

Applied Calculus; Quiz 0

1. Print your name. You must print it legibly. Also mention your year in school and your (probable) major.
2. Why are you taking this course ? Will you be taking other math or stat ?
3. When, where and from whom did you last take a math course ?
4. Do you have math anxiety ? If so, what do you plan on doing about it ?
5. How many hours per week do you plan to put into this class ? What will you do if you start having difficulties with the material ?
6. What is Calculus and why do we study it ?
7. What grade do you honestly expect to get from this class ? Why ?

0. Print your name: _____

1. Find a function that takes as input temperature in Fahrenheit ($^{\circ}F$) and gives as output temperature in Celsius ($^{\circ}C$). Use the fact that the relationship is linear, that $0^{\circ}C = 32^{\circ}F$, and $100^{\circ}C = 212^{\circ}F$.

2. Car rental company Hurts charges \$ 50 a day and ten cents a mile, while car rental company Avarice charges \$ 38 a day and a quarter a mile. Under what circumstances is Hurts the better deal ?

3. Let $M(t)$ be the value in dollars of some mutual funds where t is in days. Since the market has been climbing, the average daily rate of change is positive each and every day. However, the rate of increase has been decreasing. Sketch the graph of $M(t)$.

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1. You are selling magic instant math pills. If you charge one dollar, you end up making 700 sales every week. Each dime increase in price results in 30 fewer sales. Find the equation of the demand curve and graph it.

2. Your Caculus T-shirt business has fixed costs of \$500 and variable costs of \$8 per shirt. Assume that the demand curve has formula $p = -(\frac{1}{10})n + 40$. Find the optimal price.

3. Which function eventually gets larger $y_1 = 1000x$ or $y_2 = .001x^{1.1}$? Why ?

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1. The population of eliboM grows at an annual rate of 8.5%. If initially there were 200,000 inhabitants, how long before the population reaches one million ?

2. You have a sample of the radioactive element mathiscool. You observe that there are 70 grams at noon and 25 grams at 2:45pm. Find the half-life of mathiscool.

3. You want to give your newborn nephew one million dollars, in the form of mutual funds, on his 21st birthday. Assuming that the mutual funds return at a continuous rate of 14.5%, how much should you invest now ?

0. Print your name: _____

1. Approximate the slope of $y = 1/x$ near $x = 2$ using at least 2 average rates of change.

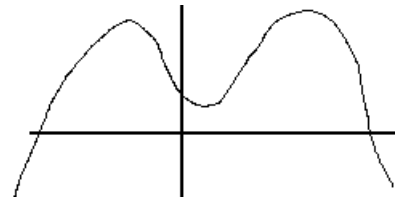
2. Graph $y = \frac{2}{3}x^3 + \frac{3}{2}x^2 - 2x$. Find all x where $y' = 0$.

3. Let $P(t)$ be the price of a stock listed on the New York Stock Exchange, where P is in dollars per share and t is in days (with $t = 0$ being the 1/1/99). What are the units of $P'(t)$? What does $P'(274) = -.60$ mean?

0. Print your name: _____

1. Sketch a graph of a function $y = f(x)$ where $f'(x) < 0$ when $0 < x < 4$ and $f'(x) > 0$ when $x < 0$ or $4 < x$.

2. Sketch a graph of $y = f'(x)$ given that $f(x)$ is as pictured:



3. Sketch a graph of a function $y = f(x)$ whose derivative is always positive but whose derivative is also always decreasing.

0. Print your name: _____

1. Find y' where $y = 7x^3 - \sqrt{x} + 2x^9 + \frac{1}{3x^2}$

2. Find the line tangent to $y = x^3 - 3x^2 + 4x$ at $x = 2$

3. Find all x for which $y = x^3 - \pi^3$ has tangent line parallel to $3y - 4x = e$.

0. Print your name: _____

1. Find y' where $y = 7^x - \ln(x) + e^x + \ln(5) - e^6$

2. Find y' where $y = \ln(4x^2 + 5) + e^{13x}$

3. Find the equation of the line tangent to $y = (x^2 - 10)^5$ at $x = 3$.

0. Print your name: _____

1. Set up (but do not compute) a Riemann sum using 4 rectangles and the left hand endpoint rule for the area bounded by $y = \ln(x)$ from $x = 2$ to $x = 4$. Draw a graph showing the rectangles.

2. Use the fundamental theorem of calculus to compute $\int_1^2 (6x^2 + 1) dx$

3. Without doing any computation, explain graphically why $\int_{-n}^{+n} x^3 dx = 0$ for all $n \geq 0$.

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1. Set up (but do not compute) a Riemann sum using 4 rectangles and the left hand endpoint rule that could be used to approximate $\ln(2)$.

2. Use the fundamental theorem of calculus to compute $\int_1^3 (x^3 - 2x + 4) dx$

3. Suppose $\int_a^b f(x) dx = 0$, what can you conclude about $f(x)$ over $a \leq x \leq b$?

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1. Use the second derivative test to find and classify the critical points of $y = x^3 - 3x$.

2. Find the inflection points of $y = e^{-x^2}$.

3. Sketch a graph of y , classifying the critical points, given that