FUNCTIONS

A DEFINITIONS

A.1 DETERMINING FUNCTIONS: LEVEL 1

MCQ 1: Consider the following calculation program:

1. Choose a number.
2. Add 2 to the chosen number.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

- ☐ $f(x) = 2x$
- ☐ $f(x) = x + 2$
- ☐ $f(x) = x - 2$
- ☐ $f(x) = 2x + 2$

MCQ 2: Consider the following calculation program:

1. Choose a number.
2. Multiply the chosen number by 3.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

- ☐ $f(x) = 3x$
- ☐ $f(x) = x + 3$
- ☐ $f(x) = x - 3$
- ☐ $f(x) = 3x + 3$

MCQ 3: Consider the following calculation program:

1. Choose a number.
2. Multiply the chosen number by five.
3. Subtract 2 from the result obtained.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

- ☐ $f(x) = 5x + 2$
- ☐ $f(x) = 5x^2 - 2$
- ☐ $f(x) = x - 2$
- ☐ $f(x) = 5x - 2$

MCQ 4: Consider the following calculation program:

1. Choose a number.
2. Multiply the chosen number by -2.
3. Add 3 to the result obtained.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

- ☐ $f(x) = -2x + 3$
- ☐ $f(x) = -2x - 3$
- ☐ $f(x) = 2x + 3$
- ☐ $f(x) = 2x - 3$

A.2 DETERMINING FUNCTIONS: LEVEL 2

MCQ 5: Consider the following calculation program:

1. Choose a number.
2. Multiply the chosen number by itself.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

- ☐ $f(x) = 2x$
- ☐ $f(x) = x + 2$
- ☐ $f(x) = 2x^2$
- ☐ $f(x) = x^2$

MCQ 6: Consider the following calculation program:

1. Choose a number.
2. Multiply the chosen number by itself.
3. Subtract 3 from the product obtained.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

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

MCQ 7: Consider the following calculation program:

1. Choose a number.
2. Add 3 to the chosen number.
3. Multiply the result by the original chosen number.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

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

MCQ 8: Consider the following calculation program:

1. Choose a number.

2. Add 4 to the chosen number.

3. Divide the result by the chosen number.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

Choose one answer:

☐ $f(x) = \frac{x+4}{x}$

☐ $f(x) = \frac{x+4}{2}$

☐ $f(x) = \frac{4}{x} + x$

☐ $f(x) = x + 4$

A.3 WRITING FUNCTIONS: LEVEL 1

Ex 9: Consider the following calculation program:

1. Choose a number.

2. Subtract 5 from the chosen number.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

$$f(x) = \square$$

Ex 10: Consider the following calculation program:

1. Choose a number.

2. Multiply the chosen number by three.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

$$f(x) = \square$$

Ex 11: Consider the following calculation program:

1. Choose a number.

2. Multiply the chosen number by five.

3. Subtract 2 from the result obtained.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

$$f(x) = \square$$

Ex 12: Consider the following calculation program:

1. Choose a number.

2. Multiply the chosen number by -2.

3. Add 5 to the result obtained.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

$$f(x) = \square$$

A.4 WRITING FUNCTIONS: LEVEL 2

Ex 13: Consider the following calculation program:

1. Choose a number.

2. Multiply the chosen number by itself.

3. Subtract 1 from the result obtained.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

$$f(x) = \square$$

Ex 14: Consider the following calculation program:

1. Choose a number.

2. Square the chosen number.

3. Multiply the result by 2.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

$$f(x) = \square$$

Ex 15: Consider the following calculation program:

1. Choose a number.

2. Subtract 1 from the chosen number.

3. Multiply the result by the original number chosen.

Let x be the number chosen initially. Determine the function f that corresponds to the result obtained with this program.

$$f(x) = \square$$

A.5 CALCULATING $f(x)$

Ex 16: For $f(x) = x + 3$,

$$f(4) = \square$$

Ex 17: For $f(x) = 2x - 1$,

$$f(5) = \square$$

Ex 18: For $f(x) = 3x + 2$,

$$f(2) = \square$$

Ex 19: For $f(x) = x^2 - 1$,

$$f(3) = \square$$

Ex 20: For $f(x) = 5x - 3$,

$$f(1) = \square$$

Ex 21: For $f(x) = \frac{x}{2} + 4$,

$$f(6) = \square$$

Ex 22: For $f(x) = x - 5$,

$f(10) =$ ☐

Ex 23: For $f(x) = 2x - 5$,

$f(-2) =$ ☐

Ex 24: For $f(x) = -x + 4$,

$f(-3) =$ ☐

Ex 25: For $f(x) = 3x - 7$,

$f(-1) =$ ☐

Ex 26: For $f(x) = x^2 - 2x$,

$f(-2) =$ ☐

Ex 27: For $f(x) = 2x + 3$,

$f(-3) =$ ☐

Ex 28: For $f(x) = \frac{x}{2} - 4$,

$f(8) =$ ☐

Ex 29: For $f(x) = \frac{3x-5}{2}$,

$f(-1) =$ ☐

Ex 30: For $f(x) = \frac{x-6}{2} - 3$,

$f(10) =$ ☐

A.6 CALCULATING $f(x)$

Ex 31: For $f : x \mapsto x + 3$,

$f(4) =$ ☐

Ex 32: For $f : x \mapsto x^2 - 1$,

$f(2) =$ ☐

Ex 33: For $f : x \mapsto (x - 1)(x - 2)$,

$f(0) =$ ☐

Ex 34: For $f : x \mapsto x^3$,

$f(-1) =$ ☐

B TABLES OF VALUES

B.1 FINDING $f(x)$

Ex 35: The table of values is given below:

x	-2	-1	0	1	2
$f(x)$	-1	0	1	2	3

$f(2) =$ ☐

Ex 36: The table of values is given below:

x	-3	-1	0	3	4
$f(x)$	5	3	0	1	4

$f(3) =$ ☐

Ex 37: The table of values is given below:

x	-4	-2	0	2	4
$f(x)$	2	1	-1	0	3

$f(0) =$ ☐

Ex 38: The table of values is given below:

x	-5	-2	0	3	5
$f(x)$	4	2	-1	0	6

$f(5) =$ ☐

B.2 FILLING TABLES OF VALUES

Ex 39: For $f(x) = x^2$, fill in the table of values:

x	-2	-1	0	1	2
$f(x)$	☐	☐	☐	☐	☐

Ex 40: For $f(x) = -2x + 1$, fill in the table:

x	-2	-1	0	1	2
$f(x)$	☐	☐	☐	☐	☐

Ex 41: For $f(x) = x^2 - 3x + 1$, fill in the table:

x	-2	-1	0	1	2
$f(x)$	☐	☐	☐	☐	☐

B.3 FINDING x SUCH THAT $f(x) = y$

Ex 42: The table of values is given below:

x	-2	-1	0	1	2
$f(x)$	-1	0	1	2	3

Find x such that $f(x) = 1$.

$x =$ ☐

Ex 43: The table of values is given below:

x	-3	-1	0	2	3
$f(x)$	4	2	1	-1	0

Find x such that $f(x) = 4$.

$x =$ ☐

Ex 44: The table of values is given below:

x	-2	0	1	3	4
$g(x)$	3	0	1	2	-1

Find x such that $g(x) = 2$.

$x =$ ☐

Ex 45: The table of values is given below:

x	-3	-1	1	2	4
$f(x)$	0	2	0	3	2

Find x such that $f(x) = 0$.

Give your answers in increasing order:

$x =$ ☐ , ☐

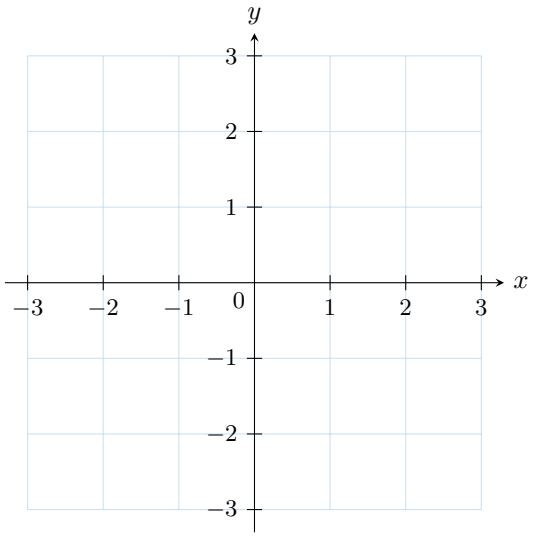
C GRAPHS

C.1 PLOTTING LINE GRAPHS

Ex 46: Here is a table of values for the function $f(x) = x - 1$:

x	-2	-1	0	1	2	3
$f(x)$	-3	-2	-1	0	1	2

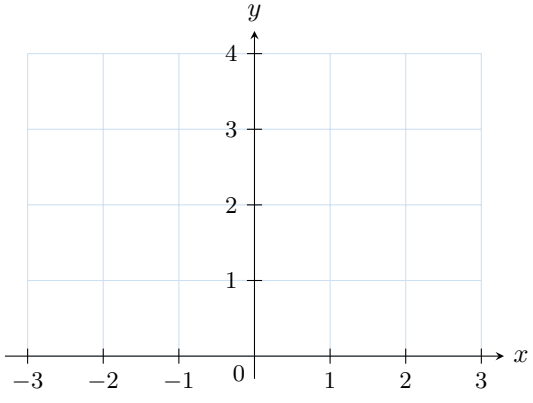
Plot the line graph of f.



Ex 47: Here is a table of values for the function $f(x) = x^2$:

x	-2	-1	-0.5	0	0.5	1	2
$f(x)$	4	1	0.25	0	0.25	1	4

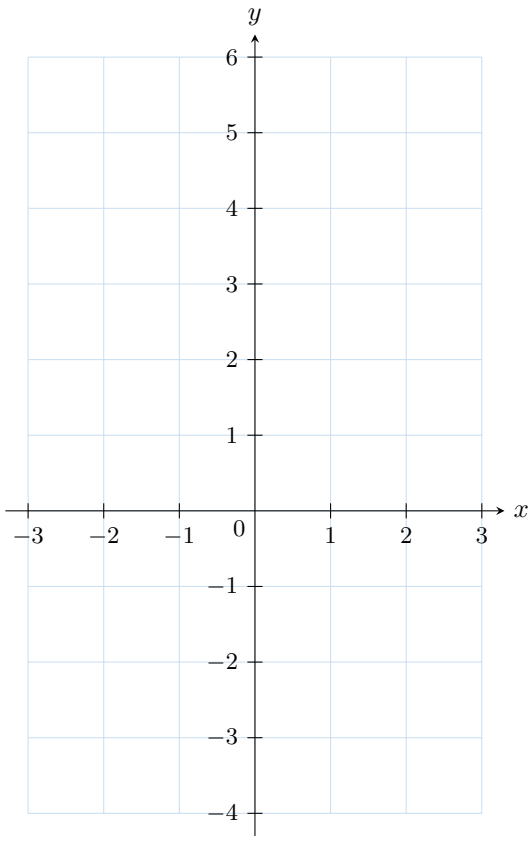
Plot the line graph of f.



Ex 48: Here is a table of values for the function $f(x) = -2x+1$:

x	-2	-1	0	1	2
$f(x)$	5	3	1	-1	-3

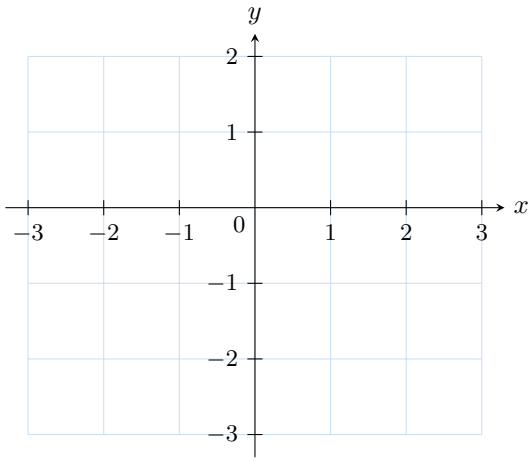
Plot the line graph of f.



Ex 49: Here is a table of values for the function $f(x) = 0.5x-1$:

x	-3	-2	-1	0	1	2	3
$f(x)$	-2.5	-2	-1.5	-1	-0.5	0	0.5

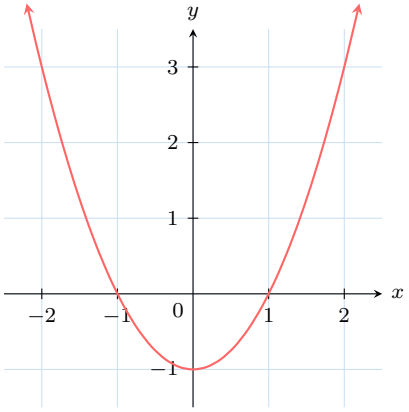
Plot the line graph of f.



D READING VALUES AND SOLVING $f(x) = y$ ON A GRAPH

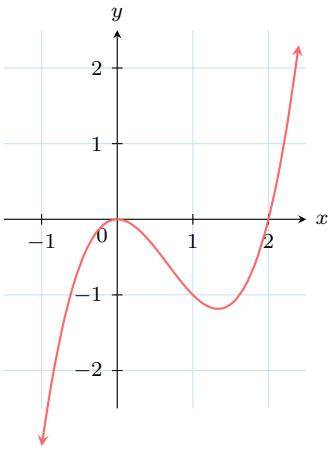
D.1 FINDING $f(x)$

Ex 50: The graph of $y = f(x)$ is:



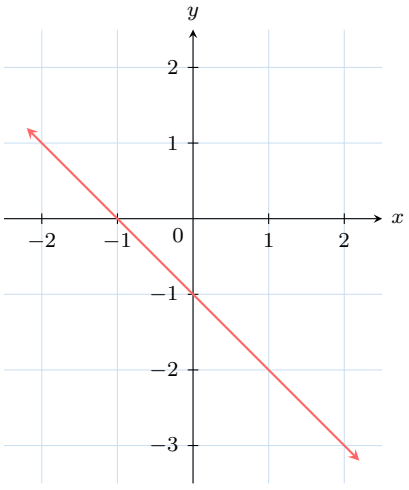
$f(2) =$ ☐

Ex 51: The graph of $y = f(x)$ is:



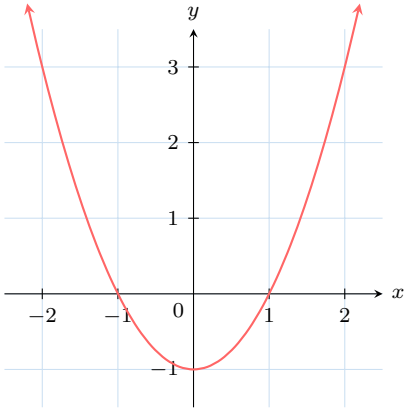
$f(1) =$ ☐

Ex 52: The graph of $y = f(x)$ is:



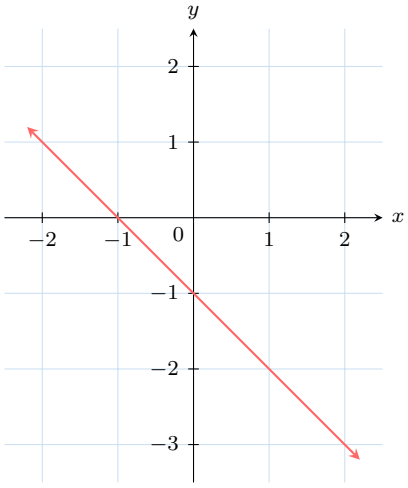
$f(-2) =$ ☐

Ex 53: The graph of $y = f(x)$ is:



$f(1) =$ ☐

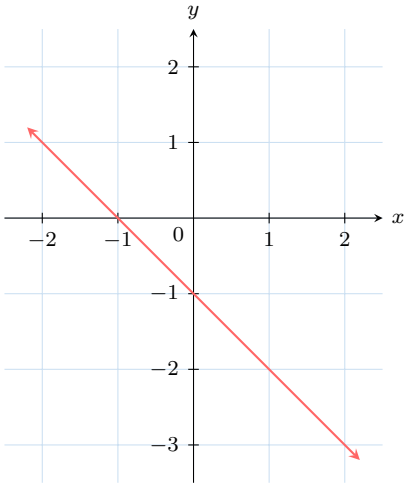
Ex 54: The graph of $y = f(x)$ is:



$f(1) =$ ☐

D.2 FINDING x SUCH THAT $f(x) = y$

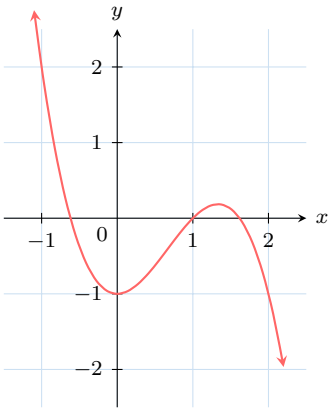
Ex 55: The graph of $y = f(x)$ is:



Find x such that $f(x) = -2$.

$x =$ ☐

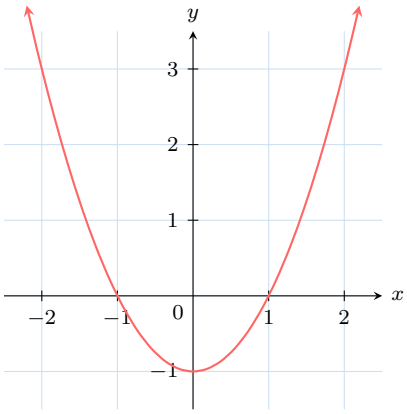
Ex 56: The graph of $y = f(x)$ is:



Find x such that $f(x) = 2$.

$x =$ ☐

Ex 57: The graph of $y = f(x)$ is:

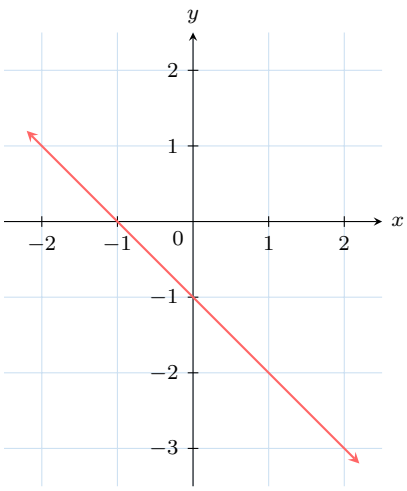


Find all x such that $f(x) = 3$.

Give your answers in increasing order:

$x =$ ☐ or $x =$ ☐

Ex 58: The graph of $y = f(x)$ is:



Find x such that $f(x) = 1$.

$x =$ ☐

E SOLVING $f(x) = y$ ALGEBRAICALLY

E.1 SOLVING LINEAR EQUATIONS FOR $f(x) = y$

Ex 59: Let $f(x) = 3x + 12$. Find all x such that $f(x) = 0$. Justify your answer.

Ex 60: Let $f(x) = 2x - 18$. Find all x such that $f(x) = 0$. Justify your answer.

Ex 61: Let $f(x) = 2x + 20$. Find all x such that $f(x) = 10$. Justify your answer.

Ex 62: Let $f(x) = -6x + 7$. Find all x such that $f(x) = 2$. Justify your answer.