Answer to Question #87995 – Math – Calculus

Question

7.Integrate with respect to x : -1 -------- dx
(x^3+4)^2
a.12
b.1

2
c.6
d.5

12

8.Integrate with respect to x :∫4 x+1
1 ------ dx
√x

a.20
--
3
b.20
c.3
--
20
d.−20

Solution

#1.

$$\int_a^b -(x^3+4)^2 dx$$

$$= \int_a^b -(x^6+8x^3+16)dx$$

$$= -\left[\frac{x^7}{7}+\frac{8x^4}{4}+16x\right]_a^b$$

Plugging limits,

$$= -\left[\frac{b^7}{7}+\frac{8b^4}{4}+16b\right]+\left[\frac{a^7}{7}+\frac{8a^4}{4}+16a\right]$$

$$= \frac{a^7}{7}+2a^4+16a-\frac{b^7}{7}-2b^4-16b.$$

#2.

$$\int_a^b (4x + \frac{1}{\sqrt{x}})dx$$

$$= \int_a^b (4x + x^{-\frac{1}{2}})dx$$

$$= \left[\frac{4x^2}{2} + \frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} \right]_a^b$$

$$= \left[2x^2 + \frac{x^{\frac{1}{2}}}{\frac{1}{2}} \right]_a^b = \left[2x^2 + 2\sqrt{x} \right]_a^b$$

Plugging limits,

$$= \left[2b^2 + 2\sqrt{b} \right] - \left[2a^2 + 2\sqrt{a} \right]$$

$$= 2b^2 + 2\sqrt{b} - 2a^2 - 2\sqrt{a}.$$