Function Notation - Worksheet

Skill

Group A - Evaluating simple functions

Evaluate the functions for the given values.

1) $f(1)$ when $f(x) = x + 4$

2) $f(2)$ when $f(x) = 3x$

3) $f(4)$ when $f(x) = 2x - 1$

4) $f(7)$ when $f(x) = 3(x + 5)$

5) $f(8)$ when $f(x) = \frac{x}{2} + 6$

6) $f(-1)$ when $f(x) = \frac{x-5}{3}$

7) $f(3)$ when $f(x) = x^2$

8) $f(-2)$ when $f(x) = x^3$

9) $f(5)$ when $f(x) = x^2 + 4x$

Group B - Solving simple functions

Find the value of $x$that satisfies the function.

1) $f(x) = 4$ when $f(x) = x - 7$

2) $f(x) = 13$ when $f(x) = 2x + 1$

3) $f(x) = 32$ when $f(x) = 5x - 3$

4) $f(x) = 24$ when $f(x) = 3(x - 2)$

5) $f(x) = 42$ when $f(x) = 6(x + 5)$

6) $f(x) = 8$ when $f(x) = \frac{x}{3} + 4$

7) $f(x) = 6$ when $f(x) = \frac{2x+8}{3}$

8) $f(x) = -2$ when $f(x) = 12 - 2x$

9) $f(x) = 4$ when $f(x) = \frac{36}{x}$

Group C - Writing algebraic expressions using function notation

Write the simplified algebraic expression for the transformed function.

1) $f(a)$ when $f(x) = x + 5$

2) $f(m)$ when $f(x) = 2x - 3$

3) $f(c)$ when $f(x) = \frac{3x+1}{4}$

4) $f(2h)$ when $f(x) = x - 3$

5) $f(3k)$ when $f(x) = 4x - 5$

6) $f(n + 1)$ when $f(x) = 5x + 1$

7) $f(p - 2)$ when $f(x) = 3(x + 9)$

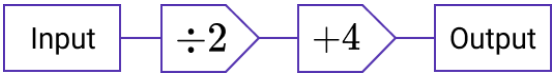
8) $f(2d)$ when $f(x) = x^2 + 1$

9) $f(q - 1)$ when $f(x) = x^2 - 3$

Function Notation - Worksheet

Applied

1) Here is a function machine for a function f.



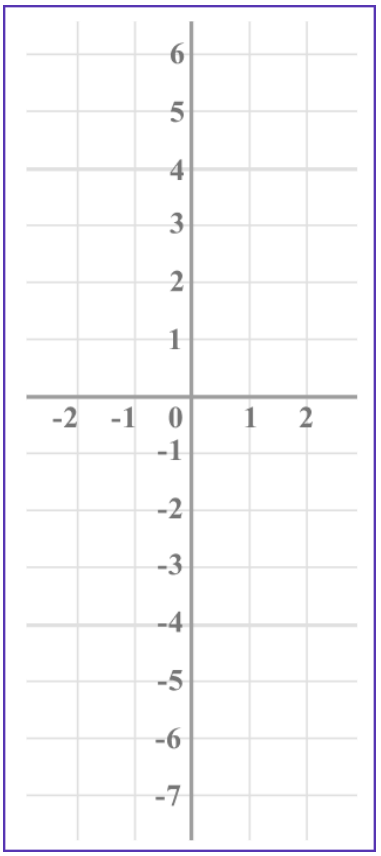
(a) Write the function f using function notation.

(b) Find $f(-3)$.

2) **(a)** Complete the table of values for the function $f(x) = 3x - 1$.

x	-2	-1	0	1	2
$f(x)$		-4			5

(b) Plot the graph of $f(x)$ for x values between -2 and 2.



Function Notation - Worksheet

3) $f(x) = 4x - 5$ and $g(x) = 6x - 9$.

(a) Work out $f(5) - g(3)$.

(b) Find the value of $x$when $f(x) = g(x)$.

4) If $h(x) = x + 1$

(a) Write an expression for $h(2m + 3)$.

(b) Find values of x which satisfy $[h(x)]^2 = 3h(x) + 4$.

Function Notation - Exam Questions

1) Given that $f(x) = 5x - 2$

(a) Find $f(-4)$. ..... **(1)**

(b) Find when $f(x) = 8$. ..... **(2)**

(3 marks)

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2) **(a)** If $f(x) = 4x + 1$, write a simplified expression for $f(2a - 1)$. ..... **(2)**

(b) If $h(x) = x^2 + 2x - 3$, write a simplified expression for $h(2m + 3)$. ..... **(3)**

(5 marks)

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3) Given that $f(x) = x^2 + 2$ and $g(x) = 3(x + 4)$. ..... **(4 marks)**

Find the value of x which satisfies $f(x) = g(x)$.

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4) If $f(x) = x^2 + 4x - 5$ ..... **(3 marks)**

Find a simplified expression for $f(x + 3) - f(x - 1)$.

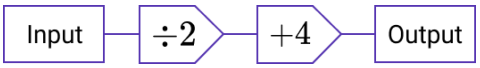
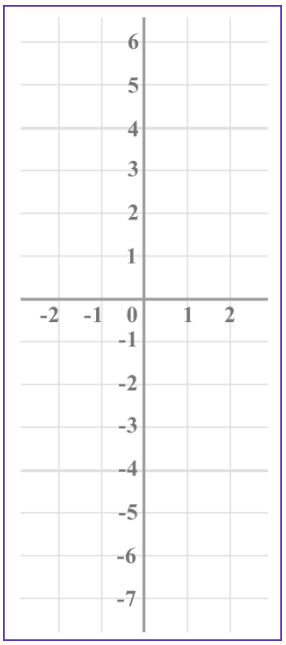
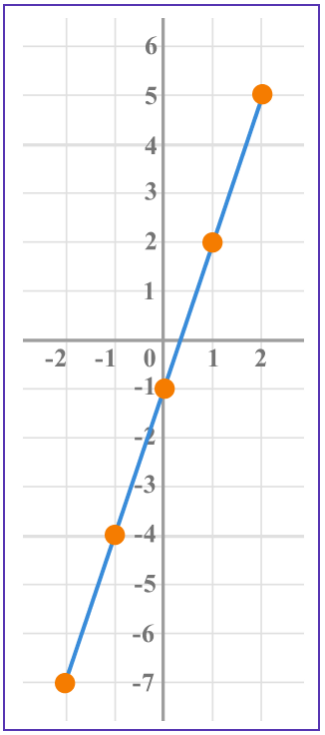
Function Notation - Answers

	Question	Answer
	Skill Questions	
Group A	Evaluate the functions for the given values. **1)** $f(1)$ when $f(x) = x + 4$ **2)** $f(2)$ when $f(x) = 3x$ **3)** $f(4)$ when $f(x) = 2x - 1$ **4)** $f(7)$ when $f(x) = 3(x + 5)$ **5)** $f(8)$ when $f(x) = \frac{x}{2} + 6$ **6)** $f(-1)$ when $f(x) = \frac{x-5}{3}$ **7)** $f(3)$ when $f(x) = x^2$ **8)** $f(-2)$ when $f(x) = x^3$ **9)** $f(5)$ when $f(x) = x^2 + 4x$	**1)** 5 **2)** 6 **3)** 7 **4)** 36 **5)** 10 **6)** -2 **7)** 9 **8)** -8 **9)** 45
Group B	Find the value of x that satisfies the function. **1)** $f(x) = 4$ when $f(x) = x - 7$ **2)** $f(x) = 13$ when $f(x) = 2x + 1$ **3)** $f(x) = 32$ when $f(x) = 5x - 3$ **4)** $f(x) = 24$ when $f(x) = 3(x - 2)$ **5)** $f(x) = 42$ when $f(x) = 6(x + 5)$ **6)** $f(x) = 8$ when $f(x) = \frac{x}{3} + 4$ **7)** $f(x) = 6$ when $f(x) = \frac{2x+8}{3}$ **8)** $f(x) = -2$ when $f(x) = 12 - 2x$ **9)** $f(x) = 4$ when $f(x) = \frac{36}{x}$	**1)** 11 **2)** 6 **3)** 7 **4)** 10 **5)** 2 **6)** 12 **7)** 5 **8)** 7 **9)** 9

Function Notation - Answers

Group C	Write the simplified algebraic expression for the transformed function. **1)** $f(a)$ when $f(x) = x + 5$ **2)** $f(m)$ when $f(x) = 2x - 3$ **3)** $f(c)$ when $f(x) = \frac{3x+1}{4}$ **4)** $f(2h)$ when $f(x) = x - 3$ **5)** $f(3k)$ when $f(x) = 4x - 5$ **6)** $f(n + 1)$ when $f(x) = 5x + 1$ **7)** $f(p - 2)$ when $f(x) = 3(x + 9)$ **8)** $f(2d)$ when $f(x) = x^2 + 1$ **9)** $f(q - 1)$ when $f(x) = x^2 - 3$	**1)** $a + 5$ **2)** $2m - 3$ **3)** $\frac{3c+1}{4}$ **4)** $2h - 3$ **5)** $12k - 5$ **6)** $5n + 6$ **7)** $3p + 21$ **8)** $4d^2 + 1$ **9)** $q^2 - 2q - 2$

Function Notation - Answers

	Question	Answer
	Applied Questions	
1)	Here is a function machine for a function f .  **(a)** Write the function f using function notation. **(b)** Find $f(-3)$.	**(a)** $f(x) = \frac{x}{2} + 4$ **(b)** 2.5
2)	**(a)** Complete the table of values for the function $f(x) = 3x - 1$. x | -2 | -1 | 0 | 1 | 2 $f(x)$ | | -4 | | | 5 **(b)** Plot the graph of $f(x)$ for x values between -2 and 2. 	**(a)** x | -2 | -1 | 0 | 1 | 2 $f(x)$ | -7 | -4 | -1 | 2 | 5 **(b)** 

Function Notation - Answers

3)	$f(x) = 4x - 5$ and $g(x) = 6x - 9$. **(a)** Work out $f(5) - g(3)$. **(b)** Find the value of $x$when $f(x) = g(x)$.	**(a)** $15 - 9 = 6$ **(b)** $x = 2$
4)	If $h(x) = x + 1$ **(a)** Write an expression for $h(2m + 3)$. **(b)** Find values of x which satisfy $[h(x)]^2 = 3h(x) + 4$.	**(a)** $2m + 4$ **(b)** $x^2 + 2x + 1 = 3x + 7$ $x^2 - x - 6 = 0$ $(x - 3)(x + 2) = 0$ $x = 3, -2$

Function Notation - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Given that $f(x) = 5x - 2$		
(a)	Find $f(-4)$.	**(a)** -22	**(1)**
(b)	Find when $f(x) = 8$.	**(b)** Equation formed $5x - 2 = 8$ Answer $x = 2$	**(2)**
2) (a)	If $f(x) = 4x + 1$, write a simplified expression for $f(2a - 1)$.	**(a)** Substitution seen $4(2a - 1) + 1$ $8a - 3$	**(2)**
(b)	If $h(x) = x^2 + 2x - 3$, write a simplified expression for $h(2m + 3)$.	**(b)** Substitution seen $(2m + 3)^2 + 2(2m + 3) - 3$ Expanded brackets $4m^2 + 12m + 9 + 4m + 6 - 3$ Simplified expression $4m^2 + 16m + 12$	**(3)**
3)	Given that $f(x) = x^2 + 2$ and $g(x) = 3(x + 4)$. Find the value of x which satisfies $f(x) = g(x)$.	Set equal $x^2 + 2 = 3(x + 4)$ Form quadratic $x^2 - 3x - 10 = 0$ Factorise $(x - 5)(x + 2) = 0$ (1) Both solutions $x = 5, -2$	**(4)**
4)	If $f(x) = x^2 + 4x - 5$ Find a simplified expression for $f(x + 3) - f(x - 1)$.	Substitution seen $(x + 3)^2 + 4(x + 3) - 5$ or $(x - 1)^2 + 4(x - 1) - 5$ Expanded terms $x^2 + 6x + 9 + 4x + 12 - 5$ $-x^2 + 2x - 1 - 4x + 4 + 5$ Simplified expression $8x + 24$	**(3)**