CALCULUS I – Worksheet #41

1. For $y = \dfrac{x^2 + x - 12}{x^2 - 3x - 10}$ give all vertical asymptotes.

2. For $y = \dfrac{x^2 - 5x + 6}{x^2 - 2x + 1}$ give the y-intercept.

3. For $y = \dfrac{x^2 + x}{x^2 + 9}$ give all roots.

4. For $y = \dfrac{x^5 - 7x + 7}{3x^5 - 12x^2 - 9x}$ give all horizontal asymptotes.

5. For $y = \dfrac{x^2 + x}{x^2 - 7x - 8}$ give all holes.

6. For $y = \dfrac{x^2 + x}{x^2 + 3x + 2}$ **graph** labeling asymptotes, roots, holes and the y-intercept.

7. Find $\dfrac{d}{dx}\left(\int_{x}^{9} 7t^2 + 3\, dt\right)$

8. If $F(x) = \int_{0}^{x^3} (2t - 1)^2\, dt$ then find $F'(x)$

9. Find $\dfrac{d}{dx}\left(\int_{-x}^{6} \left(\dfrac{6}{t^2 + 8}\, dt\right)\right)$

10. If $f(x) = 3x^3 - 3x^2 + 5$, then find the interval where $f(x)$ is concave up.

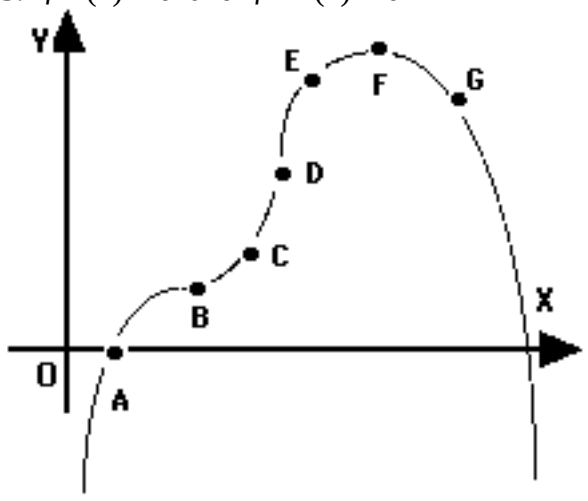
If the graph of $f(x)$ is given by the figure below #14, then give the letter for the point that is where:

11. $f'(x) = 0$ and $f''(x) < 0$

12. $f'(x) > 0$ and $f''(x) = 0$

13. $f'(x) < 0$ and $f''(x) < 0$

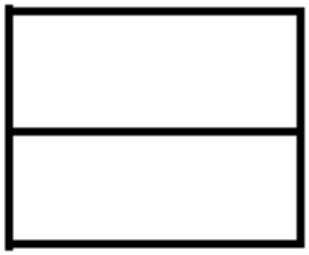
14. $f'(x) > 0$ and $f''(x) > 0$



15. If $f(x) = x^2 - 5x + 6$ then find the absolute <u>minimum</u> of $f(x)$ on $[-3,4]$.

16. If $f(x) = x^3 + 2x^2 + x + 2$ find then the absolute <u>maximum</u> of $f(x)$ $[-2,1]$.

17. A farmer has 180 feet to enclose a rectangular field which is divided into two parts by his fence as shown here:



Find the maximum <u>area</u> the farmer can use using his 180 feet of fencing.

18. Find the volume when the area between the curves $y = x^2$ and $y = \sqrt{x}$ is revolved around the x-axis (use a shell).

19. The base of a solid is the region in the first quadrant bounded by the coordinate axes and the line $x + y = 4$. Cross sections of the solid perpendicular to the y-axis are rectangles of height 6 units. The volume of the solid is: (A) 16 (B) 48 (C) 96 (D) 24 (E) None of these