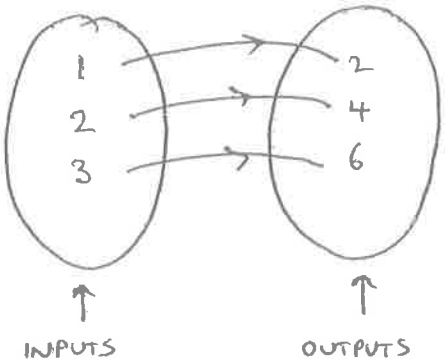
FUNCTIONS [INPUTS → OUTPUTS]

A FUNCTION IS LIKE A "RULE", OR A "MACHINE". FOR EVERY INPUT, A FUNCTION GIVES US A PARTICULAR OUTPUT

WAYS OF SHOWING A FUNCTION:

MAPPING DIAGRAM



DOMAIN
ALL OF THE INPUTS

RANGE
ALL OF THE OUTPUTS

TABLE

INPUT	FUNCTION (RULE)	OUTPUT
-1	ADD 3	2
0	ADD 3	3
1	ADD 3	4
2	ADD 3	5

COUPLES / PAIRS

$\{(1,2),(2,4),(3,6)\}$

(INPUT, OUTPUT)
(x, y)

FUNCTION NOTATION

$f(x) = x^2$

$f(1) = (1)^2 = 1$

$f(2) = (2)^2 = 4$

$f(7) = (7)^2 = 49$

INPUT OUTPUT

IMPORTANT NOTES / TERMS

x = INPUT

y = OUTPUT → ALSO $y = f(x)$

THESE MEAN SAME THING.

DOMAIN = ALL THE INPUTS

RANGE = ALL THE OUTPUTS

CODOMAIN = ALL THE POSSIBLE OUTPUTS

TWO INPUTS COULD HAVE THE SAME OUTPUT.

eg $f(x) = x^2$

$f(1) = (1)^2 = 1$

AND

$f(-1) = (-1)^2 = 1$

DIFFERENT INPUTS

SAME OUTPUTS

BUT

ONE INPUT CAN'T HAVE TWO DIFFERENT OUTPUTS.

ie. THERE IS ONLY ONE OUTPUT FOR EACH INPUT.

SUBSTITUTION

- IF YOU'RE GIVEN THE FUNCTION eg $f(x) = 2x + 3$
- REPLACE THE x WITH EACH INPUT (IN A BRACKET)

SO $f(2) = 2(2) + 3$

$f(2) = 7$

$(2, 7)$

GRAPHING FUNCTIONS

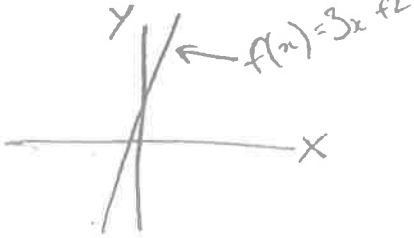
FUNCTIONS CAN BE GRAPHED ON THE X-AXIS AND Y-AXIS.

- REMEMBER THAT A FUNCTION IS A RULE THAT "maps" A PARTICULAR INPUT (x) TO A PARTICULAR OUTPUT (y)
- THESE CAN BE WRITTEN AS PAIRS OF INPUTS + OUTPUTS. (x, y) or $(x, f(x))$
- THESE POINTS CAN THEN BE PLOTTED ON X-AXIS / Y-AXIS, MAKING A CERTAIN SHAPE
- WE NEED TO BE FAMILIAR WITH 2 PARTICULAR TYPES OF FUNCTION:

① LINEAR
(JUST x - NO x^2's etc)
LOOKS LIKE A LINE

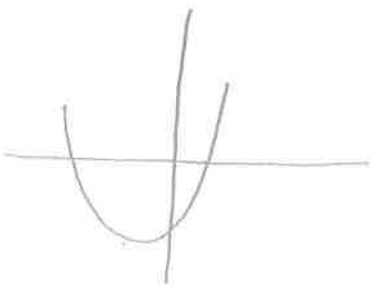
eg $y = 3x + 2$ OR $f(x) = 3x + 2$

PICTURE



② QUADRATIC
(x^2 IN IT)
LOOKS LIKE U (x^2)

$f(x) = x^2 + 3x - 4$



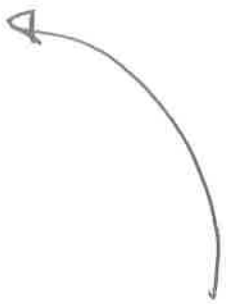
TO GRAPH FUNCTIONS :

- 1ST WE NEED AN INPUT / OUTPUT TABLE

(SEE SEPARATE NOTES ON HOW TO USE "TABLE" FUNCTION ON YOUR CALCULATOR).

eg

INPUT ↓ x	OUTPUT ↓ $f(x)$	(x, y)
-2	5	$(-2, 5)$
-1	-2	$(-1, -2)$
0	-3	$(0, -3)$
1	2	$(1, 2)$
2	13	$(2, 13)$



- NEXT, MAKE AN EXTRA COLUMN IN THE TABLE FOR ALL THE (x, y) POINTS

- DRAW x AND y AXES.
- CHOOSE A SCALE THAT MAKES GRAPH BIG
- MARK EACH POINT CLEARLY.

- JOIN POINTS TOGETHER
  - IF IT'S LINEAR USE A RULER
  - IF IT'S QUADRATIC - DON'T