



Homework 3.4 – Products of Functions

1. (1 pt) [alfredLibrary/AUCI/chapter3/lesson4/productpet3.pg](#)

If $f(x) = (6x^2 - 3)(6x + 4)$, then by the product rule,

$$f'(x) = \underline{\hspace{2cm}}$$

$$\text{and } f'(1) = \underline{\hspace{2cm}}.$$

2. (1 pt) [alfredLibrary/AUCI/chapter3/lesson4/productpet4.pg](#)

If $f(x) = (9x^2 - 7)^5(4x^2 - 8)^{15}$,

$$\text{then } f'(x) = \underline{\hspace{2cm}}.$$

(Don't forget to use the chain rule when you differentiate each factor.)

3. (1 pt) [alfredLibrary/AUCI/chapter3/lesson4/productpet5.pg](#)

If $f(x) = (2x - 2x^3)(3 + \sqrt{x})$,

$$\text{then } f'(x) = \underline{\hspace{2cm}}.$$

4. (1 pt) [alfredLibrary/AUCI/chapter3/lesson4/product66pet.pg](#)

The revenue R for a new mobile device during day t after its release is the product of the sales s on that day and the set price p for that day. In this problem, the sales and price both depend on day t , hence so does the revenue. That is,

$$R(t) = s(t)p(t).$$

On day $t = 60$, the sales were 6193 units and *decreasing* at a rate of 47 units per day. On this same day, the price was 247 dollars per unit and *increasing* at a rate of 2 dollars per unit per day.

By the product rule, the revenue was changing at the rate of

$$R'(60) = \underline{\hspace{2cm}} \text{ dollars per day.}$$

(HINT: Find $R'(t)$ using the product rule, then plug in the given information.)

5. (1 pt) [alfredLibrary/AUCI/chapter3/lesson4/quiz/product66pet.pg](#)

The force F on an object is the product of the mass m and the acceleration a . In this problem, assume that the mass and acceleration both depend on time t , hence so does the force. That is, $F(t) = m(t)a(t)$.

At time $t = 9$ seconds, the mass of an object is 44g and changing at a rate of $1g/s$. At this same time, the acceleration is $16m/s^2$ and changing at a rate of $-7m/s^3$.

By the product rule, the force on the object is changing at the rate of

$$F'(9) = \underline{\hspace{2cm}} \text{ (Your answer requires units. If there are two units multiplied together be sure to put the * between them).}$$