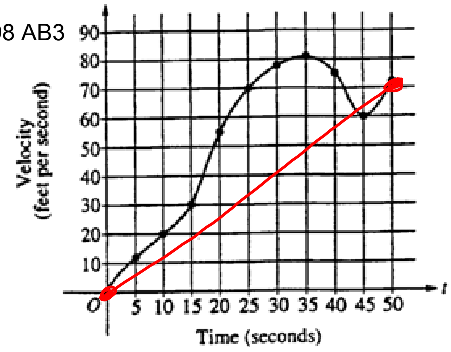
From 1998 AB3



t (seconds)	$v(t)$ (feet per second)
0	0
5	12
10	20
15	30
20	55
25	70
30	78
35	81
40	75
45	60
50	72

The graph of the velocity v(t) in ft/sec, of a car traveling on a straight road, for $0 \le t \le 50$. is shown above. A table of values for v(t) at 5 second intervals of time t, is shown to the right of the graph.

(a) During what intervals of time is the acceleration of the car positive? Give a reason for your answer.

(b) Find the average acceleration of the car, in ft/sec^2, over the interval $0 \le t \le 50$.

(c) Find one approximation for the acceleration of the car, in ft/sec^2, at t = 40. Show the computations you used to arrive at your answer.

$$\frac{1}{x^2} = x^{-2} = \frac{1}{x^2}$$

$$-2x^{-3}$$

$$6x^{-4} = \frac{6}{x^4}$$

$$-24x^{-5}$$

$f'(x) = 8x - 8 = 0$

slope $= 0$

$x = 1$

$f'(0) = 8(0) - 8$

slope @ $x = 0$

$\frac{d}{dx}(2x+3)(x^2-8)$

$(2x+3)(2x) + (x^2-8)(2)$

$4x^2 + 6x + 2x^2 - 16$

$6x^2 + 6x - 16$

$f''(x) = 12x + 6$

$\frac{d^2}{dx^2}\left((2x+3)(x^2-8)\right)$

x^{-1}

$f(x) = 1 + \frac{1}{x}$

$f'(x) = 0 - 1x^{-2}$

$f''(x) = 2x^{-3}$

$\cancel{0} + \frac{\cancel{x(0)} - 1(1)}{x^2}$

$\frac{-1}{x^2}$

$\frac{\cancel{x^2(0)} - (-1)(2x)}{(x^2)^2}$

$\frac{2x}{x^4}$

position

velocity

acceleration

jerk

$f(x) = (2x+3)(x^2-8)$

$f'(x) = (2x+3)(2x) + (x^2-8)(2)$

$4x^2 + 6x + 2x^2 - 16$

$6x^2 + 6x - 16$

$f''(x) = 12x + 6$

$f(x) = 1 + \frac{1}{x}$ x^{-1}

$f'(x) = 0 - 1x^{-2}$

$f''(x) = 2x^{-3}$

$\cancel{0} + \frac{\cancel{x(0)} - 1(1)}{x^2}$

$\frac{-1}{x^2}$

$\frac{\cancel{x^2(0)} - (-1)(2x)}{(x^2)^2}$

$\frac{2\cancel{x}}{x^{\cancel{4}3}} = \frac{2}{x^3}$