

$$i) S = \{0, 1, 2, 3, 4, 5\}$$

$$f(0) = 0$$

$$f(S) = \{0, 1, 3, 5, 8\}$$

$$f(1) = 0$$

$$f(2) = 1$$

$$f(3) = 3$$

$$f(4) = 5$$

$$f(5) = 8$$

$$ii) S = \{1, 5, 7, 11\}$$

$$f(1) = 0$$

$$f(S) = \{0, 8, 16, 40\}$$

$$f(5) = 8$$

$$f(7) = 16$$

$$f(11) = 40$$

$$iv) S = \{2, 6, 10, 14\}$$

$$f(2) = 1$$

$$f(S) = \{1, 12, 33, 65\}$$

$$f(6) = 12$$

$$f(10) = 33$$

$$f(14) = 65$$

$$b) i) \left| \frac{3}{4} \right|$$

$$f\left(\frac{3}{4}\right) = \frac{3}{16}$$

$$f(S) = \frac{3}{16} \{0\}$$

$$ii) \left| \frac{7}{8} \right|$$

$$f\left(\frac{7}{8}\right) = \frac{49}{192}$$

$$f(S) = \{0\}$$

$$b) i) \left[\frac{3}{4} \right]$$

$$\text{floor} = 0.75 \\ = \cancel{0}1$$

$$ii) \left[\frac{7}{8} \right]$$

$$\text{ceiling} = 0.875 \\ = 0$$

$$iii) \left[-\frac{3}{4} \right]$$

$$\text{floor} = -0.75 \\ = 0$$

$$iv) \left[-\frac{7}{8} \right]$$

$$\text{ceiling} = -0.875 \\ = -1$$

$$v) [3]$$

$$\text{floor} = 3$$

$$vi) [-1]$$

$$\text{ceiling} = -1 \\ = -1$$

$$vii) \left[\frac{1}{2} + \left[\frac{3}{2} \right] \right]$$

$$\text{floor} = \frac{3}{2} = 1.5 = 2 \\ \text{ceiling} = 2 = 2$$

$$viii) \left[\frac{1}{2} \cdot \left[\frac{5}{2} \right] \right]$$

$$\text{ceiling} = \frac{5}{2} = 2.5 = 2 \\ \text{ceiling} = 2 \times 0.5 \\ = \cancel{0}1$$

$$c) \lfloor -x \rfloor = -\lceil x \rceil \text{ And } \lceil -x \rceil = -\lfloor x \rfloor$$

$$x = 1.25$$

$$\lfloor -1.25 \rfloor = -2$$

$$\lceil 1.25 \rceil = -2$$

$$\lfloor -x \rfloor = -\lceil x \rceil \text{ valid}$$

$$x = 0.5$$

$$\lfloor -0.5 \rfloor = 0$$

$$-\lceil 0.5 \rceil = 0$$

$$\lfloor -x \rfloor = -\lceil x \rceil \text{ valid}$$

Q.25 $f(a) = 2a + 3$ $g(a) = 3a + 2$.

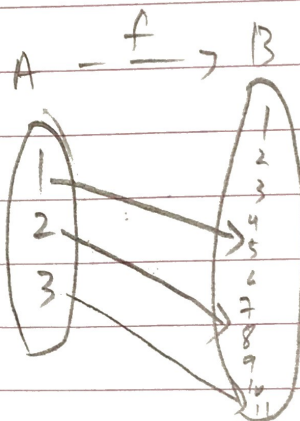
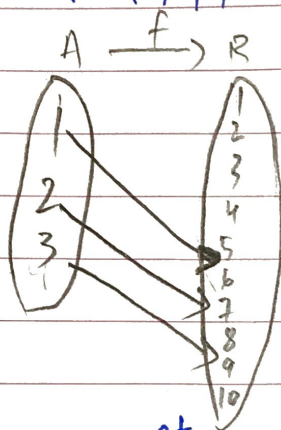
a) i) $f \circ g$

$$\begin{aligned} f \circ g &= 2(3a + 2) + 3 \\ &= 6a + 4 + 3 \\ &= 6a + 7 \end{aligned}$$

ii) $g \circ f$

$$\begin{aligned} &= 3(2a + 3) + 2 \\ &= 6a + 9 + 2 \\ &= 6a + 11 \end{aligned}$$

b)



Both are ^{not} injective (one-to-one) functions.
or surjective or bijective.

c) Both are not invertible because their inverse does not make a bijective function although and their inverse does not make a function either.