

Sec. 1 day 2 page 23 (29, 32, 33, 35, 38, 40, 43, 45, 47, 51, 52, 55, 57)

(29) $x^2 - 9 \neq 0$ so $(x-3)(x+3) = 0$ when $x = 3$ or -3
Domain: $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

(32) $3-t \geq 0$ and $2+t \geq 0$
 $t \leq 3$ and $t \geq -2$
 \therefore Domain: $[-2, 3]$

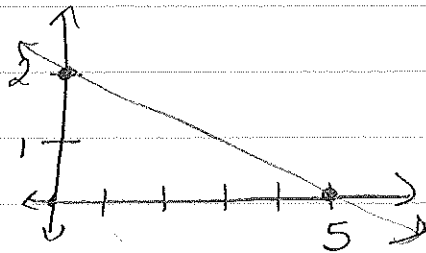
(33) $x^2 - 5x > 0$ either $(+)(+)$ or $(-)(-)$
 $x(x-5) > 0$

Case 1: $x > 0$ & $x-5 > 0 \Rightarrow x > 5 \therefore x > 5$

Case 2: $x < 0$ & $x-5 < 0 \Rightarrow x < 5 \therefore x < 0$

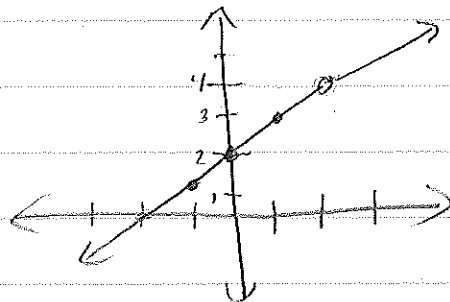
\therefore Domain: $(-\infty, 0) \cup (5, \infty)$

(35) $f(x) = 2 - 0.4x$
Domain is \mathbb{R} or $(-\infty, \infty)$



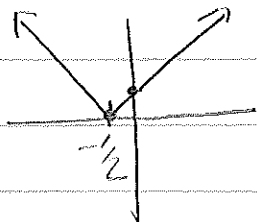
(38) $H(t) = \frac{4-t^2}{2-t} = \frac{(2-t)(2+t)}{(2-t)} = 2+t$

Domain: $(-\infty, 2) \cup (2, \infty)$

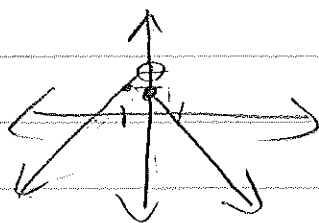


$$(40) \quad F(x) = |2x+1| \Rightarrow F(x) = \begin{cases} 2x+1 & \text{if } x \geq -\frac{1}{2} \\ -(2x+1) & \text{if } x < -\frac{1}{2} \end{cases}$$

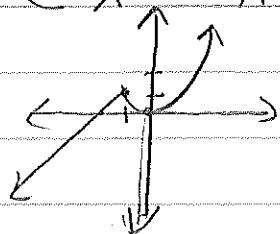
Domain: all \mathbb{R} or $(-\infty, \infty)$



$$(43) \quad S(x) = \begin{cases} x+2 & \text{if } x < 0 \\ 1-x & \text{if } x \geq 0 \end{cases} \quad \text{Domain: all } \mathbb{R} \text{ or } (-\infty, \infty)$$



$$(45) \quad S(x) = \begin{cases} x+2 & \text{if } x \leq -1 \\ x^2 & \text{if } x > -1 \end{cases} \quad \text{Domain: all } \mathbb{R} \text{ or } (-\infty, \infty)$$



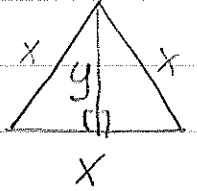
$$(47) \quad S(x) = \frac{5}{2}x - \frac{1}{2}, \quad 1 \leq x \leq 5$$

$$(51) \quad S(x) = \begin{cases} -x+3 & \text{if } 0 \leq x \leq 3 \\ 2x-6 & \text{if } 3 < x \leq 5 \end{cases}$$

$$(52) \quad \text{from } -2 \leq x \leq 2 \text{ we have a circle with } r=2 \text{ and center } (0,0) \therefore x^2+y^2=4 \text{ or } y=\sqrt{4-x^2}$$

$$S(x) = \begin{cases} -\frac{3}{2}x-3 & \text{if } -4 \leq x \leq -2 \\ \sqrt{4-x^2} & \text{if } -2 < x < 2 \\ \frac{3}{2}x-3 & \text{if } 2 \leq x \leq 4 \end{cases}$$

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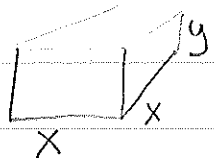
$$y^2 = x^2 - \left(\frac{1}{2}x\right)^2 = \frac{3}{4}x^2$$

$$y = \frac{\sqrt{3}}{2}x$$

$$A = \frac{1}{2}x \left(\frac{\sqrt{3}}{2}x\right) = \frac{\sqrt{3}}{4}x^2 \quad \text{where } x > 0$$

(why?)

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$$x^2 y = 2 \text{ m}^3 \quad \Rightarrow y = \frac{2}{x^2}$$

$$SA = 2x^2 + 4xy$$

$$SA(x) = 2x^2 + 4x \left(\frac{2}{x^2}\right) = 2x^2 + \frac{8}{x} \quad \text{where } x > 0$$