

AB Calculus

Test # 5 (1–50) Review

41. Graph: $y = \frac{-(x-1)^2(x^2+1)(x+4)}{(x+2)(x-3)^2(x-6)^3}$

42. Find $\frac{dy}{dx}$ if A) $y = \frac{x^2 + 3x + 2}{\ln x}$ B) $y = \frac{\sin x}{x}$

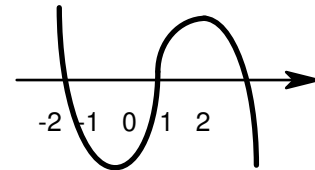
43. Find the exact area under $y = x^2 + 2$ on the interval $[0, 2]$ by using infinitely many upper rectangles.

44. A) Use the chain rule to find $\frac{dy}{dx}$ if $y = e^v$ and $v = \frac{1}{\sqrt{x}}$.

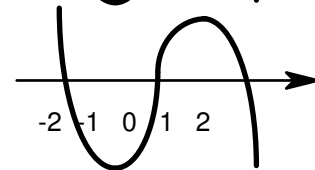
B) Evaluate: $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$. Do not use a calculator.

C) Use the symmetric derivative to calculate $f'(x)$ if $f(x) = 3x^2 - 4x$.

45. A) Sketch the graph of $f'(x)$ if the graph of $f(x)$ is as shown:



B) Sketch the graph of $f(x)$ if the graph of $f'(x)$ is as shown:



C) Sketch the graph of $f(x)$ if $f'(x) \begin{cases} < 0 & \text{when } x > 2 \\ < 0 & \text{when } x < 2 \\ = 0 & \text{when } x = 2 \end{cases}$

46. The base of a triangle decreases at a rate of 1 in/sec while its height increases at a rate of 1/2 in/second. How fast is the area of the triangle changing when its height is 8 inches and its base is 10 inches?

47. A) Find the area under $y = x^2 + 2$ on the interval $[2, 6]$.

B) Find the area under $y = e^x + 2x^{-1}$ on the interval $[1, 3]$.

48. A) Write the derivatives of all six trig functions using complete sentences and then again symbolically.

B) Find $\frac{dy}{dx}$ if $y = \frac{\tan x}{\sec x}$.

49. Sketch a curve that has:

A) positive slope and negative concavity.

B) negative slope and positive concavity.

C) negative slope and negative concavity.

D) positive slope and positive concavity.

E) Use the second derivative test to classify all the extrema of $y = 2x^3 + 3x^2 - 36x + 6$.

50. Find $\frac{dy}{dx}$ if: A) $y = e^{\sin(x^2+3x-4)}$

B) $y = e^{2x}(x^2+2)^{50}$