

Mathematics 122

Quiz 12

Name: Key

You must show your work to get full credit.

Compute the following derivatives:

1. $f(x) = 3x^4 - 17x^2 + 5$

$f'(x) = 12x^3 - 34x$

2. $A = 4\sqrt{r} = 4r^{\frac{1}{2}}$

$\frac{dA}{dr} = 2r^{-\frac{1}{2}}$

3. $w = 4e^z$

$\frac{dw}{dz} = 4e^z$

4. $A(r) = 5(3)^r$

$A'(r) = \ln(3)5(3)^r$

5. $y = 4e^{2x}$

$y' = 8e^{2x}$

6. $P(s) = 3\ln(s)$

$P'(s) = \frac{3}{s}$

7. $y = e^2 + 3\ln(x)$

$\frac{dy}{dx} = \frac{3}{x}$

(Note e^2 is constant so $(e^2)' = 0$)

8. What is the equation of the tangent line to $y = x^2$ at the point where $x = 3$?

$y' = 2x$. When

$x = 3$

$y = 3^2 = 9$

$y' = 2(3) = 6$

The tangent line is

$y - 9 = 6(x - 3)$ or

$y = 6x - 9$

so the tangent line goes

through $(3, 9)$ with slope $m = 6$

Thus equation is

$y - 9 = 6(x - 3)$

or $y = 6x - 18 + 9 = 6x - 9$