Math 0120 Homework_04 is due : 08/29/2012 at 02:08pm EDT.

Reference: Berresford, Sections 2.4, 2.5, 2.6, 2.7

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1. (1 pt)

Let $f(x) = \frac{2}{7x+3}$.

$f'(x) =$ _____

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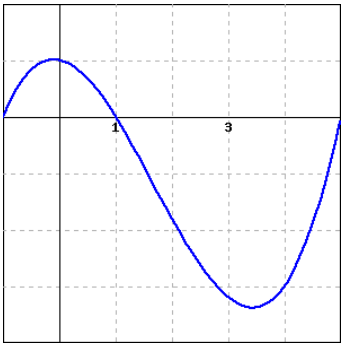
2. (1 pt) Consider the function $f(x)$ graphed below.



For this function, are the following nonzero quantities positive or negative?

$f(4)$ is ?

$f'(4)$ is ?

$f''(4)$ is ?

(Because this is a multiple choice problem, it will not show which parts of the problem are correct or incorrect when you submit it.)

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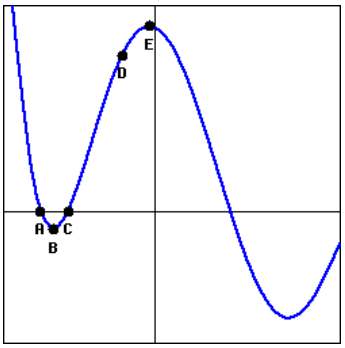
3. (1 pt) At exactly two of the labeled points in the figure below, which shows a function f, the derivative f' is zero; the second derivative f'' is not zero at any of the labeled points. Select the correct signs for each of f, f' and f'' at each marked point.



Point	A	B	C	D	E
f	?	?	?	?	?
f'	?	?	?	?	?
f''	?	?	?	?	?

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4. (1 pt) Let $P(t)$ represent the price of a share of stock of a corporation at time t. What does each of the following statements tell us about the signs of the first and second derivatives of $P(t)$?

(a) The price of the stock is rising faster and faster.

The first derivative of $P(t)$ is ?

The second derivative of $P(t)$ is ?

(b) The price of the stock is just past where it bottomed out.

The first derivative of $P(t)$ is ?

The second derivative of $P(t)$ is ?

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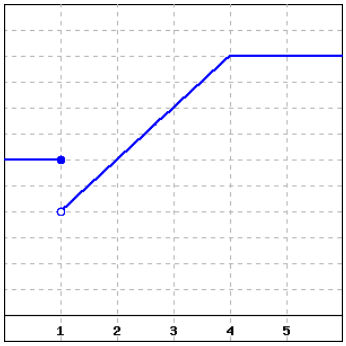
5. (1 pt) Consider the function graphed below.



At what x-values does the function appear to not be continuous? $x =$ _____

At what x-values does the function appear to not be differentiable? $x =$ _____

(Enter **none** *if there are no x-values that apply; enter x-values as a comma-separated list, e.g.,* **1,3,5***.)*

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6. (1 pt) Find the derivative of the function $f(x)$, below. It may be to your advantage to simplify first.

$f(x) = \dfrac{5+x}{6+3x+2x^2}$

$f'(x) =$ _____

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7. (1 pt) If $F(3) = 4, F'(3) = 4, H(3) = 3, H'(3) = 3$, find:

A. $G'(3)$ if $G(z) = F(z) \cdot H(z)$: $G'(3) =$ _____

B. $G'(3)$ if $G(w) = F(w)/H(w)$: $G'(3) =$ _____

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8. (1 pt) Find the derivative of

$f(x) = (x+1)^{74}$

$f'(x) =$ _____

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9. (1 pt) Find the derivative of

$w = (t^3+8)^{70}$

$\frac{dw}{dt} =$ _____

10. (1 pt) Find the derivative of

$w(r) = \sqrt{r^9+3}$

$\frac{dw}{dr} =$ _____

11. (1 pt) Find the derivative of

$$h(z) = \left(\frac{b}{a+z^2}\right)^2$$

Assume that a and b are constants.

$h'(z) =$ _____

12. (1 pt) If

$$f(x) = \frac{7-x^2}{7+x^2}$$

find $f'(x)$.

_____

13. (1 pt) Let

$$f(x) = \left(-\left(6x^2+2\right)\right)^3\left(4-8x^2\right)^{14}$$

$f'(x) =$ _____

14. (1 pt)

Differentiate:

$$F(y) = \left(\frac{1}{y^2} - \frac{2}{y^4}\right)\left(y - 10y^3\right)$$

$F'(y) =$ _____

15. (1 pt)

Find an equation of the tangent line to the given curve at the specified point:

$$f(x) = \frac{-1x}{x+1}, \quad (1,-0.5)$$

$y =$ _____

16. (1 pt) Let

$$f(x) = (-9x^2-2)\sqrt[3]{9x^2+2}$$

$f'(x) =$ _____

17. (1 pt) Suppose the number of CD players a retail chain is willing to sell per week at a price of p dollars is given by the function

$$S(p) = \frac{90p}{0.2p+4}.$$

Find the supply and the instantaneous rate of change of the supply with respect to price when the price is 40 dollars.

$S(40)$ = _____ players

$S'(40)$ = _____ players/dollar

Use your previous answers to estimate the increase in supply if the price rises from 40 to 50 dollars. Round your answer to the nearest integer.

Supply increase $\approx$ _____ players

18. (1 pt) Bob sells tires. He knows that his weekly sales drop if he increases the unit price p (in dollars). The weekly sales are given by an unknown function $N(p)$. His weekly revenue is

$$R(p) = pN(p).$$

Bob is currently selling tires for 55 dollars each. His weekly sales are running at 110 tires per week, so

$$N(55) = 110.$$

His marketing department estimates that he will lose 2 sales per week for each 10 dollar increase in unit price, so

$$N'(55) = -0.2.$$

Estimate Bob's increase in weekly revenue for each one dollar increase in tire price.

Revenue increase = _____ dollars

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