∴ 5.1

$y = x^2 - x$

$y' = 2x - 1$

$0 = 2x - 1$

$1 = 2x$

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

$\therefore y = \frac{1}{2}^2 - \frac{1}{2}$

$= \frac{1}{4} - \frac{1}{2}$

$= -\frac{1}{4}$

a) $y = x^2 - x$

$y' = 2x - 1$

$0 = 2x - 1$

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

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

$= \frac{1}{4} - \frac{1}{2}$

$= -\frac{1}{4}$

∴ the min $x = \frac{1}{2}$.

e

3) $y = 3x^4 - 4x^3$

$y' = 12x^3 - 12x^2$

$0 = 12x^3 - 12x^2$

$12x^2 = 12x^3$

$x = 1$

∴ the min $x = 1$

h) $y = \cos(2x) - x$

$y' = 2\sin 2x - 1$

$0 = 2\sin 2x - 1$

$1 = 2\sin 2x$

$\frac{1}{2} = \sin 2x$

$2x = \frac{\pi}{6}$ or $\frac{5\pi}{6}$

$x = \frac{\pi}{12}$ or $\frac{5\pi}{12}$

5.5.3

$f'(x) = \frac{1}{x} = -\frac{1}{x^2}$.

$\therefore x = 0$.

∴ $f(x)$ no max and min.

5.5.6

$3x^2 + c = 0$

$3x^2 = -c$

$x^2 = -\frac{c}{3}$

$f(x) = x^3 + 1$

$f(-1) = 0$, $f(0) = 1$, $f(1) = 2$

If $c = 0$

if $c < 0$.

$x = \pm\sqrt{-\frac{c}{3}} = \pm\sqrt{\frac{|c|}{3}}$

5.5.8 (a) $f(x) = \frac{-x+4}{x-4}$ on $[0, 3]$.

$f'(x) = \frac{8}{(x-4)^2}$

$f(0) = -\frac{4}{4} = 1$ $f(3) = \frac{-7}{1}$

$= -$

∴ min $(0, 1)$

max $(3, 7)$

f) $f(x) = xe^{-x^2/32}$ on $[0, 2]$.

$f'(x) = e^{-\frac{x^2}{32}} + x\left(\frac{-2x}{32}\right)e^{-\frac{x^2}{32}}$

$= (1 - 16x^2)e^{-\frac{x^2}{32}}$

$f'(x) = 0$.

$0 = 1 - 16x^2$

$x = \pm\frac{1}{4}$.

$f(0) = 0$ and $f(2) = 2e^{-\frac{1}{8}}$

∴

g) $f(x) = x - \tan^{-1}(2x)$ on $[0, 2]$

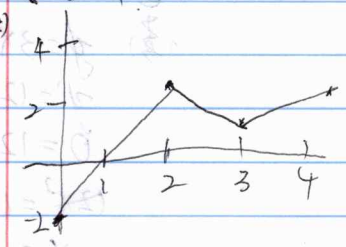
$f'(x) = 1 - \frac{2}{4x^2 + 1}$

$0 = \frac{2}{4x^2 + 1} = 1$.

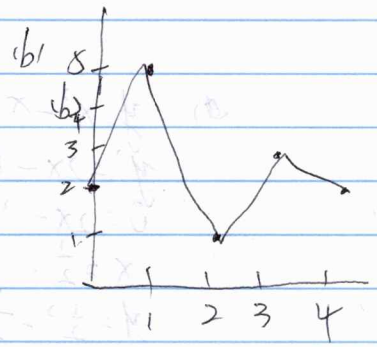
$x = \pm\frac{1}{2}$.

5.5.9

(a)



(b)



(c)