5.1 Worksheet B | Antiderivatives and the Position Equation

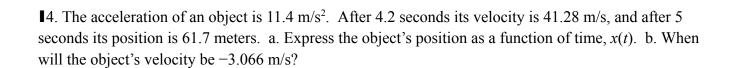
Include the units with all of your answers, and round your answers to three decimal places. Show your work. Only use a calculator if you see the calculator symbol 1.

Find the function that satisfies the given conditions.

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

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

■3. 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?



■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?

1.
$$f(x) = -4\sqrt{x} + 3x - 5$$
 2. $g(x) = 4\cos x - 5x + 9$
3a. $x(t) = -1.86t^2 + 8.5t + 1.7$ 3b. 11.411 meters