

## Answer on Question #61837 – Math – Calculus

### Question

1. Integrate with respect to  $x$  :

$$\int 2-1x^2(x^3+4)^2 dx$$

2. Integrate with respect to  $x$  :

$$\int 2-1x^2(x^3+4)^2 dx$$

3. Integrate with respect to  $x$  :

$$\int 3-1x^7+x^2-----\sqrt{dx}$$

### Solution

$$\begin{aligned} 1. \int_{-1}^2 x^2(x^3 + 4)^2 dx &= \{t = x^3, dt = 3x^2 dx\} = \frac{1}{3} \int_{-1}^8 (t + 4)^2 dt = \\ &= \frac{1}{3} \frac{(t+4)^3}{3} \Big|_{t=-1}^{t=8} = \frac{1}{9} (12^3 - 3^3) = 189. \end{aligned}$$

$$\begin{aligned} 2. \int_{-1}^2 x^2(x^3 + 4)^2 dx &= \{t = x^3, dt = 3x^2 dx\} = \frac{1}{3} \int_{-1}^8 (t + 4)^2 dt = \\ &= \frac{1}{3} \frac{(t+4)^3}{3} \Big|_{t=-1}^{t=8} = \frac{1}{9} (12^3 - 3^3) = 189. \end{aligned}$$

3.  $\int_{-1}^3 \sqrt{x^7 + x^2} dx = \int_{-1}^3 x(x^5 + 1)^{\frac{1}{2}} = \int_{-1}^3 x^m(a + bx^n)^p$  can't be expressed in elementary functions.

Here  $m = 1, n = 5, p = \frac{1}{2}$  and

$p = \frac{1}{2}, \frac{m+1}{n} = \frac{1+1}{5} = \frac{2}{5}, \frac{m+1}{n} + p = \frac{1+1}{5} + \frac{1}{2} = \frac{2}{5} + \frac{1}{2} = \frac{2 \cdot 2 + 5}{5 \cdot 2} = \frac{9}{10}$  are not integer.