

No notes or calculators. Show all work.

Find the antiderivatives.

1. (3 points) $\int 6x(3x - x^3) dx$

$$= \int 18x^2 - 6x^4 dx$$

$$= \frac{18}{3} x^3 - \frac{6}{5} x^5 + C = \boxed{6x^3 - \frac{6}{5} x^5 + C}$$

2. (3 points) $\int 6x^{2/3} - 8x^{4/5} dx$

$$= \frac{6x^{\frac{2}{3} + \frac{3}{3}}}{\frac{2}{3} + \frac{3}{3}} - \frac{8x^{\frac{4}{5} + \frac{5}{5}}}{\frac{4}{5} + \frac{5}{5}} + C$$

$$= \frac{6x^{5/3}}{5/3} - \frac{8x^{9/5}}{9/5} + C = \boxed{\frac{18}{5} x^{5/3} - \frac{40}{9} x^{9/5} + C}$$

Find the antiderivative by using u-substitution.

3. (4 points) $\int \frac{1}{5-6x} dx$

$$u = 5-6x \\ du = -6 dx \rightarrow \underline{-\frac{1}{6} du = dx}$$

$$\int \frac{1}{u} \cdot (-\frac{1}{6}) du$$

$$= -\frac{1}{6} \int \frac{1}{u} du = -\frac{1}{6} \ln|u| + C$$

$$= \boxed{-\frac{1}{6} \ln|5-6x| + C}$$