

4.7: 15, 19, 59.

15.) $\int_{1/2}^3 \frac{1}{x^2} dx$: Integrate! $\int x^{-2} dx = \frac{x^{-2+1}}{-2+1} = \frac{x^{-1}}{-1} = -x^{-1}$

Evaluate! $[-x^{-1}]_{1/2}^3 = -3^{-1} - (-\frac{1}{2})^{-1} = -\frac{1}{3} + 2 = \frac{5}{3}$.

19.) $\int_0^1 2x^2(x^3-1)^3 dx$: Integrate!

$\int_0^1 2x^2(x^3-1)^3 dx$. $u = x^3 - 1$
 $du = 3x^2 dx$
 $dx = \frac{1}{3x^2} du$
 $= \int 2x^2 u^3 \frac{1}{3x^2} du = \frac{2}{3} \int u^3 du = \frac{2}{3} \frac{u^4}{4} = \frac{2}{12} (x^3-1)^4 = \frac{1}{6} (x^3-1)^4$

Evaluate! $[\frac{1}{6}(x^3-1)^4]_0^1 = \frac{1}{6}(1^3-1)^4 - \frac{1}{6}(0^3-1)^4 = 0 - \frac{1}{6}(-1)^4 = -\frac{1}{6}$.

59.) $\int_{65}^{75} 0.2q + 8 dq$

Integrate since we need to go to total cost from marginal cost and "from 65 to 75" make the limits.

Integrate! $\int 0.2q + 8 dq = 0.2 \int q dq + \int 8 dq$

$= 0.2 \frac{q^2}{2} + 8q = 0.1q^2 + 8q$

Evaluate! $[0.1q^2 + 8q]_{65}^{75} = (0.1(75)^2 + 8(75)) - (0.1(65)^2 + 8(65)) = \underline{220}$.