

(1) (a) $y = \sqrt{3t-5} = (3t-5)^{\frac{1}{2}}$

$y' = \frac{1}{2}(3t-5)^{-\frac{1}{2}}(3)$

$y' = \frac{3}{2\sqrt{3t-5}}$

(b) $f(x) = \frac{\sin(5x)}{x^3}$

$f'(x) = \frac{x^3(\sin 5x)' - (\sin 5x)(x^3)'}{(x^3)^2}$

$= \frac{5x^3 \cos 5x - 3x^2 \sin 5x}{x^6}$

$= \frac{x^2(5x \cos 5x - 3 \sin 5x)}{x^6}$

$f(x) = \frac{5x \cos 5x - 3 \sin 5x}{x^4}$ *Reducing*

(c) $x(t) = e^{3t} \sin 2t$

$x'(t) = e^{3t}(\sin 2t)' + (\sin 2t)(e^{3t})'$

$x'(t) = 2e^{3t} \cos 2t - 3e^{3t} \sin 2t$

(d) $f(x) = 3x^2 - 7x^{-1} + \frac{1}{4}x^{\frac{1}{2}}$

$f'(x) = 6x + 7x^{-2} + \frac{1}{8}x^{-\frac{1}{2}}$

$f'(x) = 6x + \frac{7}{x^2} + \frac{1}{8\sqrt{x}}$ *Do this*

(e) $g(t) = 3e^{x^2+7x}$ *Do this*

$g'(t) = 3e^{x^2+7x} (x^2+7x)'$

$g'(t) = (6x+21)e^{x^2+7x}$

(f) $y = \cos 3x$

$y' = -3 \sin 3x$

$y'' = -9 \cos 3x$

(g) $h(x) = (4x-2)^5 (2x+1)^3$

$h'(x) = (4x-2)^5 [(2x+1)^3]' + (2x+1)^3 [(4x-2)^5]'$ *Do this*

$= 3(4x-2)^5 (2x+1)^2 (2) + (2x+1)^3 5(4x-2)^4 (4)$

$h'(x) = 6(4x-2)^5 (2x+1)^2 + 20(2x+1)^3 (4x-2)^4$

$h'(x) = 2(4x-2)^4 (2x+1)^2 [(4x-2) + (2x+1)]$

$h'(x) = 2(4x-2)^4 (2x+1)^2 (6x-1)$

(2) ⁽²⁹⁾ $y = 2x^2 + 4x + 5 \quad [-2, 2]$

$y' = 4x + 4 = 4(x+1)$

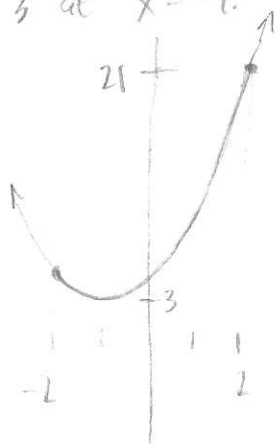
Critical point: $x = -1$

x	y
-2	5
-1	3
2	21

$y = 2(4) + 4(-2) + 5 = 5$
 $y = 2 + 4 + 5 = 3$
 $y = 2(4) + 4(2) + 5 = 21$

The function has an abs max of 21 at $x = 2$.

The function has an abs min of 3 at $x = -1$.



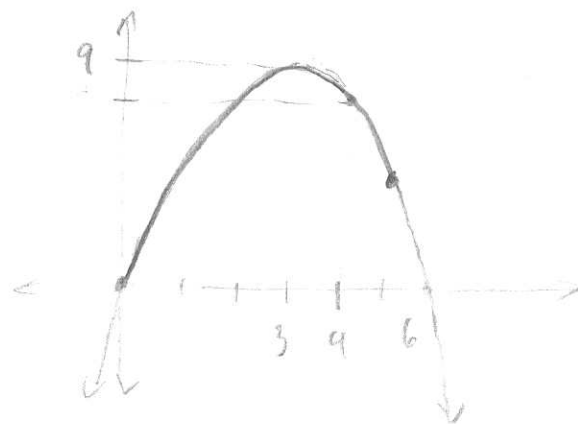
(31) $y = 6t - t^2 \quad [0, 5]$

$y' = 6 - 2t = 2(3 - t)$

$t = 3$ is a critical point, not in the interval

t	y
0	0
3	9
5	5

The function has an abs max of 8 at $t = 4$. The function has an abs min of 0 at $t = 0$.



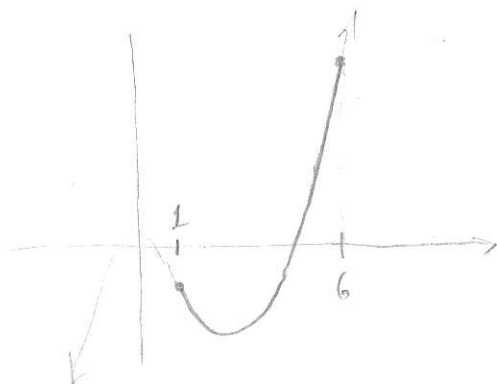
(33) $y = x^3 - 6x^2 + 8 \quad [1, 6]$

$y' = 3x^2 - 12x = 3x(x-4)$

Critical points at $x = 0, 4$

x	y
1	-3
4	-24
6	8

The function has an abs max of 8 at $x = 6$.
The function has an abs min of -24 at $x = 4$.



(35) $y = 2t^3 + 3t^2 \quad [1, 2]$

$y' = 6t^2 + 6t = 6t(t+1)$

Critical points at $t = 0, t = -1$

Neither is in the interval

t	y
1	5
2	30

The function has an abs max of 30 at $t = 2$, and an abs min of 5 at $t = 1$.

