3rd exercise:

1) Area of DMCN = $\frac{\text{Height} \times \text{base}}{2}$ ($B\hat{C}D = 90°$ angle of rectangle)

(B, M, C) & (D, N, C) collinear

$= \frac{MC \times NC}{2}$

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

$= \frac{8 - 2x - 4x + x^2}{2}$

$A_1(x) = \frac{x^2 - 6x + 8}{2}$ cm^2.

2) a) Area of DNA = $\frac{\text{Height} \times \text{base}}{2}$ ($A\hat{D}N = 90°$ angle of rectangle)

$= \frac{AD \times DN}{2}$

$= \frac{2x}{2}$

$A_2(x) = x$ cm^2.

b) $P(x) = A_1(x) + A_2(x)$

$= \left(\frac{x^2 - 6x + 8}{2}\right) + \left(\frac{x}{1}\right)_{\times 2}$

$P(x) = \frac{x^2 - 6x + 8 + 2x}{2} = \frac{x^2 - 4x + 8}{2}$

$P(x)$ is a second degree algebraic expression in unknown x.

3) a) Area of shaded region = A. of rectangle $- (A_1(x) + A_2(x))$

= length $\times$ width $- \left(\frac{x^2 - 4x + 8}{2}\right)$

$= AB \times AD - \frac{(x^2 - 4x + 8)}{2}$

$= \frac{8 \times 2}{1 \times 2} - \frac{(x^2 - 4x + 8)}{2}$

$= \frac{16 - x^2 + 4x - 8}{2}$

$E(x) = \frac{8 - x^2 + 4x}{2} = \frac{-x^2 + 4x + 8}{2}$

P-8.