FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

A7: Functions

Solve problems involving function notation, composite and inverse functions

20 marks · 25 minutes · Non-calculator

1) f(x) = $2x - 3$ and g(x) = x^2. Solve fg(x) = gf(x). Give your answers in surd form.

.....

[Question 1: 4 marks]

2) $f(x) = 3x + 1$. Solve $f(x) = f^{-1}(x)$.

.....

[Question 2: 3 marks]

---

3) $h(x) = \frac{x+5}{2}$. Find hh(1).

.....

[Question 3: 2 marks]

---

4) f(x) = x^2 + k and f(3) = 14. Find k, and find the values of x for which f(x) = 30

. . . . . .

[Question 4: 3 marks]

---

5) A shop's price for n items is f(n) = $4n$ + 3 pounds. A discount is applied using g(x) = 0.9x. Find gf(10) and explain what it means.

. . . . . .

[Question 5: 3 marks]

---

6) $f(x) = 2x + a$ and $f^{-1}(7) = 2$. Find a.

.....

[Question 6: 3 marks]

7) $f(x) = 2x + 3$ and $fg(x) = 6x + 1$. Find $g(x)$.

.....

[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	$3 \pm \sqrt{3}$	$2x^2 - 3$ (P1); $(2x - 3)^2$ (P1); $x^2 - 6x + 6 = 0$ (P1); A1.
2	$-\frac{1}{2}$	$f^{-1}(x) = \frac{x - 1}{3}$ (P1); $9x + 3 = x - 1$ (P1); A1.
3	4	h(1) = 3 (P1); A1.
4	$k = 5$; $x = \pm 5$	$9 + k = 14$ (P1); $x^2 = 25$ (P1); A1.
5	£39.60	f(10) = 43 (P1); 0.9×43 (P1); discounted cost of 10 items (A1).
6	3	f(2) = 7 (P1); $4 + a = 7$ (P1); A1.
7	$3x - 1$	$2g(x) + 3 = 6x + 1$ (P1); A1.