Math 1 x-hour

Dartmouth College

Thursday 11-03-16

Contents

Examish (Mon)

1. Find $\frac{dy}{dx}$ for the equation $y^2 = x^3 - x$.
2. Find $\frac{dy}{dx}$ for the equation $x^3 + y^3 = 6xy$.
3. Find y' for the equation $\sin(x + y) = y^2 \cos(x)$.
4. Find the equation of the tangent line to the curve $x^2 - xy - y^2 = 1$ at the point $(2, 1)$.
5. Find the equation of the tangent line to the curve $x^2 + y^2 = (2x^2 + 2y^2 - x)^2$ at the point $(0, 1/2)$.
6. Find the equation of the tangent line to the curve $x^{2/3} + y^{2/3} = 4$ at the point $\left(-3\sqrt{3}, 1\right)$.

Examish (Mon)

1. Let $f(x) = 3x^3 + 4x^2 + 6x + 5$ and $a = 5$. Find $(f^{-1})'(a)$.
2. Let $f(x) = x^3 + 3\sin(x) + 2\cos(x)$ and $a = 2$. Find $(f^{-1})'(a)$.
3. Let $f(x) = \sqrt{x^3 + 4x + 4}$ and $a = 3$. Find $(f^{-1})'(a)$.
4. Suppose f^{-1} is the inverse function of a differentiable function f and $f(4) = 5$, $f'(4) = 2/3$. Find $(f^{-1})'(5)$.

Examish (Mon)

1. Find the derivative of $y = x \arcsin(x) + \sqrt{1 - x^2}$.
2. Find the derivative of $y = \arctan \sqrt{\frac{1-x}{1+x}}$.
3. Find the derivative of $f(\theta) = \arctan(\cos(\theta))$.
4. Find y' if $\arctan(x^2 y) = x + xy^2$.

Examish (Wed)

Find the derivative of each function and the domain on which it is valid.

1. $y = \ln(x + 5)$
2. $y = \ln|x + 5|$

Examish (Wed)

1. $f(x) = x \ln x - x$
2. $f(x) = \sin(\ln x)$
3. $y = \ln \frac{1}{x}$
4. $g(x) = \ln(xe^{-2x})$
5. $f(x) = \log_{10} x$
6. $h(x) = \log_{10} \sqrt{x}$
7. $y = 2^x$
8. $y = 5^{2x+1}$
9. $y = (x^2 + 2)^2(x^4 + 4)^4$
10. $y = (2x + 1)^x$