[1-6] 11.

$$\lim_{x \to -2} (3x-7) = -6-7 = -13$$

[1-6] 17.

$$\lim_{x \to -2} \frac{x^2-x-6}{3x^2+5x-2} = \lim_{x \to -2} \frac{(x-3)(x+2)}{(3x-1)(x+2)} = \lim_{x \to -2} \left(\frac{x-3}{3x-1}\right)$$

$$= \frac{5}{7} \quad \#$$

[1-6] 24.

$$\lim_{x \to 2} \frac{2-x}{\sqrt{x+2}-2} \times \frac{\sqrt{x+2}+2}{\sqrt{x+2}+2} = \frac{(2-x)(\sqrt{x+2}+2)}{(x+2)-4}$$

$$= \frac{(2-x)(\sqrt{x+2}+2)}{(x-2)}$$

$$= -\sqrt{x+2}-2$$

$$\lim_{x \to 2} -\sqrt{x+2}-2 = -4$$

#

[1-6] 40

$$f(x) \le g(x) \le h(x)$$

$$\lim_{x \to 1} f(x) = \lim_{x \to 1} h(x) = 2$$

$$\lim_{x \to 1} g(x) = 2$$

[1-6] 41

Proof:

$-1 \le \cos(\frac{2}{x}) \le 1$

$-x^4 \le x^4 \cos(\frac{2}{x}) \le x^4$

$\because \lim_{x \to 0} -x^4 = 0$

$\lim_{x \to 0} x^4 = 0$

$\therefore \lim_{x \to 0} x^4 \cos(\frac{2}{x}) = 0$

[1-7] 19

$\lim_{x \to 9} (1 - \frac{1}{3}x) = -2$

Given any $\varepsilon$, we can find a $\delta$ so that ,

if $|x-9| < \delta$ then $|1 - \frac{1}{3}x + 2| < \varepsilon$

$|3 - \frac{1}{3}x| < \varepsilon$

$\frac{1}{-3}|x-9| < \varepsilon$

$|x-9| < -3\varepsilon$ choose $\delta = -3\varepsilon$ #

[1-7] 25

Given any $\varepsilon$ we can find a $\delta$ so that

if $|x| < \delta$ we then $|x^2| < \varepsilon$

suppose $|x| < \delta$ $\delta \le 1$

$|x| \le 1$ , $|x^2| = |x|^2 < |x| \cdot 1 = |x|$ , $\delta \le \varepsilon$ we have $|x| < \varepsilon$

for $\varepsilon > 0$ we have found a $\delta > 0$ such that $|x-0| < \delta$ $|x^2 - 0| < \varepsilon$

[1-7] 36

$$\lim_{x \to 2} \frac{1}{x}$$

$f(x) = \left(\frac{1}{x}\right) \to$ continuos

$$\lim_{x \to 2} \frac{1}{x} = \frac{1}{2} \#$$

[1-8] 35

$$\lim_{x \to 2} x\sqrt{20-x^2} = 2\times\sqrt{20-4} = 2\times 4 = 8 \#$$

[1-8] 41

$\because \lim_{x \to 1^-} f(x) = 1 - x^2 = 0$

$\lim_{x \to 1^+} f(x) = \sqrt{x-1} = 0$

$\therefore$ function is continuous in the interval $(-\infty, \infty)$

[1-8] 55

at $x = -1$, $x = 0$

$f(-1) = 1 - 4 + 1 < 0$

$f(0) = 1 > 0$

$f(-1) < 0 < f(0)$

at least one solution in the interval $(-1, 0)$

[1-8] 57

$\cos x - x = 0$

$f(0) = \cos 0 - 0 = 1 > 0$

$f(1) = \cos 1 - 1 < 0$

$\hookrightarrow f(1) < 0 < f(0)$ #

[2-1] 5

$y = 2x^2 - 5x + 1$

$y' = 4x - 5 \qquad (3, 4)$

$m = 12 - 5 = 7$

$(y - 4) = 7(x - 3)$

$y - 4 = 7x - 21$

$y = 7x - 17$ #

[2-1] 23

$f(x) = 2x^2 - 5x + 3$

$f'(x) = 4x - 5$

[2-1] 27

$y = ax + b$

$y = -\frac{1}{2}x + b$

$-3 + b = 0$

$b = 3$

$y = -\frac{1}{2}x + 3$ #

[2-1] 57

$f'(0) = \lim_{h \to 0} \frac{f(h) - f(0)}{h} = \lim_{h \to 0} \frac{\cancel{h}\sin(-\frac{1}{h}) - 0}{\cancel{h}}$

$= \lim_{h \to 0} \sin(-\frac{1}{h}) \Rightarrow$ does not exist #

[2-2] 19

$f(x) = 3x - 8$ , R

$f'(x) = 3$ , R

[2-2] 20

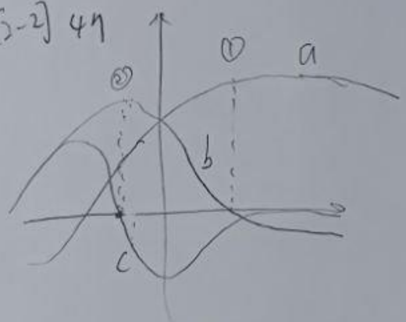
$$f'(x) = \lim_{h \to 0} \frac{(m(x+h)+b) - (mx+b)}{h}$$

$$= \lim_{h \to 0} \frac{\cancel{mx} + mh + \cancel{b} - \cancel{mx} - \cancel{b}}{h} = \lim_{h \to 0} m$$

$f'(x) = m$ , R , A

$f(x)$ , R

[2-2] 47




$a = f$

$b = f'$

$c = f''$

由 ① 得知 b 為 $f'$

② c 為 $f''$