Congratulations! You passed!

Next Item

1 / 1 point

1. In the following quiz, you will practice how to differentiate some basic functions. Some questions look tricky, but just stick to the rules you know!

Differentiate the function $f(x) = x^3 + \frac{x^2}{3} + 3$.

- $3x^2 + \frac{x^2}{3} + 3$
- $3x^2 + \frac{2x}{3} + 3$
- $3x^2 + \frac{2x}{3}$ ✓

Correct
Well done!

- $3x^3 + \frac{2x^2}{3}$

1 / 1 point

2. What function would differentiate to get $f'(x) = \frac{3\pi x^4}{4} + 11x^2 + \sqrt{2}$?

- $f(x) = \frac{3\pi x^5}{16} + \frac{11x^3}{2} + \sqrt{2}x + 2$
- $f(x) = \frac{3\pi x^5}{20} + \frac{11x^3}{3} + \sqrt{2}x + 2$ ✓

Correct
Well done! Differentiating each term would give the original expression.

- $f(x) = \frac{3\pi x^4}{20} + \frac{11x^2}{3} + \sqrt{2}x + 2$
- $f(x) = \frac{3\pi x^5}{4} + 11x^3 + \sqrt{2}x + 2$

1 / 1 point

3. When given distance as a function of time (that is, distance = $x = x(t)$), one can calculate the rate of change of distance (that is, speed) as a function of time by differentiating $x(t)$ with respect to t.

Similarly, one can calculate the rate of change of speed (that is, acceleration) by differentiating $x'(t)$ (the speed) with respect to t, to get the "double derivative" of $x(t)$.

Consider a ball being thrown from a plane in the sky. At time $t = 0$, has a distance from the ground of $10,000$ m, has speed equal to 0 ms^{-1}, and has acceleration equal to -9.8 ms^{-2}. Assuming that acceleration is constant, which of the following functions $x(t)$ best describes the distance from the ground to the ball as a function of time?

- $x(t) = -4.9t + 10,000$
- $x(t) = -9.8t^2 + 10,000$
- $x(t) = -4.9t^2 + 10,000$ ✓

Correct
Differentiating once gives the velocity of the ball, and differentiating once more gives the acceleration of the ball.

- $x(t) = 4.9t^2 + 10,000$

1 / 1 point

4. Differentiate the function $f(x) = x^3 + \frac{x^2}{3} + 3$ and evaluate the differential at $x = 5$.

- $f'(5) = \frac{409}{3}$
- $f'(5) = \frac{235}{3}$ ✓

Correct
Well done!

- $f'(5) = 0$
- $f'(5) = 85$

1 / 1 point

5. Differentiate the function $f(x) = x^3 + 27x^2 - 5x + 9$ and evaluate the differential at $x = -1$.

- $f'(-1) = -56$ ✓

Correct
Well done!

- $f'(-1) = 40$
- $f'(-1) = 0$
- $f'(-1) = 10$