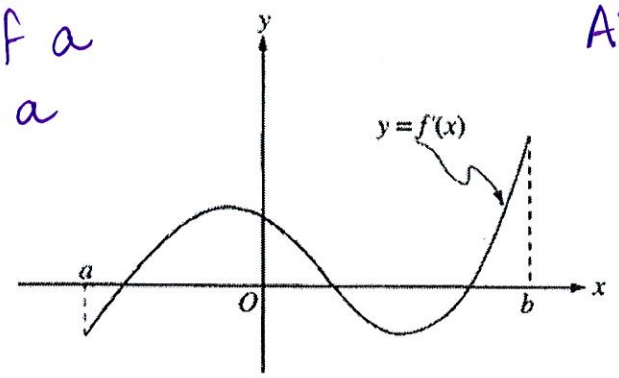
28. The derivative of f is $x^4(x-2)(x+3)$. At how many points will the graph of f have a relative maximum?

A. None B. One C. Two D. Three E. Four

Everytime you are given a graph of a derivative make a sign line!

Notecard AD 15



29.

The graph of f', the derivative of f, is shown in the figure above. Which of the following describes all relative extrema of f on the open interval (a, b)?

A. One relative maximum and two relative minima
B. Two relative maxima and one relative minimum
C. Three relative maxima and one relative minimum
D. One relative maximum and three relative minima
E. Three relative maxima and two relative minima

---

30. Let f be a function defined and continuous on the closed interval [a, b]. If f has a relative maximum at c and a < c < b, which of the following statements must be true?

I. $f'(c)$ exists

II. If $f'(c)$ exists, then $f'(c) = 0$

III. If $f''(c)$ exists, then $f''(c) \leq 0$

A. II only B. III only C. I and II D. I and III E. Ii and III

---

31. The graph of $y = 5x^4 - x^5$ has a point of inflection at

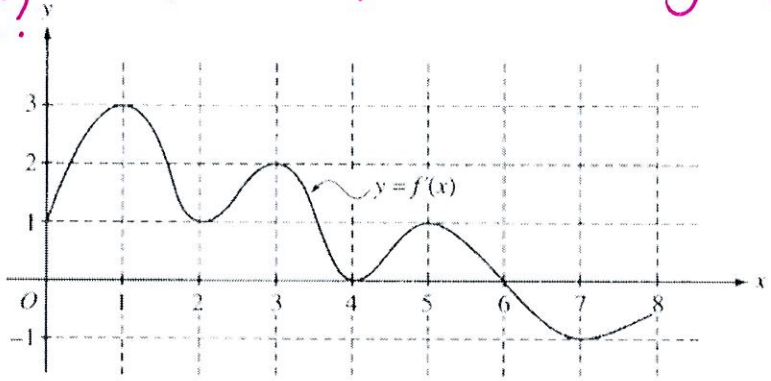
Point of Inflection $f''(x) = 0$ & changes signs

A. x = 0 B. x = 3 C. x = 4
D. x = 0 and x = 3 E. x = 0 and x = 4

32. At what value of x does the graph of $y = \frac{1}{x^2} - \frac{1}{x^3}$ have a point of inflection?

A. 0 B. 1 C. 2 D. 3 E. none

What do you do everytime you have a graph of a derivative?



33.

How many points of inflection does the graph of f have?

A. Two B. Three C. Four D. Five E. Six

---

34. What is the x-coordinate of the point of inflection on the graph of $y = \frac{1}{3}x^3 + 5x^2 + 24$?

A. 5 B. 0 C. $-\frac{10}{3}$ D. -5 E. -10

---

35. If $f''(x) = x(x+1)(x-2)^2$, then the graph of f has inflection points when x =

A. -1 B. 2 C. -1 and 0 D. -1 and 2 E. -1, 0, 2

Tangent line = 1. Point 2. Slope at that point

36. An equation of the line tangent to the graph of $y = x + \cos x$ at the point (0, 1) is

A. $y = 2x + 1$ B. $y = x + 1$ C. $y = x$ D. $y = x - 1$ E. y = 0

---

37. An equation of the line tangent to the graph of $y = \frac{2x+3}{3x-2}$ at the point (1, 5) is

A. $13x - y = 8$ B. $13x + y = 18$ C. $x - 13y = 64$ D. $x + 13y = 66$ E. $-2x + 3y = 13$

38. At what point on the graph of $y=\frac{1}{2}x^2$ is the tangent line parallel to the line $2x-4y=3$?

A. $\left(\frac{1}{2},-\frac{1}{2}\right)$ B. $\left(\frac{1}{2},\frac{1}{8}\right)$ C. $\left(1,-\frac{1}{4}\right)$ D. $\left(1,\frac{1}{2}\right)$ E. (2, 2)

---

normal line is ⊥ to tangent line. $m=2$ $\perp m=-\frac{1}{2}$

39. The slope of the line normal to the graph of $y=2\ln(\sec x)$ at $x=\frac{\pi}{4}$ is

A. -2 B. $-\frac{1}{2}$ C. $\frac{1}{2}$ D. 2 E. nonexistent

---

40. The line normal to the curve $y=\sqrt{16-x}$ at the point (0, 4) has slope

A. 8 B. 4 C. $\frac{1}{8}$ D. $-\frac{1}{8}$ E. -8

---

41. $\int_1^e \frac{x^2-1}{x}dx=$

A. $e-\frac{1}{e}$ B. $\frac{e^2}{2}-e+\frac{1}{2}$ C. $\frac{e^2}{2}-\frac{3}{2}$ D. e^2-e D. e^2-2

---

42. $\int_0^1 \sqrt{x}(x+1)dx=$

A. 0 B. $\frac{16}{15}$ C. 2 D. 1 E. $\frac{7}{5}$

---

43. $\int (3x+1)^5 dx=$

A. $\frac{(3x+1)^6}{18}+C$ B. $\frac{(3x+1)^6}{2}+C$ C. $\left(\frac{3x^2}{2}+x\right)+C$

D. $\frac{(3x+1)^6}{6}+C$ E. $\frac{\left(\frac{3x^2}{2}+x\right)^6}{2}+C$