

5.1 Worksheet B | Antiderivatives and the Position Equation

Include the units with all of your answers, and round your answers to three decimal places. Show your work. Only use a calculator if you see the calculator symbol \blacksquare .

Find the function that satisfies the given conditions.

1. $f''(x) = \frac{1}{x^{3/2}}$, $f'(4) = 2$, and $f(1) = -6$

2. $g''(x) = -4 \cos x$, $g'\left(\frac{\pi}{6}\right) = -7$, and $g(0) = 13$

13. The acceleration due to gravity on Mars is -3.72 m/s^2 . A Martian throws a rock up in the air, and after 2 seconds the rock's velocity is 1.06 m/s and its height is 11.26 meters. a. Express the rock's position as a function of time, $x(t)$. b. What is the rock's maximum height?

■4. The acceleration of an object is 11.4 m/s^2 . After 4.2 seconds its velocity is 41.28 m/s , and after 5 seconds its position is 61.7 meters. a. Express the object's position as a function of time, $x(t)$. b. When will the object's velocity be -3.066 m/s ?

■5. The acceleration due to gravity on Mercury is -3.7 m/s^2 . After 1 second a falling object has a velocity of -8.8 m/s , and after 2.3 seconds its height is 85.4835 meters. a. Express the object's position as a function of time, $x(t)$. b. When in the future will the object reach a height of 10 meters?