

Self Assessment

Math 1920.007

Find the derivatives of these functions

$y = x^5$	
$y = x \sin x$	
$y = \frac{x^2}{3x+1}$	
$y = (x^3 + x + 1)^8$	
$y = e^2(e^x)^5$	
$y = \ln\left(\frac{1+x}{x^2+1}\right)$	

$y = \sin x$	
$y = \cos(2x+1)$	
$y = \sec x$	
$y^3 + 1 = x^2 - 4x$	
$y = \int_3^x \sec^2 t \, dt$	
$y = x^2 \cdot \sqrt[3]{x}$	

Answer these questions about the function  $f(x) = x - 3\sqrt[3]{x}$

- (i) when is the function decreasing?
- (ii) when is the graph of the function concave upward?
- (iii) does the function have any critical numbers? If so, what happens at those points?

Evaluate these definite and indefinite integrals

$\int_2^{10} \sqrt{2x+5} \, dx$	
$\int_1^8 3x\sqrt[3]{x} \, dx$	
$\int_{\frac{\pi}{2}}^{\pi} (1 + \cos x) \cdot \sin x \, dx$	
$\int_0^1 e^x + x^2 \, dx$	
$\int_{-1}^2 x \cdot \sqrt{x+2} \, dx$	

$\int \frac{x^5}{6} \, dx$	
$\int \frac{1}{2x+1} \, dx$	
$\int \sin^6 x \cdot \cos x \, dx$	
$\int \frac{\ln x}{x} \, dx$	
$\int x e^{x^2} \, dx$	

Evaluate the limits (indeterminate form 0/0)

$\lim_{x \rightarrow \pi} \frac{(\pi-x)}{\sin x}$	$\lim_{x \rightarrow \pi} \frac{(\pi-x)^2}{\sin^2 x}$	$\lim_{x \rightarrow \pi} \frac{(\pi-x)^{20}}{\sin^{20} x}$
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