# Unit 2: Graphs of Quadratic Relations

(u 3 in text)

## Getting started

By the end of this lesson you should be familiar with the following:

- First and second differences
- Distribution of a Polynomial
- Plotting points on a Cartesian coordinate system

Define the following terms by choosing the appropriate definition below. Use an example to show your understanding:
a) linear relation

b) first differences

c) line of symmetry

d) distributive property

- The values you get when you find the differences between consecutive dependant variable (y) values one time only. The relation is linear if these differences are equal (same #) – First Differences

- The exact middle line of any symmetrical figure. Line of symmetry

- The rule that tells you to distribute a value to all values within a bracket by multiplication. distributive prop.

- An equation that represents a straight line. – Linear Relation

Define the following terms:

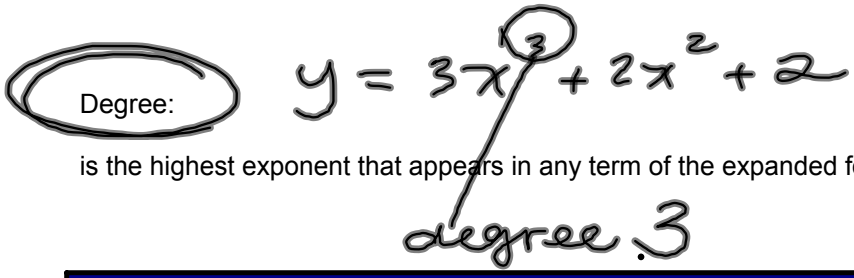
Second difference:

the values you get when you do the finite differences twice. If they are all equal, the relation is quadratic. If they are not equal, it is not quadratic nor linear.

Quadratic:

is the relationship you have when the second differences are constant. It is a second degree polynomial.

Degree:




is the highest exponent that appears in any term of the expanded form of a polynomial.

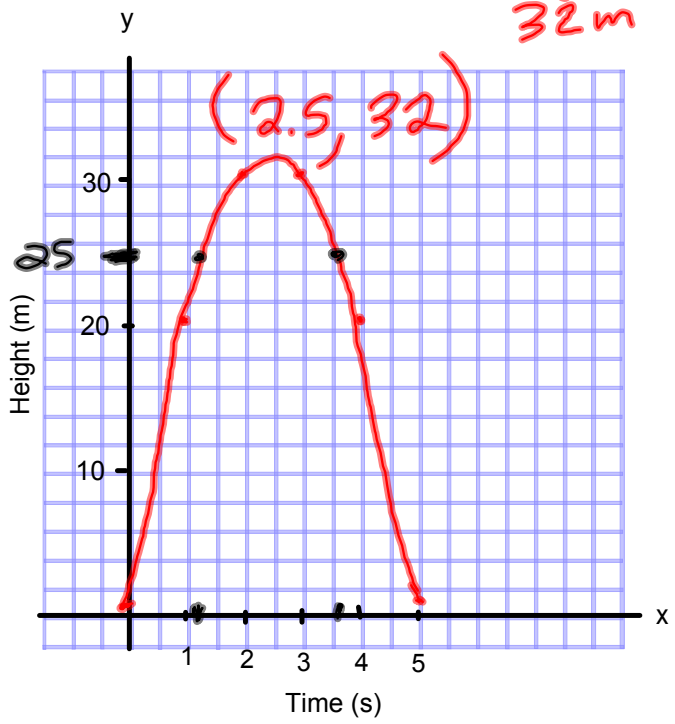
The table below shows the height of a baseball after it has been hit.

a) Create a scatter plot and draw a smooth curve.
b) Estimate the height of the baseball at 2.5 s.
c) Estimate when the baseball will have a height of 25 m.

1.25s and 3.75s

| Time (s) | 0 | 1 | 2 | 2.5 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| Height (m) | 0.5 | 20.5 | 30.5 | 32 | 30.5 | 20.5 | 0.5 |

32 m



Expand and simplify (use distributive property):

a) $4x(2x-3)$

$= 8x^2 - 12x$

b) $3x(7-5x)$

$= 21x - 15x^2$

$= -15x^2 + 21x$

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

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