

1. In each case, find the most general form of f satisfying the given condition.

$$f'(x) = x(3x + 4)$$

2. Solve the following initial value problems:

$$\frac{dy}{dx} = 6e^x, \quad y(0) = 2$$

3. A particle is moving on a straight line with the given data. Find the position $s(t)$ of the particle at time t .

(i) $v(t) = -32t + 100, \quad s(0) = 20,$

(ii) $a(t) = 2 \cos t + \sin t, \quad v(0) = 1, \quad s(0) = 0.$

4. A stone is dropped from the top of a tower 800 ft above the ground.

(a) Find the height $s(t)$ of the stone above the ground at t seconds since it was dropped. Assume the initial velocity is 0 and assume constant acceleration during the motion $a = -32ft/s^2$ (the gravitational acceleration, often denoted g).

(b) How long does it take the stone to reach the ground?

(c) With what velocity does it strike the ground?

5. A car braked with constant deceleration of $16ft/s^2$, producing skid marks measuring 200ft before coming to a stop. How fast was the car traveling when the brakes were applied?