

1. Let

$$f(x) = e^{x^3+5x}.$$

Find $f'(x)$.

2. Let

$$g(x) = 2^{5x}.$$

Find $g'(x)$.

3. Let

$$h(x) = \ln(x^2 + 1).$$

Find $h'(x)$.

4. Let

$$f(x) = e^{x^2+x}.$$

Find all the points at which $f'(x) = 0$.

5. A population of bacteria starts at 1,000 at time $t = 0$ and then triples every 5 seconds.

(a) Write down the population P as a function of t .

(b) How fast is the population growing when $t = 10$ seconds (you may use the fact the $\ln 3 = 1.1$)?

(c) At what time is the population equal to 27,000?