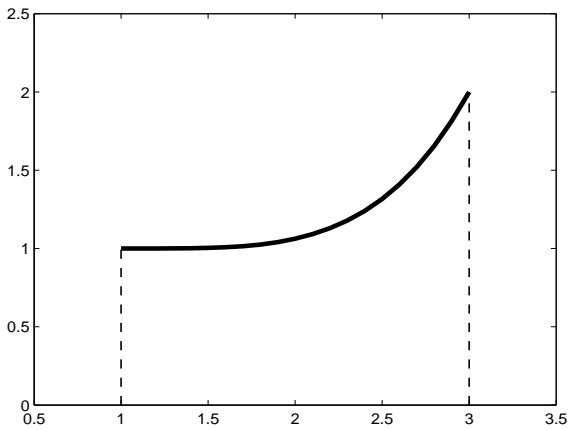
Name: _____

TA's Name: _____

| Problem | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total |
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| Score | | | | | | | | |

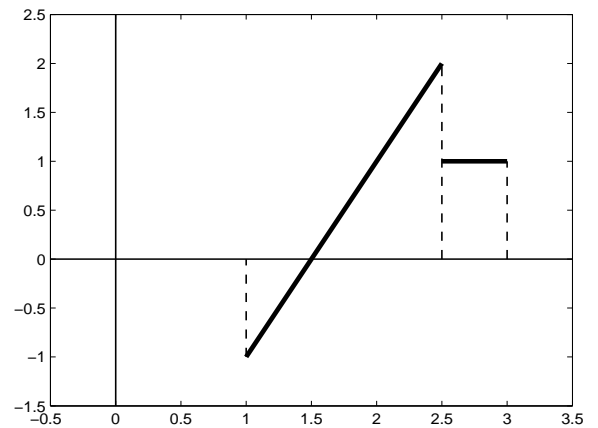
Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

- 1(10pts)** The graph of a function f is given below. Graphically approximate a point c so that the Mean Value Function Theory holds: $f'(c) = \frac{f(3) - f(1)}{3 - 1}$.



- 2(15pts)** The graph of a function f is given below.

(a) Find the exact average value $f_{\text{ave}} = \frac{1}{3-1} \int_1^3 f(x) dx$.



(b) Find a point c so that $f(c) = f_{\text{ave}}$.

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3(20pts) Find the antiderivatives (indefinite integrals) of the following functions:

(a) $f(x) = \frac{x + \sqrt{x} + 2}{x^2}$

(b) $g(x) = \frac{3x^2 + 2x}{x^3 + x^2 + 5}$

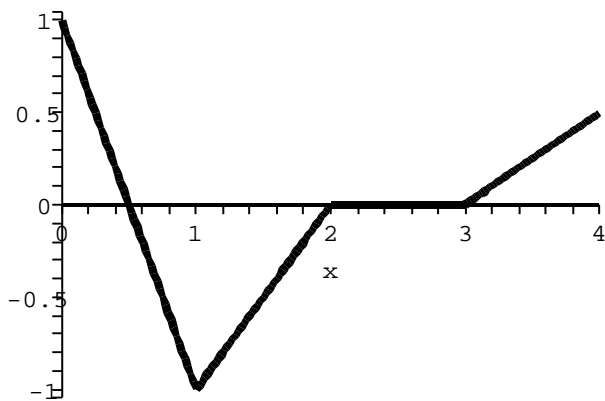
4(10pts) Find the exact values of the definite integrals $\int_{-3}^{-1} \left[\frac{2}{x} + 1 \right] dx$

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5(15pts) (a) If $F(x) = \sqrt{\ln x}$, find $\int_1^e F'(x)dx$.

(b) Find $\frac{d}{dx} \int_x^1 e^{-s^2} ds$

6(10pts) The graph of $F'(x)$ is given below. Assume $F(1) = 1$, find the exact value of $F(3)$.



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7(20pts) Find the time of flight and horizontal range of a projectile launched at angle 30° with initial speed 120ft/s.

2 Bonus Points: The space probe that crashed onto the comet Temple 1 on the 4th of July is called:
(a) the Deep Throat, (b) the Deep Pocket, (c) the Deep Impact, (d) None of the above. (... *The End*)