

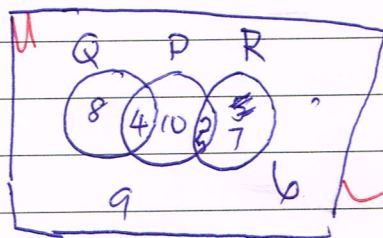
$$2a. V = \{2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

$$P = \{2, 4, 5, 10\}$$

$$Q = \{4, 8\}$$

$$R = \{2, 3, 5, 7\}$$

i)



ii) $P = \{2, 4, 5, 10\}$

$$R' = \{4, 6, 8, 9, 10\}$$

$$Q' = \{2, 3, 5, 6, 7, 9, 10\}$$

$$[(P \cap R) \cap V] \cap (R \cap Q)$$

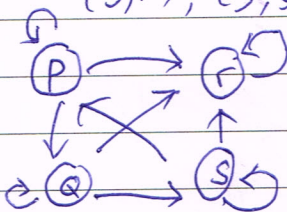
$$(P \cap R') = \{4, 10\}$$

$$(P \cap Q') = \{2, 5, 10\}$$

$$(P \cap R') \cup (P \cap Q') = \{2, 4, 5, 10\}$$

b) $T = \{(p, p), (p, q), (p, r), (q, q), (q, r), (q, s), (r, r), (s, p), (s, r), (s, s)\}$ on $\{p, q, r, s\}$

i)



It is reflexive because all elements loop itself

Not Symmetric because $(p, q) \in T$ but $(q, p) \notin T$

Not transitive because (s, p) and $(p, q) \in T$ but $(s, q) \notin T$

bii) $f(x) = 3x + x^2$

$$g(x) = \frac{x}{2} - 4$$

$$h(x) = x - 5$$

$$g^{-1}(3)$$

$$\text{let } y = \frac{x}{2} - 4$$

$$y + 4 = \frac{x}{2}$$

$$\Rightarrow (y + 4) = \frac{x}{2}$$

$$g^{-1}(x) = 2(x+4)$$

$$g^{-1}(3) = 2(3+4) = 2(7) = 14$$

$$b) fh(x) = f[h(x)]$$

$$= f(x-5)$$

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

$$= 3x - 15 + x^2 - 10x + 25$$

$$= x^2 - 7x + 10$$

$$h^{-1}(x)$$

$$\text{let } y = x - 5$$

$$x = y + 5$$

$$h^{-1}(x) = x + 5$$

$$h^{-1}f\left(\frac{1}{2}\right)$$

$$h^{-1}f(x) = h^{-1}[3x + x^2]$$

$$= 3x + x^2 + 5$$

$$h^{-1}f\left(\frac{1}{2}\right) = 3\left(\frac{1}{2}\right) + \left(\frac{1}{2}\right)^2 + 5$$

$$= \frac{3}{2} + \frac{1}{4} + 5$$

$$= 6\frac{3}{4}$$