

4. [32pts] Calculate dy/dx for each function given below:

a) $y = x^2 e^{6x}$

b) $y = \frac{e^x}{3 - e^x}$

c) $y = \ln(8x + 7)$

d) $y = (x^2 + 2)^x$

5. [10pts] If a car has velocity $v(t) = t^2 + 3$ then how far does it travel between $t = 0$ and $t = 1$?

6. [10pts] Suppose $f'(x) = e^x + 2x$ and $f(0) = 0$. Find $f(x)$.

7. [40pts] Calculate the indefinite integrals indicated below: (a, b are constants)

a) $\int (a + bx) dx$

Hint: try some u -substitution for the integrals that follow.

b) $\int 33x^2(x^3 + 7)^{10} dx$

c) $\int \exp(2t + 3) dt$

d) $\int \sqrt{ax + b} dx$

e) $\int \frac{5x^4 + 2x}{x^5 + x^2} dx$

8. [32pts] Calculate the definite integrals indicated below:

a) $\int_0^1 (x + 2)(x + 1) dx$

b) $\int_{-4}^{-1} \frac{2}{x-1} dx$

c) $\int_5^6 (2x - 9)^4 dx$

d) $\int_0^1 (e^{2x} - e^{-3x}) dx$

Bonus[15pts]: calculate $\int_{-1}^1 \sqrt{1-x^2} dx$

