

3. Find

$$\int \frac{3x^4 - 4}{2x^3} dx$$

writing your answer in simplest form.

2021  
(4)

$$\int \left( \frac{3x}{2} - 2x^{-3} \right) dx$$

$$= \frac{3}{2} \cdot \frac{x^2}{2} - \frac{2x^{-2}}{(-2)} + c$$

$$= \frac{3}{4}x^2 + \frac{1}{x^2} + c$$

9. Find the value of the constant  $k$ ,  $0 < k < 9$ , such that

$$\int_k^9 \frac{6}{\sqrt{x}} dx = 20$$

2021  
(4)

$$\int_k^9 6x^{-1/2} dx = 20 = \left[ \frac{6x^{1/2}}{(1/2)} \right]_k^9 = 20$$

$$\left[ 12x^{1/2} \right]_k^9 = 20 \Rightarrow 12\sqrt{9} - 12\sqrt{k} = 20$$

As in +ve domain take +ve roots

$$36 - 12\sqrt{k} = 20$$

$$12\sqrt{k} = 16$$

$$\sqrt{k} = \frac{16}{12} = \frac{4}{3}$$

$$\text{So } k = \frac{16}{9} \text{ as } 0 < k < 9.$$