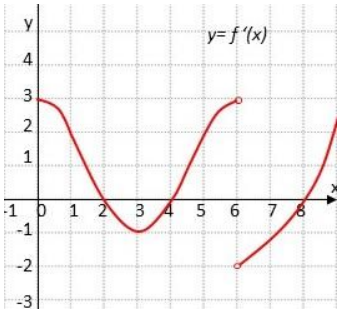
Fall Break – Extra Credit – Due Monday, September 30th at the Start of Class

How Well Do You Know Your "BIBLE"???

Extra Credit is worth an additional 8 points on the derivative applications test. No partial credit will be given on this assignment – it is all or nothing. An additional 2 points of extra credit can be earned at the end of this worksheet. All work must be shown and justified using CALCULUS to earn credit on this assignment. Please be neat and organized.

Questions 1 – 2: The graph of the derivative of f' of a continuous function f is shown (Assume f' continues to ∞.)

1.



a. On what interval is f increasing?

b. On what interval is f decreasing?

c. At what value(s) of x does f have a local maximum?

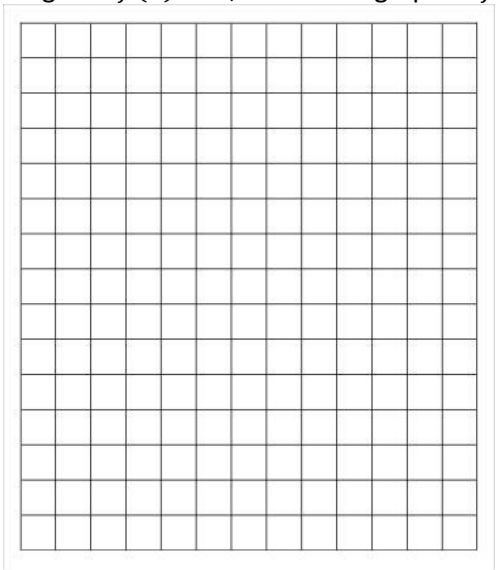
d. At what value(s) of x does f have a local minimum?

e. On what interval is f concave upward?

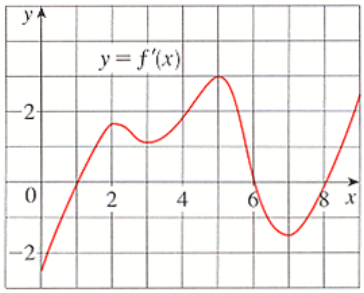
f. On what interval is f concave downward?

g. What are the $x-$ coordinate of the inflection point(s) of f?

h. Assuming that $f(0) = 0$, sketch the graph of f.



2.



a. On what interval is f increasing?

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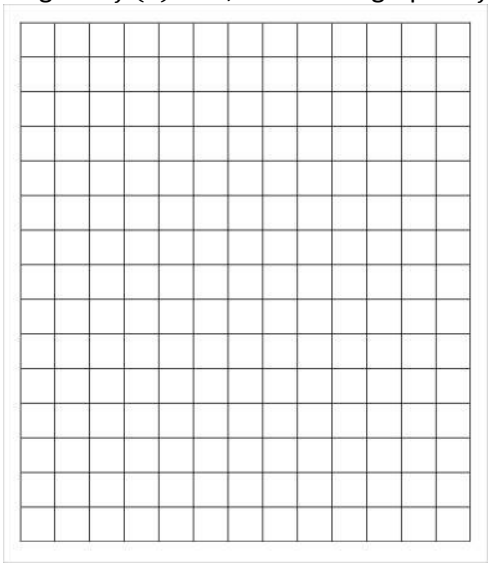


Questions 3 – 8: Answer the following questions for each function.

3. $f(x) = x^3 - 12x + 2$

a. On what interval is f increasing?

b. On what interval is f decreasing?

c. At what point(s) does f have a local maximum?

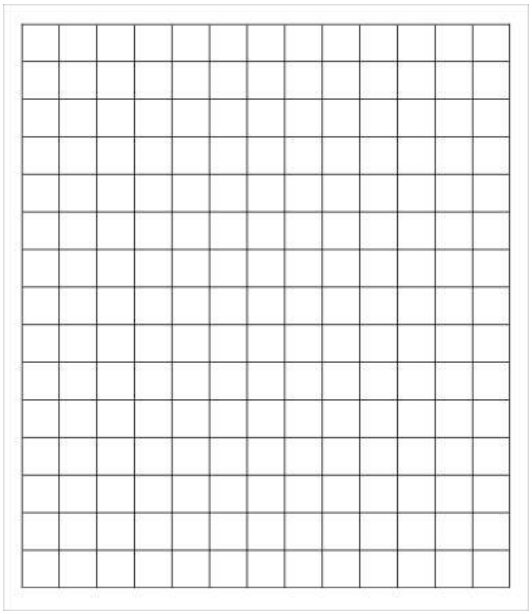
d. At what Point(s) does f have a local minimum?

e. On what interval is f concave upward?

f. On what interval is f concave downward?

g. What are the inflection point(s) of f?

h. Use a – g to sketch the graph of f. Check your answer using a graphing calculator.



4. $f(x) = 5x^{\frac{2}{3}} - 2x^{\frac{5}{3}}$

a. On what interval is f increasing?

b. On what interval is f decreasing?

c. At what point(s) does f have a local maximum?

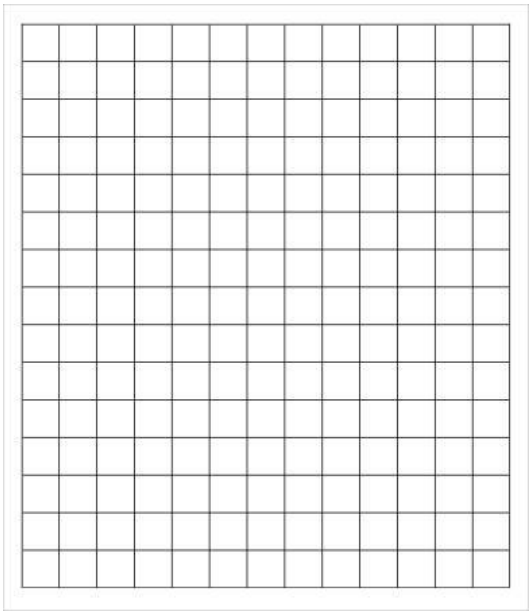
d. At what Point(s) does f have a local minimum?

e. On what interval is f concave upward?

f. On what interval is f concave downward?

g. What are the inflection point(s) of f?

h. Use a – g to sketch the graph of f. Check your answer using a graphing calculator.



5. $f(x) = x\sqrt{6-x}$

a. On what interval is f increasing?

b. On what interval is f decreasing?

c. At what point(s) does f have a local maximum?

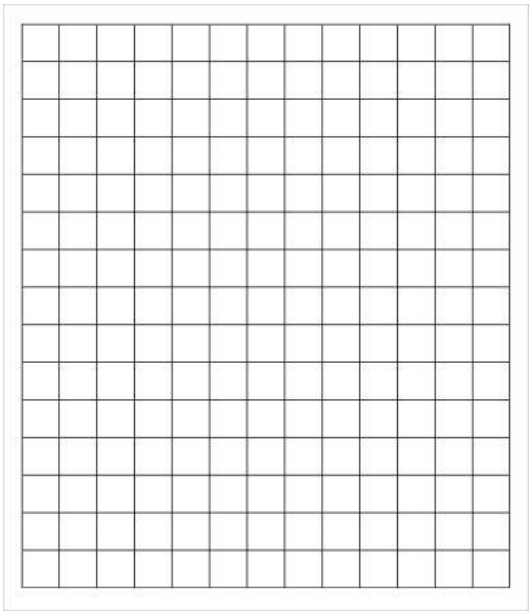
d. At what Point(s) does f have a local minimum?

e. On what interval is f concave upward?

f. On what interval is f concave downward?

g. What are the inflection point(s) of f?

h. Use a – g to sketch the graph of f. Check your answer using a graphing calculator.



6. $f(x) = x^{\frac{1}{3}}(x+4)$

a. On what interval is f increasing?

b. On what interval is f decreasing?

c. At what point(s) does f have a local maximum?

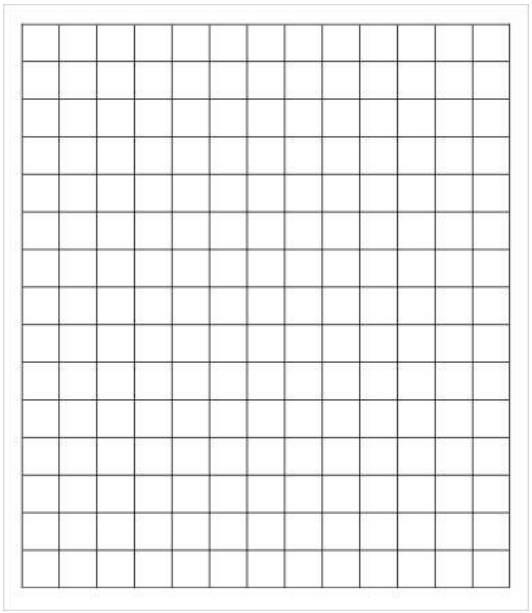
d. At what Point(s) does f have a local minimum?

e. On what interval is f concave upward?

f. On what interval is f concave downward?

g. What are the inflection point(s) of f?

h. Use a – g to sketch the graph of f. Check your answer using a graphing calculator.



7. $f(x) = \frac{x^2-4}{x^2+4}$

a. On what interval is f increasing?

b. On what interval is f decreasing?

c. At what point(s) does f have a local maximum?

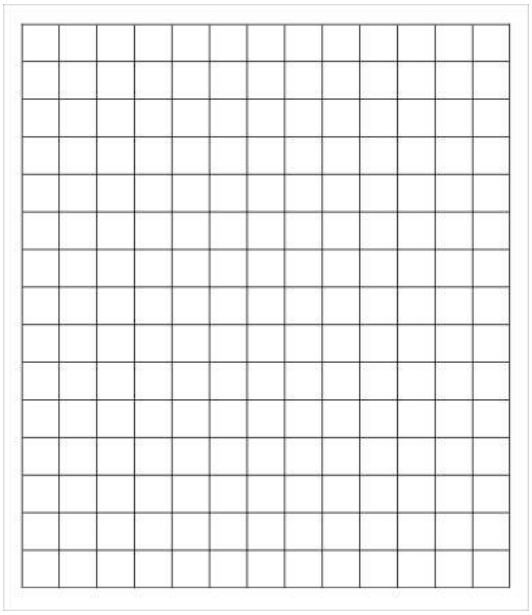
d. At what Point(s) does f have a local minimum?

e. On what interval is f concave upward?

f. On what interval is f concave downward?

g. What are the inflection point(s) of f?

h. Use a – g to sketch the graph of f. Check your answer using a graphing calculator.



8. $f(x) = \frac{e^x}{1-e^x}$

a. On what interval is f increasing?

b. On what interval is f decreasing?

c. At what point(s) does f have a local maximum?

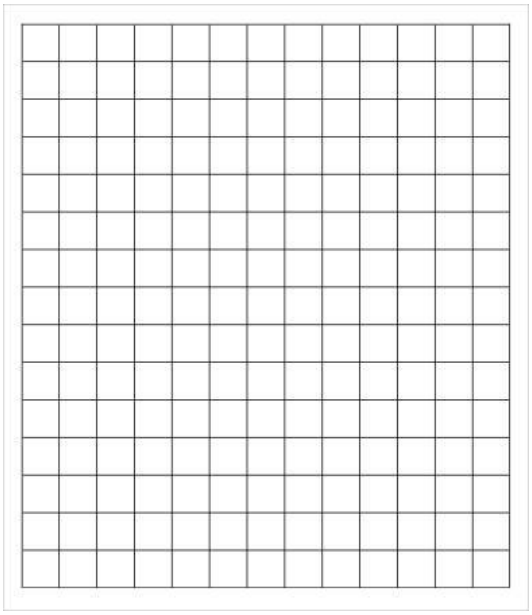
d. At what Point(s) does f have a local minimum?

e. On what interval is f concave upward?

f. On what interval is f concave downward?

g. What are the inflection point(s) of f?

h. Use a – g to sketch the graph of f. Check your answer using a graphing calculator.



Additional 2 Points of Extra Credit

Find the derivative of each function. Show all work in a neat and organized manner.

1. $f(x) = x \cdot \sqrt{\ln x}$

2. $y = \frac{1}{b^2}\left[\ln(a + bx) + \frac{a}{a+bx}\right]$

3. $y = -\frac{1}{a}\ln\left(\frac{a+bx}{x}\right)$

4. $f(x) = \ln\left(e^{-x^2}\right)$

5. $y = x^{2x+1}$

6. $g(x) = \log_3 \sqrt{1 - x}$

7. $y = x(\arcsin x)^2 - 2x + 2\sqrt{1-x^2} \cdot \arcsin x$

8. $y \cdot \ln x + y^2 = 0$

9. $x^2 + 3xy + y^3 = 10$

10. $y\sqrt{x} - x\sqrt{y} = 16$