

5th exercise

1) * $A_1 = \text{length} \times \text{width}$

$$= AB \times EB$$

$$= x(x+1)$$

$$A_1 = (x^2 + x) \text{ cm}^2$$

* $A_2 = \frac{\text{base} \times \text{height}}{2}$

$$= \frac{AB \times BC}{2}$$

$$= \frac{(x+1)(x+1)}{2}$$

$$A_2 = \frac{(x+1)^2}{2} \text{ cm}^2$$

* $A_3 = \frac{\pi r^2}{2}$ (area of a semi-circle)

$$A_3 = \frac{\pi x^2}{2} \text{ cm}^2$$

2) a) $S(x) = (\text{Area}_1 + \text{Area}_2) - \text{Area}_3$ (Shaded region)

$$= \left(\frac{x^2}{1 \times 2} + \frac{x^2}{1 \times 2} + \frac{(x+1)^2}{2} \right) - \frac{\pi x^2}{2}$$

$$= \frac{2x^2 + 2x + (x+1)^2}{2} - \frac{\pi x^2}{2}$$

$$= \frac{2x^2 + 2x + x^2 + 2x + 1 - \pi x^2}{2}$$

$$= \frac{(3-\pi)x^2 + 4x + 1}{2}$$

$$S(x) = \frac{1}{2} [(3-\pi)x^2 + 4x + 1]$$