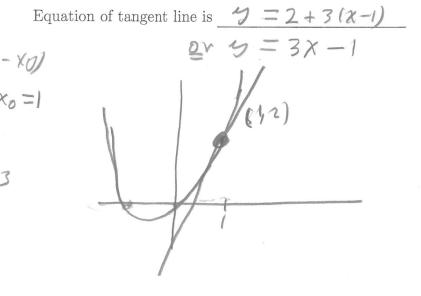Quiz # 12   Name: *Key*

You must show your work to get full credit.

1. Find the equation of the tangent line to $y = x^2 + x$ at the point where $x = 1$. Draw the graphs of $y = x^2 + x$ and the tangent line on the same axis.

Slope point form
of a line is
$$y = y_0 + m(x - x_0)$$

In our case $x_0 = 1$
$$y_0 = y(1) = 1^2 + 1 = 2$$
$$y' = 2x + 1$$
$$m = y'(1) = 2 \cdot 1 + 1 = 3$$
$$y = 2 + 3(x - 1)$$
$$= 2 + 3x - 3$$
$$= 3x - 1$$

Equation of tangent line is $\underline{\quad y = 2 + 3(x-1) \quad}$

or $y = 3x - 1$

$(1, 2)$

2. Find the following derivatives.

(a) $P = 4t^2 + 5e^t$

$$\frac{dP}{dt} = \underline{\quad 8t + 5e^t \quad}$$

(b) $y = 4e^{2t}$

$$y' = \underline{\quad 8e^{2t} \quad}$$

(c) $A(r) = r^{-2} + 2 \cdot 3^r$

$$A'(r) = \underline{\quad -2r^{-3} + 2 \cdot \ln(3) \cdot 3^r \quad}$$

(d) $f(s) = 3\ln(s)$

$$f'(s) = \underline{\quad \frac{3}{s} \quad}$$