GCSE Mathematics

Algebraic Notation & Substitution

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

$3(4) + 2 = 14$

∴ **14**

[Fluency] Question 2

$3^2 + 3(3) - 1 = 9 + 9 - 1 = 17$

∴ **17**

[Fluency] Question 3

$2(5) + 3(-2) = 10 - 6 = 4$

∴ **4**

[Fluency] Question 4

P=2(3x)+2(2x+1)=6x+4x+2

∴ **10x+2 cm**

[Fluency] Question 5

(a) 3(10)+2=32

(b) 3n+2=50→3n=48→n=16. Yes, 50 is the 16th term.

∴ **(a) 32 (b) Yes, it is the 16th term**

[Reasoning] Question 6

$\text{Area} = (x + 5) \times 3 = 3x + 15 \text{ cm}^2$

∴ **3x+15 cm²**

[Reasoning] Question 7

$4(-2 - 1)^2 = 4(-3)^2 = 4 \times 9 = 36$

∴ **36**

[Reasoning] Question 8

$v = 5 + 3 \times 4 = 5 + 12 = 17$

$\therefore$ **17**

[Problem Solving] Question 9

$(a)\ P = 4(x + 3) = 4x + 12$ cm

$(b)\ A = (x + 3)^2 = x^2 + 6x + 9$ cm^2

$\therefore$ **(a) 4x+12 cm (b) x²+6x+9 cm²**

[Problem Solving] Question 10

A=2(5)+1=11. B=25-4=21. A×B=11×21

$\therefore$ **231**

Section B — Higher — Worked Solutions

[Fluency] Question 1

$(a)\ f(3) = 9 - 6 + 1 = 4$

$(b)\ f(-1) = 1 + 2 + 1 = 4$

$(c)\ f(a) = a^2 - 2a + 1$

$\therefore$ **(a) 4 (b) 4 (c) a²–2a+1**

[Fluency] Question 2

$\frac{15}{4} = 3.75$

$\therefore$ **3.75**

[Fluency] Question 3

$v^2 = 3^2 + 2(4)(5) = 9 + 40 = 49$

$v = \sqrt{49} = 7$

$\therefore$ **v = 7**

[Reasoning] Question 4

$(a)\ g(0) = -5$

$(b)\ g(a+1) = 3(a+1) - 5 = 3a - 2$

$(c)\ 3x - 5 = 16 \Rightarrow x = 7$

$\therefore$ **(a) –5 (b) 3a–2 (c) x=7**

[Reasoning] Question 5

$(a)\ f(2) = 8 + 6 - 1 = 13$

$(b)\ f(-3) = 18 - 9 - 1 = 8$

$(c)\ 2x^2 + 3x - 1 = 0 \Rightarrow x = \frac{-3 \pm \sqrt{9+8}}{4} = \frac{-3 \pm \sqrt{17}}{4}$

$\therefore$ **(a) 13 (b) 8 (c) x=\frac{-3\pm\sqrt{17}}{4}**

[Reasoning] Question 6

$(a)\ E = \frac{1}{2}(4)(9) = 18$

$(b)\ 50 = \frac{1}{2}(4)v^2 \Rightarrow v^2 = 25 \Rightarrow v = 5$

$\therefore$ **(a) 18 J (b) v = 5**

[Problem Solving] Question 7

$x^2 + 1 = 2x - 3 \Rightarrow x^2 - 2x + 4 = 0$

$\Delta = 4 - 16 = -12 < 0 \Rightarrow$ no real solutions

$\therefore$ **No real solutions**

[Problem Solving] Question 8

$(a)\ S = 2\pi(9) + 2\pi(3)(5) = 18\pi + 30\pi = 48\pi$

$(b)\ 60\pi = 18\pi + 6\pi h \Rightarrow 6\pi h = 42\pi \Rightarrow h = 7$

$\therefore$ **(a) 48π (b) h = 7**