Ex 1.2

Q1

Width	Length
x	$x+4$

(i) $A(x) = x(x+4) = x^2+4x$

(ii) $P(x) = 2(x) + 2(x+4)$
$= 2x + 2x + 8$
$= 4x + 8$

Q2

$A(x) = 6x^2+4x-2$ $\quad L = 3x-1$

(i) $\frac{(3x-1)(2x+2)}{3x-1} \Rightarrow W = 2x+2$

(ii) $P(x) = 2(3x-1) + 2(2x+2)$
$= 6x - 2 + 4x + 4$
$= 10x + 2$

Q3

(a) $V = x(x+1)(2x+3)$
$= (x^2+x)(2x+3)$
$= 2x^3 + 3x^2 + 2x^2 + 3x$
$= 2x^3 + 5x^2 + 3x$

(b) $SA_{(x)} = 2(x)(2x+3) + 2(x)(x+1)$

$+ (x+1)(2x+3)$

↑ open box!

$SA_{(x)} = (2x)(2x+3) + (2x)(x+1) + (x+1)(2x+3)$

$= 4x^2 + 6x + 2x^2 + 2x + 2x^2 + 3x + 2x + 3$

$= 8x^2 + 15x + 3.$

(c)(i) $V(x) = 2x^3 + 5x^2 + 3x$

$V(5) = 2(5)^3 + 5(5)^2 + 3(5)$

$= 250 + 125 + 15$

$= 390.$

(ii) $SA(x) = 8x^2 + 15x + 3$

$S(5) = 8(5)^2 + 15(5) + 3$

$= 200 + 75 + 3$

$= 278.$

241

Q5 $f(x) = x^2 - 3x + 6$

$f(0) = (0)^2 - 3(0) + 6 = 6.$

$f(-5) = (-5)^2 - 3(-5) + 6 =$

$25 + 15 + 6 = 46$

$f(-\frac{1}{2}) = (-\frac{1}{2})^2 - 3(-\frac{1}{2}) + 6$

$\frac{1}{4} + \frac{3}{2} + 6 = \frac{1+6+24}{4} = \frac{31}{4} = 7\frac{3}{4}$

$f\ a/4 = \left(\frac{a}{4}\right)^2 - 3\left(\frac{a}{4}\right) + 6$

$a^2/16 - 3a/4 + 6 = \frac{a^2 - 12a + 24}{16}.$

Q6

$A_{(x)} = (x-y)(2x+3y)$

$2x^2 + 3xy - 2xy - 3y^2$

$2x^2 + xy - 3y^2$

$P = 2(x-y) + 2(2x+3y)$

$= 2x - 2y + 4x + 6y$

$= 6x + 4y$

Q7

$L = x$

$W = x - 5$

$H = 2x$

Q8

$d(4)$ ⇒ how many diagonals in a 4 sided shape

$d_{(n)} = \frac{n^2}{2} - \frac{3n}{2}$

$= \frac{4^2}{2} - \frac{3(4)}{2} = \frac{16}{2} - \frac{12}{2} = 8 - 6 = 2.$

$d(5) = \frac{5^2}{2} - \frac{3(5)}{2} = \frac{25}{2} - \frac{15}{2} = \frac{10}{2} = 5$

$d(6) = \frac{6^2}{2} - \frac{3(6)}{2} = \frac{36}{2} - \frac{18}{2} = 18 - 9 = 9$

$d(3) = \frac{3^2}{2} - \frac{3(3)}{2} = \frac{9}{2} - \frac{9}{2} = 0.$

↳ 3 sided = a Δ or has no diagonals.

Q10

$f(x) = x^2 - 3x + 6$

$f(-2t) = (-2t)^2 - 3(-2t) + 6$

$= 4t^2 + 6t + 6$ Quadratic

$f(t^2) = (t^2)^2 - 3(t^2) + 6$

$= t^4 - 3t^2 + 6$ (4)

$f(t-2) = (t-2)^2 - 3(t-2) + 6$

$= t^2 - 4t + 4 - 3t + 6 + 6$

$= t^2 - 7t + 16.$ Quadratic

Q11

(i) $V_{(r,h)} = \frac{1}{3}\pi r^2 h.$

$V = \frac{1}{3}\pi(14)^2(21) = 1372\pi \text{ cm}^3$

(ii) $V = \frac{1}{3}\pi r^2(r) = \frac{\pi r^3}{3}$

(iii) $V = \frac{1}{3}\pi(2h)^2(h) = \frac{1}{3}4h^3\pi$

$= \frac{4}{3}h^3\pi.$

(12) $f(x) = 3x + 6$

$f(10) = 3(10) + 6 = 36$

$f(x) = 2x + 8$

$f(10) = 2(10) + 8 = 28$

$g(10) = 47$

$\Rightarrow 4x + 7.$

(13) $T = 2\pi\sqrt{\frac{l}{g}}$ (2) $T = 4\sec\ g = 10$

$4 = 2\pi\sqrt{\frac{l}{10}}$

$\frac{4^2}{2\pi} = \sqrt{\frac{l}{10}}$

$\frac{2}{\pi} = \sqrt{\frac{l}{10}}$

$\frac{4}{\pi^2} = \frac{l}{10}$

$\frac{40}{\pi^2} = l$

(14) $V = \frac{4}{3}\pi r^3$

$\frac{792}{7} = \frac{4}{3} \times \frac{22}{7} \times r^3$

$27 = r^3$

$3 = r$

Q15 $H(x) = \frac{x}{2}(x-1)$

$H(5) = \frac{5}{2}(5-1)$

$\frac{20}{2} \Rightarrow 10$

$H(6) = \frac{6}{2}(6-1) = \frac{30}{2} = 15.$

$H_{(10)} = \frac{10}{2}(10-1) = \frac{90}{2} = 45$

$136 = \frac{x}{2}(x-1)$

$272 = x^2 - x$

$0 = x^2 - x - 272$

$(x+16)(x-17)$

$x = -16$ $x = 17$

Ans.