2.4

① ⓐ $y = \sqrt{3-x}$

$0 \leq 3-x$  $\{x \mid x \leq 3\}$

$-3 \leq -x$

$3 \geq x$

ⓑ $y = \frac{1}{x-3}$

$\{x \mid x = \mathbb{R}, x \neq 3\}$ Because $x$ is in the denominator, 3 will make it 0

ⓒ $y = \sqrt{(x-1)(x+2)x}$

$0 \leq (x-1)(x+2)x$
    1    -2  0

$\{x \mid x \leq -2, x \geq 1, x = 0\}$

ⓓ $y = \frac{1}{x^2+4}$ $\{x \mid x = \mathbb{R}\}$ Because $x$ is in the denominator and being squared, it will always be positive

ⓔ $y = \frac{1}{x^2-5x+6}$ $\{x \mid 2 > x, x > 3\}$

$(x-2)(x-3)$ Because $x$ is in the
  2    3   denominator and is a polynomial, the roots of the polynomial are undefined

(f) $y = \sqrt{x^2 - 9}$

$0 \leq x^2 - 9$

$9 \leq x^2$

$x \leq 3$     $\{x \mid x \geq 3\}$

(n) $y = \sqrt{\dfrac{x^2 - 4}{x + 7}}$

$0 \leq \dfrac{x^2 - 4}{x + 7} \quad = \quad \begin{array}{l} x \geq 2 \\ x \neq -7 \end{array}$

$\{x \mid x \geq 2, x \neq -7\}$ Because $-7$ makes
this undefined and $\leq 2$
makes this negative

Handout 8

① ⓐ Denominator can't be 0

$g(x) = \dfrac{1}{x + 3}$

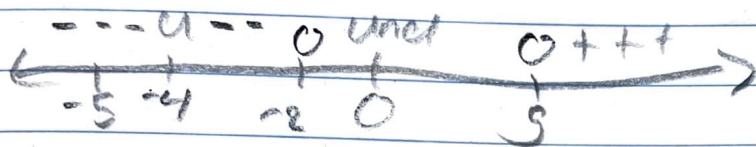$0 \neq x + 3$

$\{x \mid x \in \mathbb{R}, x \neq -3\}$

ⓑ $x \geq \pm 2$ doesn't means $x \geq 2, x \geq -2$

$\{x \mid -2 \geq x, x \geq 2\}$

① Didn't close the domain statement

$\{x \mid x \geq \frac{6}{5}\}$

② -2 to -4 should result in a negative because the denominator would be negative



④ (a) $0 = \dfrac{3t^2+5}{t-6}$ | 0 is Not|

$0 = 3t^2 + 5$

$-5 = 3t^2$

$-\frac{5}{3} = t^2$

(b) 1 Is because range is $\{t \mid t > 0, t \neq 6\}$

(c) -1 Is not because range $\{t \mid t > 0, t \neq 6\}$

(d) 70 is because range is $\{t \mid t > 0, t \neq 6\}$

⑤ (a) Yes because there are 3 different parts to the domain

(b) No because we can see that $x \neq 0$

(c) Yes because there are 3 parts at the domain

(6)(a) $f(x) = \sqrt{x^2 + 5x + 6}$

$0 \leq x^2 + 5x + 6$

$0 \leq (x+2)(x+3)$

$\{x \mid x \geq -2, x \leq -3\}$

(b) $h(x) = \dfrac{1}{x^2 + 5x + 6}$

$0 \neq x^2 + 5x + 6$

$0 \neq (x+2)(x+3)$

$\{x \mid x = \mathbb{R}, x \neq -2, -3\}$

(c) $h(x) = \dfrac{1}{\sqrt{x^2 + 5x + 6}}$

$0 < x^2 + 5x + 6$

$0 < (x+2)(x+3)$

$\{x \mid x > -2, x < -3\}$

(d) $j(x) = \sqrt{x+2}\,\sqrt{x+2}$

$\{x \mid x \geq -2\}$

(7)(a) $y = \sqrt{3 - \dfrac{1}{2x}}$

$0 \leq 3 - \dfrac{1}{2x}$

$-3 \leq -\dfrac{1}{2x}$

$6x \geq 1$

$x \geq \dfrac{1}{6}$

$\boxed{\{x \mid x \geq \tfrac{1}{6}\}}$

① $g(w) = \dfrac{1}{\sqrt{15-w}}$

$0 < 15 - w$

$w < 15$   $\{w \mid w < 15\}$