B

1. a) $$f(x) = \frac{x^2-10x+24}{2x^2-12x-14} = \frac{(x-4)(x-6)}{2(x-7)(x+1)}$$

$$2x^2-12x-14 \neq 0$$
$$2(x^2-6x-7) \neq 0$$
$$2(x-7)(x+1) \neq 0$$
$$\underline{x \neq 7} \wedge \underline{x \neq -1}$$

$$\boxed{D_f = \mathbb{R} \setminus \{-1; 7\}}$$

b) $f(x) = 0 \iff \underline{x=4} \vee \underline{x=6}$ $\quad P_{x_1} = [4; 0]$

$P_{x_2} = [6; 0]$

$f(0) = \frac{24}{-14} = -\frac{12}{7}$ $\quad P_y = [0; -\frac{12}{7}]$

c)

	$(-\infty,-1)$	$(-1,4)$	$(4,6)$	$(6,7)$	$(7,+\infty)$
$x-4$	$-$	$-$	$+$	$+$	$+$
$x-6$	$-$	$-$	$-$	$+$	$+$
$x-7$	$-$	$-$	$-$	$-$	$+$
$x+1$	$-$	$+$	$+$	$+$	$+$

$-\infty \quad + \quad -1 \quad - \quad 4 \quad + \quad 6 \quad - \quad 7 \quad + \quad +\infty$

$\forall x \in (-\infty,-1) \cup \langle 4,6 \rangle \cup (7,\infty) : f(x) \geq 0$

$\forall x \in (-1,4\rangle \cup \langle 6,7) : f(x) \leq 0$

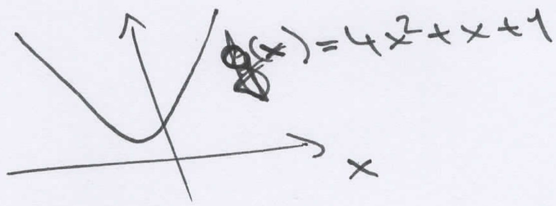
(2.) $\lim\limits_{n\to\infty} \frac{(3+4n)(-2+5n)}{6-n^2} = \lim\limits_{n\to\infty} \frac{\cancel{n^2}\cdot\left(\frac{3}{n}+4\right)\left(-\frac{2}{n}+5\right)}{\cancel{n^2}\cdot\left(\frac{6}{n^2}-1\right)}$

$= \frac{(0+4)(-0+5)}{0-1} = \frac{20}{-1} = \underline{\underline{-20}}$

(3.) $f(x) = \frac{\sqrt{4x^2+x+1}}{2x+5}$

$\forall x\in\mathbb{R}: 4x^2+x+1 \geq 0 \quad \wedge \quad 2x+5 \neq 0$

$D = 1^2 - 4\cdot4\cdot1 < 0 \qquad x \neq -\frac{5}{2}$



$\boxed{D_f = \mathbb{R}\setminus\left\{-\frac{5}{2}\right\}}$

$\lim\limits_{x\to-\frac{5}{2}+} f(x) = \frac{\sqrt{4\cdot\frac{25}{4}-\frac{5}{2}+1}}{0_+} = \underline{\underline{+\infty}}$

$\lim\limits_{x\to-\frac{5}{2}-} f(x) = \frac{\sqrt{25-\frac{5}{2}+1}}{0_-} = \underline{\underline{-\infty}}$

$\lim\limits_{x\to+\infty} f(x) = \lim\limits_{x\to+\infty} \frac{\cancel{|x|}\cdot\sqrt{4+\frac{1}{x}+\frac{1}{x^2}}}{\cancel{x}\cdot\left(2+\frac{5}{x}\right)} = \frac{\sqrt{4+0+0}}{2+0} = \frac{2}{2} = \underline{\underline{1}}$

$\lim\limits_{x\to-\infty} f(x) = \lim\limits_{x\to-\infty} \frac{\cancel{|x|}\cdot\sqrt{4+\frac{1}{x}+\frac{1}{x^2}}}{\cancel{x}_{(-1)}\cdot\left(2+\frac{5}{x}\right)} = \underline{\underline{-1}}$