

1. Differentiate the function.

$$F(r) = \frac{5}{r^3}$$

$$y = 3e^x + \frac{4}{\sqrt[3]{x}}$$

$$G(q) = (1 + q^{-1})^2$$

2. Find equations of the tangent line and normal line to the curve at the given point:  $y = x^2 + 2e^x$ ,  $(0, 2)$

3. The equation of motion of a particle is  $s = t^4 - 2t^3 + t^2 - t$ , where  $s$  is in meters and  $t$  is in seconds.

(a) Find the velocity and acceleration as functions of  $t$ .

(b) Find the acceleration after 1 s.

4. Find an equation of a tangent line to the curve  $y = x^4 + 1$  which is parallel to the line  $32x - y = 15$ .

5. Find the first and second derivatives of the function.

$$G(r) = \sqrt{r} - \sqrt[3]{r}$$