

Do any 5 parts  
2 pts each  
other 2  
extra credit.

Key

Elements of Calculus I, MATH 180 Quiz 11

Janet Vassilev

(1) Find derivatives of the following:

(a)  $f(x) = xe^{3x}$ .

2 pts  $f'(x) = x \cdot 3e^{3x} + e^{3x} \leftarrow$  ok to leave like this  
 $= e^{3x}(3x+1)$

(b)  $g(t) = \ln t^3 = 3 \ln t$

2 pts  $g'(t) = \frac{3}{t}$

(c)  $h(y) = (\ln y + e^y)^{-4}$ .

2 pts  $h'(y) = -4(\ln y + e^y)^{-5} \left( \frac{1}{y} + e^y \right)$

(2) Verify that  $F(x) = \frac{2}{5}x^5 - x^3 + 4x - 7$  is an antiderivative of  $f(x) = 2x^4 - 3x^2 + 4$ .

2 pts  $F'(x) = 2x^4 - 3x^2 + 4 = f(x)$ . ✓

(3) Evaluate the following:

(a)  $\int x^3 - x^2 - 3x + 7 dx = \frac{1}{4}x^4 - \frac{1}{3}x^3 - \frac{3}{2}x^2 + 7x + C$

2 pts

(b)  $\int e^t - 2t - \frac{1}{t} dt = e^t - t^2 - \ln|t| + C$

2 pts

(c)  $\int (3t-2)^{2/3} dt = \frac{1}{3} \int u^{2/3} du = \frac{1}{3} \cdot \frac{3}{5} u^{5/3} + C$

2 pts  $u = 3t-2$   
 $du = 3dt$

$= \frac{1}{5} (3t-2)^{5/3} + C$