Functions - Lesson 2

Values of Quadratic Functions

LI

- Know what a Quadratic Function is.
- Work out values of a quadratic function without a calculator.

SC

- Substitution.

Jan 10-12:11

A quadratic function is one of the form :

$$f(x) = a x^2 + b x + c$$

(b and c are any numbers) $(a \neq 0)$

Example 1

If $f(x) = x^2 + 3x + 1$, calculate :

(a) $f(1)$.

(b) $f(0)$.

(c) $f(-3)$.

(a) $f(x) = x^2 + 3x + 1$

$\therefore \quad f(1) = (1)^2 + 3(1) + 1$

$\Rightarrow \quad f(1) = 1 + 3 + 1$

$\Rightarrow \quad \boxed{f(1) = 5}$

(b) $f(x) = x^2 + 3x + 1$

$\therefore \quad f(0) = (0)^2 + 3(0) + 1$

$\Rightarrow \quad f(0) = 0 + 0 + 1$

$\Rightarrow \quad \boxed{f(0) = 1}$

(c) $f(x) = x^2 + 3x + 1$

$\therefore \quad f(-3) = (-3)^2 + 3(-3) + 1$

$\Rightarrow \quad f(-3) = 9 - 9 + 1$

$\Rightarrow \quad \boxed{f(-3) = 1}$

Example 2

If $p(x) = 3x^2 - 4x + 2$, calculate :

(a) $p(2)$.

(b) $p(0)$.

(c) $p(-4)$.

(a) $p(x) = 3x^2 - 4x + 2$

$\therefore \quad p(2) = 3(2)^2 - 4(2) + 2$

$\Rightarrow \quad p(2) = 3(4) - 8 + 2$

$\Rightarrow \quad p(2) = 12 - 8 + 2$

$\Rightarrow \quad \boxed{p(2) = 6}$

(b) $p(x) = 3x^2 - 4x + 2$

$\therefore \quad p(0) = 3(0)^2 - 4(0) + 2$

$\Rightarrow \quad p(0) = 3(0) - 0 + 2$

$\Rightarrow \quad p(0) = 0 - 0 + 2$

$\Rightarrow \quad \boxed{p(0) = 2}$

(c) $p(x) = 3x^2 - 4x + 2$

$\therefore \quad p(-4) = 3(-4)^2 - 4(-4) + 2$

$\Rightarrow \quad p(-4) = 3(16) + 16 + 2$

$\Rightarrow \quad p(-4) = 48 + 16 + 2$

$\Rightarrow \quad \boxed{p(-4) = 66}$

Jan 19-10:11

1) $f(x) = x^2 + 2x + 3$; $f(1)$, $f(3)$

2) $g(x) = x^2 + 5x - 8$; $g(7)$, $g(-1)$

3) $h(x) = x^2 - 7x - 2$; $h(0)$, $h(4)$

4) $b(x) = x^2 - 4x + 2$; $b(6)$, $b(-10)$

5) $m(x) = x^2 - 8x + 4$; $m(2)$, $m(3)$

6) $w(x) = x^2 + 5x - 9$; $w(3)$, $w(4)$

7) $A(x) = 3x^2 - 6x + 1$; $A(12)$, $A(-30)$

8) $Q(x) = 2x^2 - 4x - 2$; $Q(50)$, $Q(90)$

9) $c(x) = 3x^2 - x + 6$; $c(8)$, $c(12)$

10) $N(x) = 4x^2 - 5x + 2$; $N(100)$, $N(200)$

11) $j(x) = 5x^2 - 6x + 11$; $j(30)$, $j(-30)$

12) $T(x) = 6x^2 - 11x - 12$; $T(12)$, $T(-8)$

1) $f(x) = x^2 + 2x + 3$; $f(1)$, $f(3)$	6, 18
2) $g(x) = x^2 + 5x - 8$; $g(7)$, $g(-1)$	76, −12
3) $h(x) = x^2 - 7x - 2$; $h(0)$, $h(4)$	−2, −14
4) $b(x) = x^2 - 4x + 2$; $b(6)$, $b(-10)$	14, 142
5) $m(x) = x^2 - 8x + 4$; $m(2)$, $m(3)$	−8, −11
6) $w(x) = x^2 + 5x - 9$; $w(3)$, $w(4)$	15, 27
7) $A(x) = 3x^2 - 6x + 1$; $A(12)$, $A(-30)$	361, 2 881
8) $Q(x) = 2x^2 - 4x - 2$; $Q(50)$, $Q(90)$	4 798, 15 838
9) $c(x) = 3x^2 - x + 6$; $c(8)$, $c(12)$	190, 426
10) $N(x) = 4x^2 - 5x + 2$; $N(100)$, $N(200)$	39 502, 159 002
11) $j(x) = 5x^2 - 6x + 11$; $j(30)$, $j(-30)$	4 331, 4 691
12) $T(x) = 6x^2 - 11x - 12$; $T(12)$, $T(-8)$	720, 460