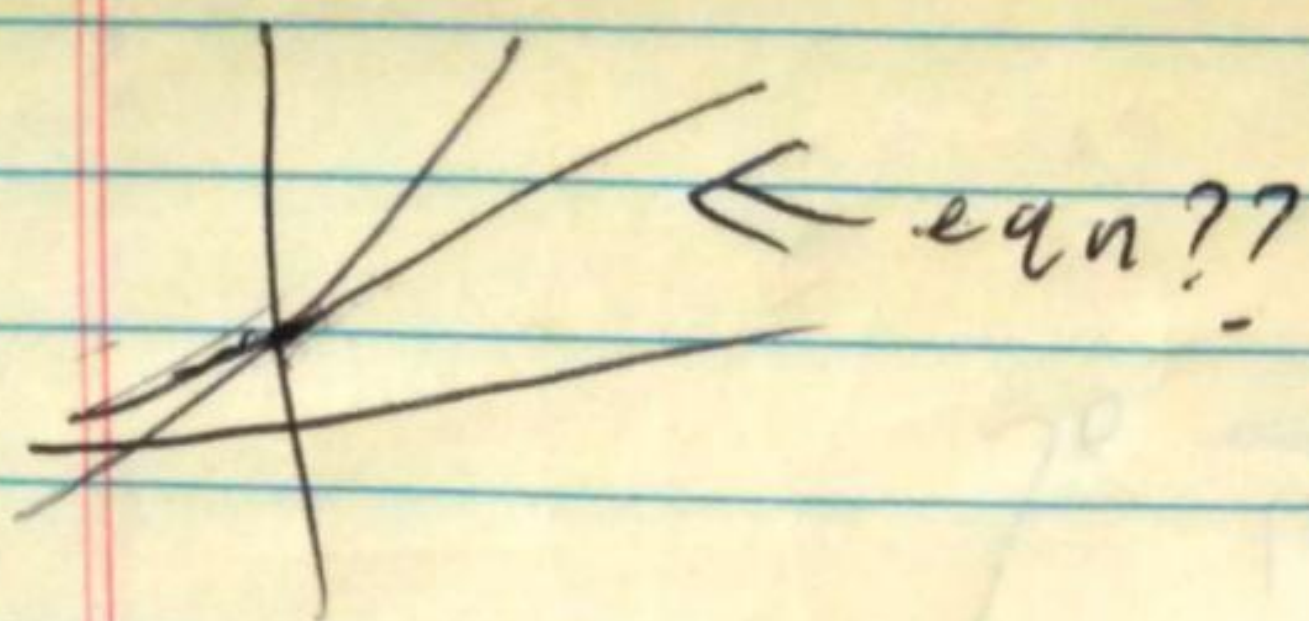


1. Find eq of tang line of $y = e^{7x}$ at $x_0 = 0$.



$$y(0) = e^{7 \cdot 0} = e^0 = 1$$

$(0, 1)$.

$$y'(x) = e^{7x} \cdot 7$$
$$= 7e^{7x}$$

$$y'(0) = 7e^{7 \cdot 0} = 7$$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = 7(x - 0)$$

$$y = 7x + 1$$

2. Differentiate: $f(x) = 7e^{-x} + 2e^{-2x}$.

$$\left[\frac{d}{dx} e^{kx} = k e^{kx} \right]$$

$$\frac{d}{dx} (7e^{-x}) = 7 \frac{d}{dx} e^{-x}$$

$$= 7(-1e^{-x})$$

$$= -7e^{-x}$$

$$\frac{d}{dx} (2e^{-2x}) = 2 \frac{d}{dx} e^{-2x}$$

$$= 2(-2e^{-2x})$$

$$= -4e^{-2x}$$

$$f'(x) = -7e^{-x} - 4e^{-2x}$$

3. Differentiate: $f(t) = \cos(te^{-9t})$

$$f'(t) = -\sin(te^{-9t}) \frac{d}{dt}(te^{-9t})$$

$$\frac{d}{dt}(te^{-9t}) = e^{-9t} + t \frac{d}{dt} e^{-9t}$$

$$= e^{-9t} + t(-9e^{-9t})$$

$$= e^{-9t} - 9te^{-9t}$$

$$\Rightarrow f'(t) = -\sin(te^{-9t}) [\quad]$$

4. Integrate: $\int_0^7 x e^{-x^2/2} dx$

$$\int_0^7 x e^{-x^2/2} dx$$

$$u = x^2/2$$

~~$$du = 2x/2 dx = x dx$$~~

$$du = (2x/2) dx = x dx$$

$$u(0) = 0^2/2 = 0$$

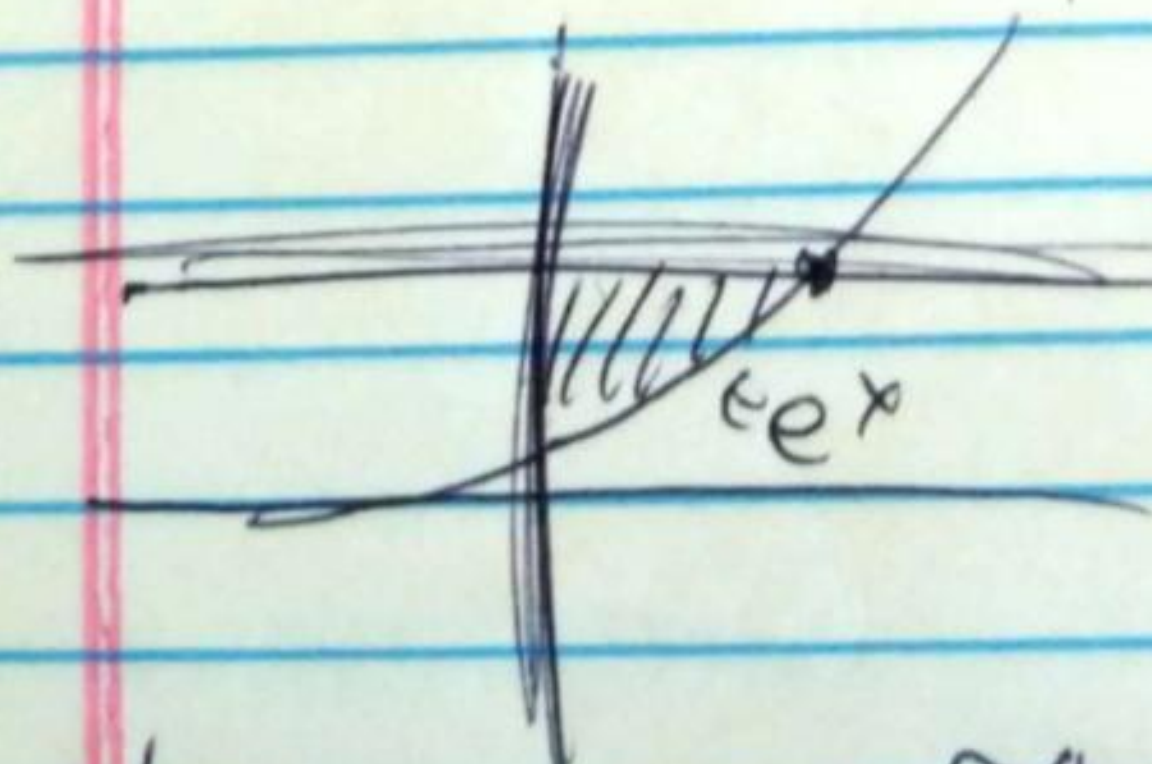
$$u(7) = 7^2/2 = 49/2$$

$$\Rightarrow \int_0^{49/2} e^{-u} du$$

$$\int_0^{49/2} e^{-u} du$$

$$= -e^{-u} \Big|_0^{49/2}$$

5. Find area bdd by $y = e^4$, $y = e^x$, $x = 0$.



$$y = e^4$$

$$e^x = e^4 \Rightarrow x = 4$$

$$\int_a^b f(x) dx$$

$$f(x) \Big|_a^b$$

$$\int_0^4 e^4 - e^x dx$$

$$xe^4 - e^x \Big|_0^4 = (4e^4 - e^4) - (-1)$$

$$-e^{-49/2} - (-e^{-0})$$

$$= 1 - e^{-49/2}$$