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:

☐ $f(x) = 2x$

☒ $f(x) = x + 2$

☐ $f(x) = x - 2$

☐ $f(x) = 2x + 2$

Answer: Given the following program:

1. Choose a number: x.

2. Add 2 to the chosen number: $x + 2$.

Thus, the function is:

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

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:

☒ $f(x) = 3x$

☐ $f(x) = x + 3$

☐ $f(x) = x - 3$

☐ $f(x) = 3x + 3$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by 3: $3x$.

Thus, the function is:
$$f(x) = 3x$$

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:

☐ $f(x) = 5x + 2$

☐ $f(x) = 5x^2 - 2$

☐ $f(x) = x - 2$

☒ $f(x) = 5x - 2$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by five: $5x$.

3. Subtract 2 from the result obtained: $5x - 2$.

Thus, the function is:

$$f(x) = 5x - 2$$

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:

☒ $f(x) = -2x + 3$

☐ $f(x) = -2x - 3$

☐ $f(x) = 2x + 3$

☐ $f(x) = 2x - 3$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by -2: $-2x$.

3. Add 3 to the result obtained: $-2x + 3$.

Thus, the function is:

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

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:

☐ $f(x) = 2x$

☐ $f(x) = x + 2$

☐ $f(x) = 2x^2$

☒ $f(x) = x^2$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by itself: $x \times x = x^2$.

Thus, the function is:
$$f(x) = x^2$$

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:

☒ $f(x) = x^2 - 3$

☐ $f(x) = x - 3$

☐ $f(x) = x - 3x$

☐ $f(x) = x^2 + 3x$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by itself: $x \times x = x^2$.

3. Subtract 3 from the product obtained: $x^2 - 3$.

Thus, the function is:
$$f(x) = x^2 - 3$$

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:

☐ $f(x) = x + 3x$

☒ $f(x) = (x + 3)x$

☐ $f(x) = x(x + 3) + 3$

☐ $f(x) = 3x^2 + x$

Answer: Given the following program:

1. Choose a number: x.

2. Add 3 to the chosen number: $x + 3$.

3. Multiply the result by the original chosen number: $(x+3) \times x$.

Thus, the function is:
$$f(x) = (x + 3)x$$

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:

☒ $f(x) = \frac{x+4}{x}$

☐ $f(x) = \frac{x+4}{2}$

☐ $f(x) = \frac{4}{x} + x$

☐ $f(x) = x + 4$

Answer: Given the following program:

1. Choose a number: x.

2. Add 4 to the chosen number: $x + 4$.

3. Divide the result by the original chosen number: $\frac{x+4}{x}$.

Thus, the function is:
$$f(x) = \frac{x+4}{x}$$

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.
$$f(x) = \boxed{x - 5}$$

Answer: Given the following program:

1. Choose a number: x.

2. Subtract 5 from the chosen number: $x - 5$.

Thus, the function is:
$$f(x) = x - 5$$

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.
$$f(x) = \boxed{3x}$$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by three: $3x$.

Thus, the function is:
$$f(x) = 3x$$

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.
$$f(x) = \boxed{5x - 2}$$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by five: $5x$.

3. Subtract 2 from the result obtained: $5x - 2$.

Thus, the function is:
$$f(x) = 5x - 2$$

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.
$$f(x) = \boxed{-2x + 5}$$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by -2: $-2x$.

3. Add 5 to the result obtained: $-2x + 5$.

Thus, the function is:
$$f(x) = -2x + 5$$

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.
$$f(x) = \boxed{x^2 - 1}$$

Answer: Given the following program:

1. Choose a number: x.

2. Multiply the chosen number by itself: x^2.

3. Subtract 1 from the result obtained: $x^2 - 1$.

Thus, the function is:
$$f(x) = x^2 - 1$$

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.
$$f(x) = \boxed{2x^2}$$

Answer: Given the following program:

1. Choose a number: x.

2. Square the chosen number: x^2.

3. Multiply the result by 2: $2x^2$.

Thus, the function is:
$$f(x) = 2x^2$$

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.
$$f(x) = \boxed{(x - 1)x}$$

Answer: Given the following program:

1. Choose a number: x.

2. Subtract 1 from the chosen number: $x - 1$.

3. Multiply the result by the original number: $(x - 1)x$.

Thus, the function is:
$$f(x) = (x - 1)x$$

A.5 CALCULATING $f(x)$

Ex 16: For $f(x) = x + 3$,
$$f(4) = \boxed{7}$$

Ex 17: For $f(x) = 2x - 1$,
$$f(5) = \boxed{9}$$

Answer:
$$\begin{aligned} f(5) &= 2 \times (5) - 1 \quad \text{(substituting } x \text{ with (5))} \\ &= 10 - 1 \\ &= 9 \end{aligned}$$

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

$$f(2) = \boxed{8}$$

Answer:

$$\begin{aligned} f(2) &= 3 \times (2) + 2 \quad \text{(substituting } x \text{ with (2))} \\ &= 6 + 2 \\ &= 8 \end{aligned}$$

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

$$f(3) = \boxed{8}$$

Answer:

$$\begin{aligned} f(3) &= (3)^2 - 1 \quad \text{(substituting } x \text{ with (3))} \\ &= 9 - 1 \\ &= 8 \end{aligned}$$

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

$$f(1) = \boxed{2}$$

Answer:

$$\begin{aligned} f(1) &= 5 \times (1) - 3 \quad \text{(substituting } x \text{ with (1))} \\ &= 5 - 3 \\ &= 2 \end{aligned}$$

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

$$f(6) = \boxed{7}$$

Answer:

$$\begin{aligned} f(6) &= \frac{(6)}{2} + 4 \quad \text{(substituting } x \text{ with (6))} \\ &= 3 + 4 \\ &= 7 \end{aligned}$$

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

$$f(10) = \boxed{5}$$

Answer:

$$\begin{aligned} f(10) &= (10) - 5 \quad \text{(substituting } x \text{ with (10))} \\ &= 10 - 5 \\ &= 5 \end{aligned}$$

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

$$f(-2) = \boxed{-9}$$

Answer:

$$\begin{aligned} f(-2) &= 2 \times (-2) - 5 \quad \text{(substituting } x \text{ with (-2))} \\ &= -4 - 5 \\ &= -9 \end{aligned}$$

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

$$f(-3) = \boxed{7}$$

Answer:

$$\begin{aligned} f(-3) &= -(-3) + 4 \quad \text{(substituting } x \text{ with (-3))} \\ &= 3 + 4 \\ &= 7 \end{aligned}$$

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

$$f(-1) = \boxed{-10}$$

Answer:

$$\begin{aligned} f(-1) &= 3 \times (-1) - 7 \quad \text{(substituting } x \text{ with (-1))} \\ &= -3 - 7 \\ &= -10 \end{aligned}$$

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

$$f(-2) = \boxed{8}$$

Answer:

$$\begin{aligned} f(-2) &= (-2)^2 - 2 \times (-2) \quad \text{(substituting } x \text{ with (-2))} \\ &= 4 + 4 \\ &= 8 \end{aligned}$$

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

$$f(-3) = \boxed{-3}$$

Answer:

$$\begin{aligned} f(-3) &= 2 \times (-3) + 3 \quad \text{(substituting } x \text{ with (-3))} \\ &= -6 + 3 \\ &= -3 \end{aligned}$$

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

$$f(8) = \boxed{0}$$

Answer:

$$\begin{aligned} f(8) &= \frac{(8)}{2} - 4 \quad \text{(substituting } x \text{ with (8))} \\ &= 4 - 4 \\ &= 0 \end{aligned}$$

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

$$f(-1) = \boxed{-4}$$

Answer:

$$\begin{aligned} f(-1) &= \frac{3 \times (-1) - 5}{2} \quad \text{(substituting } x \text{ with (-1))} \\ &= \frac{-3 - 5}{2} \\ &= \frac{-8}{2} \\ &= -4 \end{aligned}$$

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

$$f(10) = \boxed{-1}$$

Answer:

$$f(10) = \frac{(10) - 6}{2} - 3 \quad \text{(substituting } x \text{ with (10))}$$
$$= \frac{4}{2} - 3$$
$$= 2 - 3$$
$$= -1$$

A.6 CALCULATING $f(x)$

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

$$f(4) = \boxed{7}$$

Answer:

$$f(4) = (4) + 3 \quad \text{(substituting } x \text{ with (4))}$$
$$= 4 + 3$$
$$= 7$$

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

$$f(2) = \boxed{3}$$

Answer:

$$f(2) = (2)^2 - 1 \quad \text{(substituting } x \text{ with (2))}$$
$$= 4 - 1$$
$$= 3$$

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

$$f(0) = \boxed{2}$$

Answer:

$$f(0) = (0 - 1)(0 - 2) \quad \text{(substituting } x \text{ with (0))}$$
$$= (-1) \times (-2)$$
$$= 2$$

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

$$f(-1) = \boxed{-1}$$

Answer:

$$f(-1) = (-1)^3 \quad \text{(substituting } x \text{ with (-1))}$$
$$= -1$$

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

$$f(2) = \boxed{3}$$

Answer: For $x = 2$, $f(2) = 3$.

Ex 36: The table of values is given below:

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

$$f(3) = \boxed{1}$$

Answer: For $x = 3$, $f(3) = 1$.

Ex 37: The table of values is given below:

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

$$f(0) = \boxed{-1}$$

Answer: For $x = 0$, $f(0) = -1$.

Ex 38: The table of values is given below:

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

$$f(5) = \boxed{6}$$

Answer: For $x = 5$, $f(5) = 6$.

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
$f(x)$	$\boxed{4}$	$\boxed{1}$	$\boxed{0}$	$\boxed{1}$	$\boxed{4}$

Answer:

- $f(-2) = ((-2))^2 \quad \text{(substituting } x \text{ with (-2))}$
  $= 4$

- $f(-1) = ((-1))^2 \quad \text{(substituting } x \text{ with (-1))}$
  $= 1$

- $f(0) = (0)^2 \quad \text{(substituting } x \text{ with (0))}$
  $= 0$

- $f(1) = (1)^2 \quad \text{(substituting } x \text{ with (1))}$
  $= 1$

- $f(2) = (2)^2 \quad \text{(substituting } x \text{ with (2))}$
  $= 4$

So the table of values is:

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

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

x	-2	-1	0	1	2
$f(x)$	$\boxed{5}$	$\boxed{3}$	$\boxed{1}$	$\boxed{-1}$	$\boxed{-3}$

Answer:

- $f(-2) = -2 \times (-2) + 1 \quad \text{(substituting } x \text{ with (-2))}$
  $= 4 + 1$
  $= 5$

- $f(-1) = -2 \times (-1) + 1$ (substituting x with (-1))
  $= 2 + 1$
  $= 3$

- $f(0) = -2 \times (0) + 1$ (substituting x with (0))
  $= 0 + 1$
  $= 1$

- $f(1) = -2 \times (1) + 1$ (substituting x with (1))
  $= -2 + 1$
  $= -1$

- $f(2) = -2 \times (2) + 1$ (substituting x with (2))
  $= -4 + 1$
  $= -3$

So the table of values is:

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

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

x	-2	-1	0	1	2
$f(x)$	11	5	1	-1	-1

Answer:

- $f(-2) = ((-2))^2 - 3 \times (-2) + 1$ (substituting x with (-2))
  $= 4 + 6 + 1$
  $= 11$

- $f(-1) = ((-1))^2 - 3 \times (-1) + 1$ (substituting x with (-1))
  $= 1 + 3 + 1$
  $= 5$

- $f(0) = (0)^2 - 3 \times (0) + 1$ (substituting x with (0))
  $= 0 + 0 + 1$
  $= 1$

- $f(1) = (1)^2 - 3 \times (1) + 1$ (substituting x with (1))
  $= 1 - 3 + 1$
  $= -1$

- $f(2) = (2)^2 - 3 \times (2) + 1$ (substituting x with (2))
  $= 4 - 6 + 1$
  $= -1$

So the table of values is:

x	-2	-1	0	1	2
$f(x)$	11	5	1	-1	-1

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 $f(x) = 1$.

$$x = \boxed{0}$$

Answer: As $f(0) = 1$, $x = 0$ is an antecedent of 1 by f.

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 $f(x) = 4$.

$$x = \boxed{-3}$$

Answer: As $f(-3) = 4$, $x = -3$ is an antecedent of 4 by f.

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 $g(x) = 2$.

$$x = \boxed{3}$$

Answer: As $g(3) = 2$, $x = 3$ is an antecedent of 2 by g.

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:

$$x = \boxed{-3} \ , \ \boxed{1}$$

Answer: As $f(-3) = 0$ and $f(1) = 0$, the antecedents of 0 by f are $x = -3$ and $x = 1$.

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.
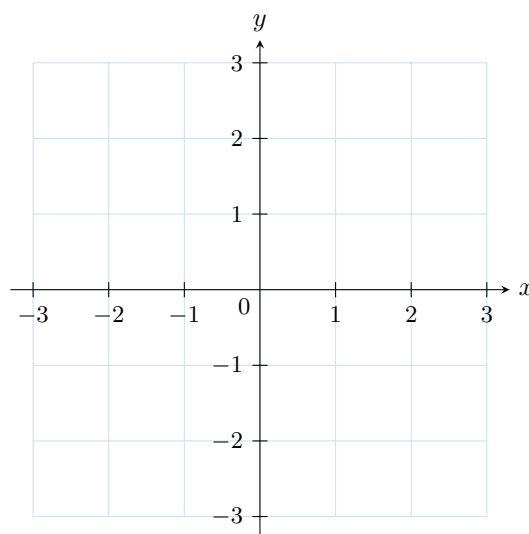
Answer: Plot the points $(-2, -3)$, $(-1, -2)$, $(0, -1)$, $(1, 0)$, $(2, 1)$, and $(3, 2)$. Then, connect the points with straight segments to form the line graph.
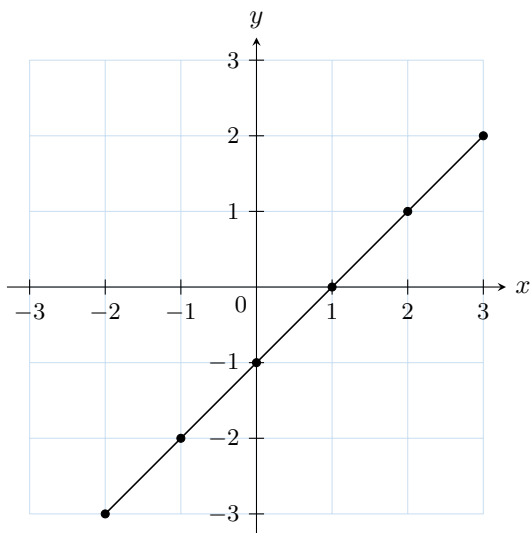
Ex 47: Here is a table of values for the function $f(x) = x^2$:

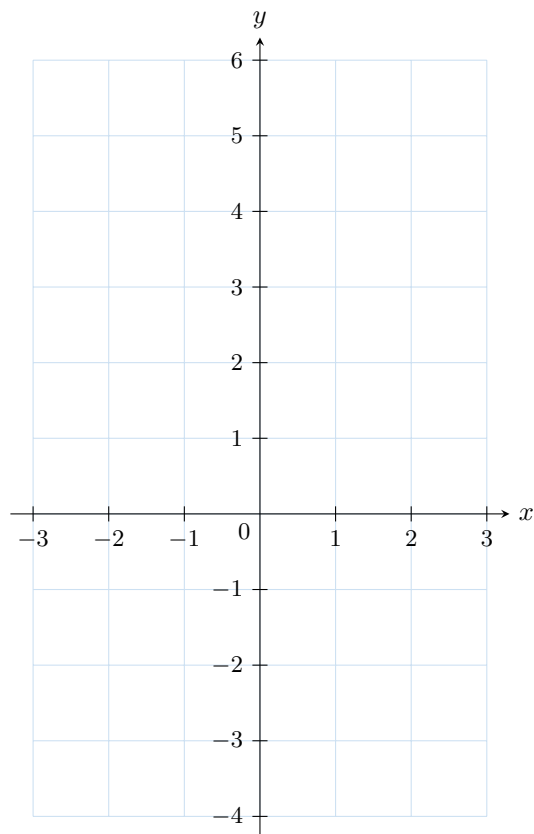| x	-2	-1	-0.5	0	0.5	1	2
$f(x)$	4	1	0.25	0	0.25	1	4

Plot the line graph of f.
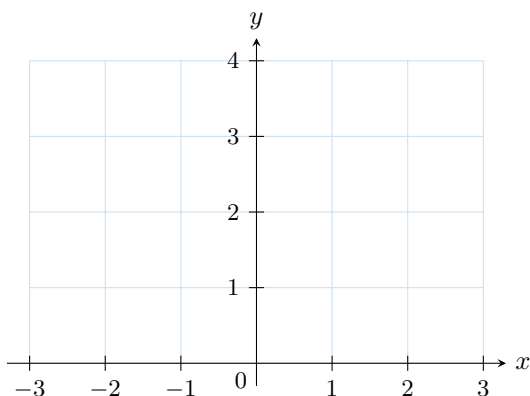
Answer: Plot the points $(-2, 4)$, $(-1, 1)$, $(-0.5, 0.25)$, $(0, 0)$, $(0.5, 0.25)$, $(1, 1)$, and $(2, 4)$. Then, connect the points with straight segments.
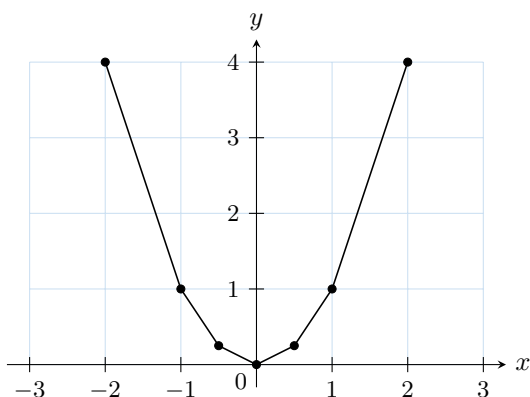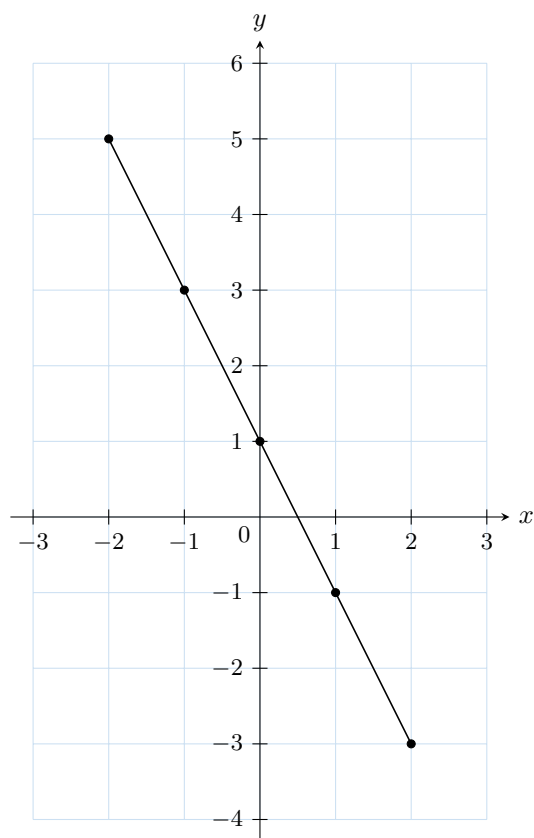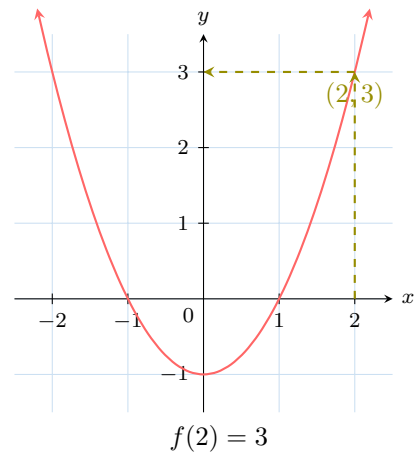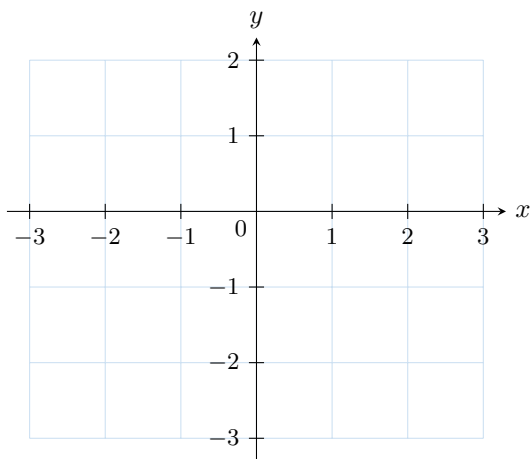

Ex 48: Here is a table of values for the function $f(x) = -2x + 1$:

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

Plot the line graph of f.

Answer: Plot the points $(-2, 5)$, $(-1, 3)$, $(0, 1)$, $(1, -1)$, $(2, -3)$. Then, connect the points with straight segments to form the line graph.

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.

$$f(2) = 3$$

Answer: Plot the points $(-3, -2.5)$, $(-2, -2)$, $(-1, -1.5)$, $(0, -1)$, $(1, -0.5)$, $(2, 0)$, $(3, 0.5)$. Then, connect the points with straight segments to form the line graph.

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

$$f(1) = \boxed{-1}$$
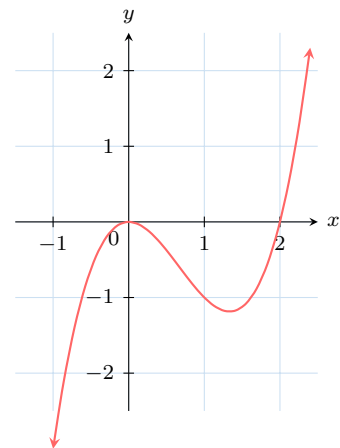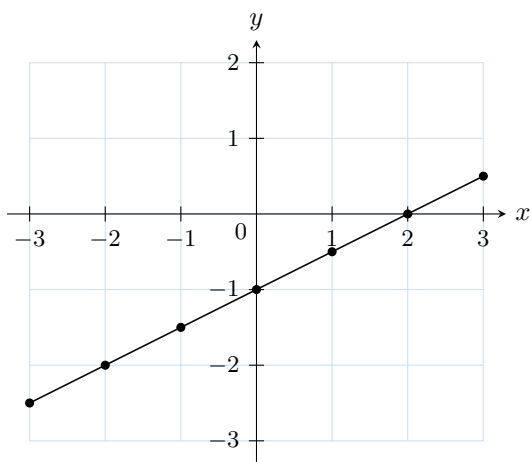
D READING VALUES AND SOLVING $f(x) = y$ ON A GRAPH

D.1 FINDING $f(x)$

Answer:

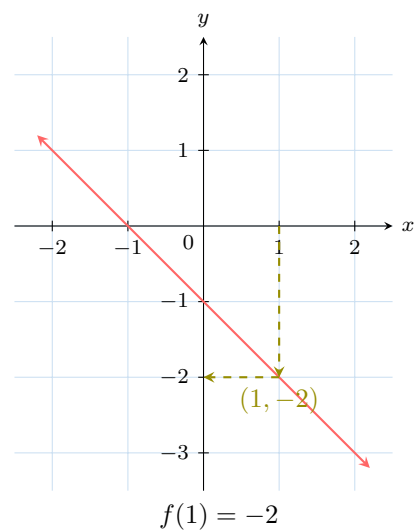**Ex 50:** The graph of $y = f(x)$ is:

$$f(2) = \boxed{3}$$

$$f(1) = -1$$
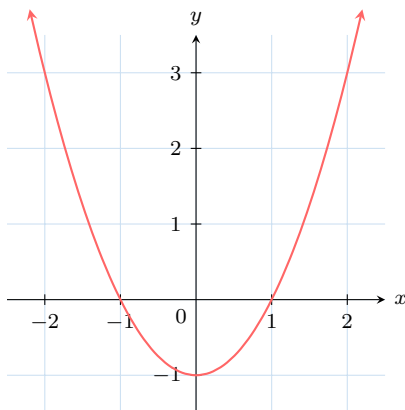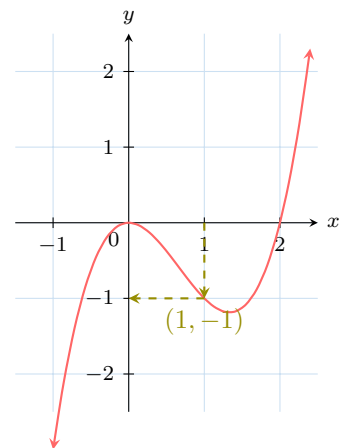
Ex 52: The graph of $y = f(x)$ is:

Answer:

$$f(-2) = \boxed{1}$$

Answer:

$$f(-2) = 1$$

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

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

Answer:

$$f(1) = 0$$
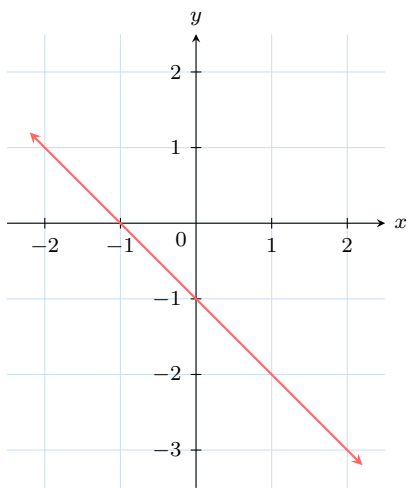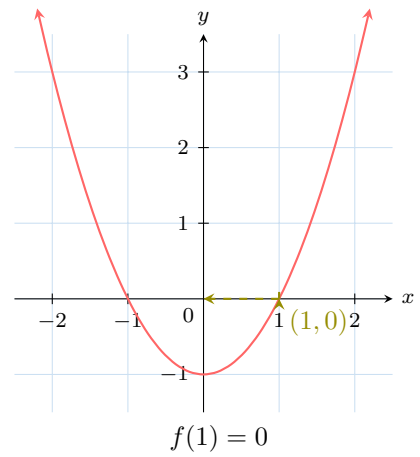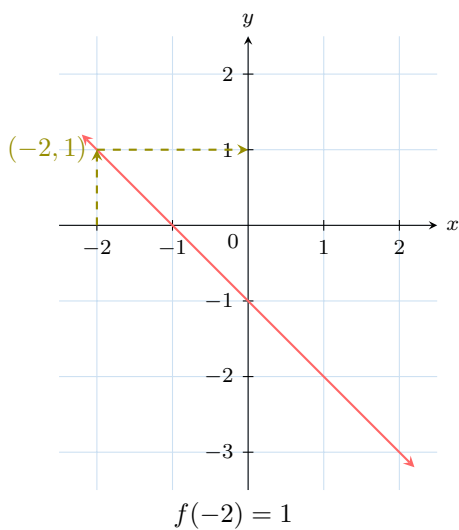
Ex 54: The graph of $y = f(x)$ is:

$$f(1) = \boxed{-2}$$

Answer:

$$f(1) = -2$$
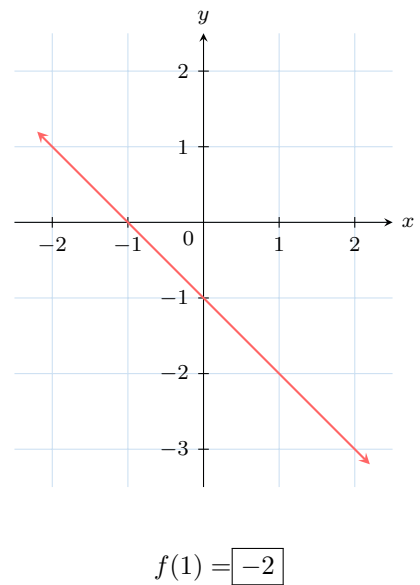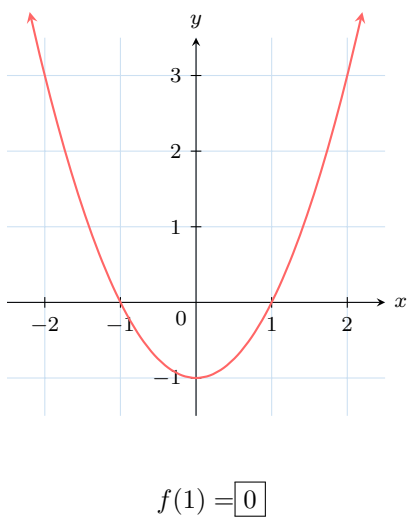
D.2 FINDING x SUCH THAT $f(x) = y$
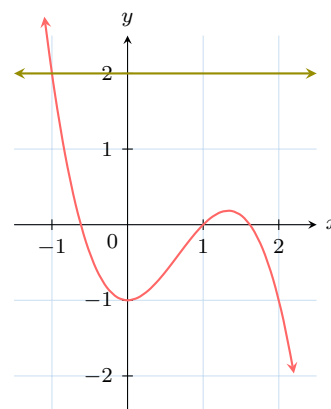
Ex 55: The graph of $y = f(x)$ is:

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

$$x = \boxed{1}$$

Answer:

- Draw a horizontal line at $y = -2$.
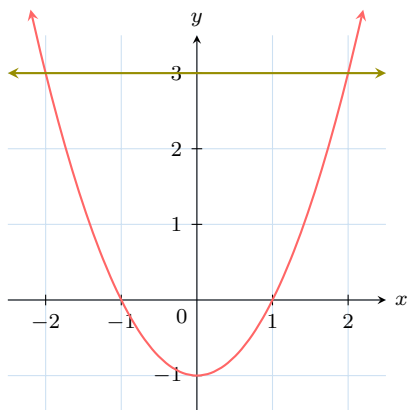

- Identify the intersection point with the curve.

$(1, -2)$

$$x = 1$$
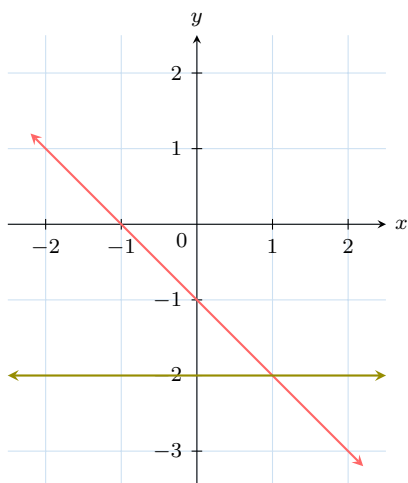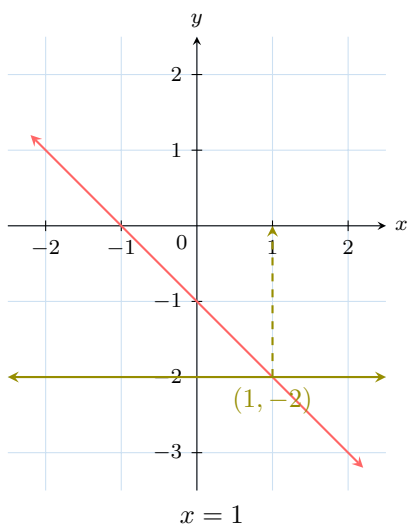
Ex 56: The graph of $y = f(x)$ is:
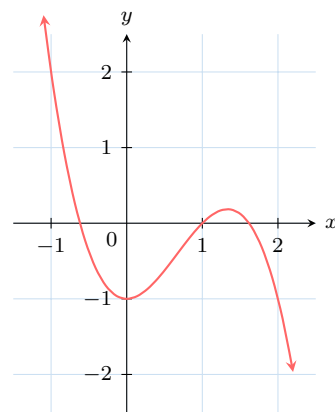
Find x such that $f(x) = 2$.

$$x = \boxed{-1}$$

Answer:

- Draw a horizontal line at $y = 2$.

- Identify the intersection point with the curve.

$(-1, 2)$

$$x = -1$$
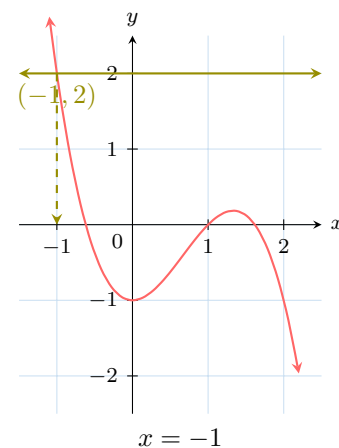
Ex 57: The graph of $y = f(x)$ is:
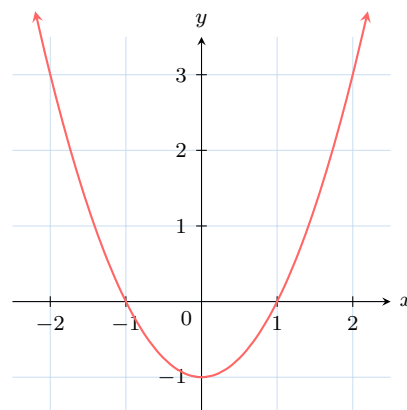
Find all x such that $f(x) = 3$.
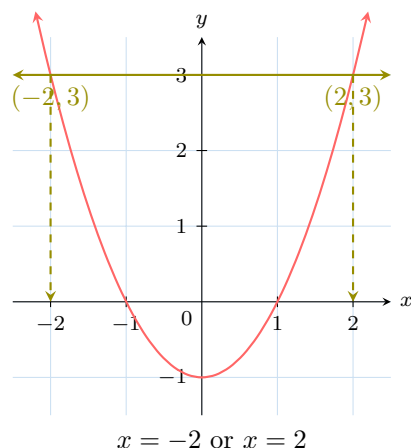
Give your answers in increasing order:

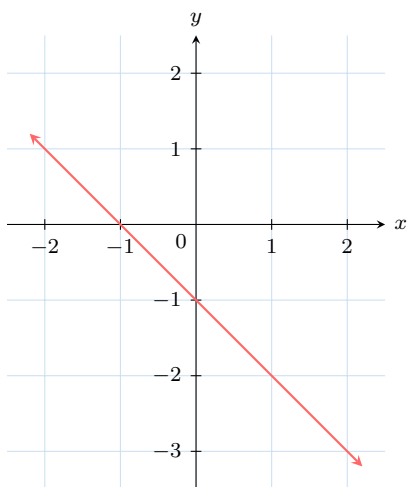$$x = \boxed{-2} \text{ or } x = \boxed{2}$$

Answer:

- Draw a horizontal line at $y = 3$.

- Identify the intersection points with the curve.

$$x = -2 \text{ or } x = 2$$
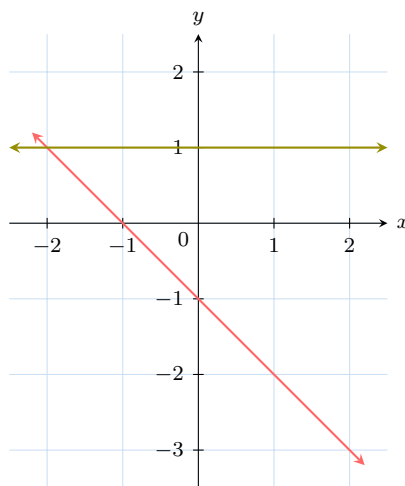
Ex 58: The graph of $y = f(x)$ is:
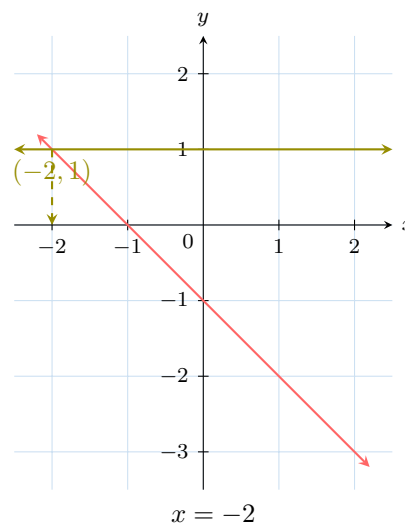

Find x such that $f(x) = 1$.

$$x = \boxed{-2}$$

Answer:

- Draw a horizontal line at $y = 1$.

- Identify the intersection point with the curve.

$$x = -2$$

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.

Answer: We solve the equation:

$$
\begin{aligned}
f(x) &= 0 \\
3x + 12 &= 0 \\
3x &= -12 \quad \text{(subtract 12 from both sides)} \\
x &= -4 \quad \text{(divide both sides by 3)}
\end{aligned}
$$

So the solution is $x = -4$.
(Optional) We can check this by calculating $f(-4)$:

$$
\begin{aligned}
f(-4) &= 3 \times (-4) + 12 \\
&= -12 + 12 \\
&= 0
\end{aligned}
$$

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

Answer: We solve the equation:

$$f(x) = 0$$
$$2x - 18 = 0$$
$$2x - 18 + 18 = 0 + 18 \quad \text{(add 18 to both sides)}$$
$$2x = 18$$
$$\frac{2x}{2} = \frac{18}{2} \quad \text{(divide both sides by 2)}$$
$$x = 9$$

So the solution is $x = 9$.*(Optional) We can check this by calculating $f(9)$:*

$$f(9) = 2 \times 9 - 18$$
$$= 18 - 18$$
$$= 0$$

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

Answer: We solve the equation:

$$f(x) = 10$$
$$2x + 20 = 10$$
$$2x + 20 - 20 = 10 - 20 \quad \text{(subtract 20 from both sides)}$$
$$2x = -10$$
$$\frac{2x}{2} = \frac{-10}{2} \quad \text{(divide both sides by 2)}$$
$$x = -5$$

So the solution is $x = -5$.*(Optional) We can check this by calculating $f(-5)$:*

$$f(-5) = 2 \times (-5) + 20$$
$$= -10 + 20$$
$$= 10$$

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

Answer: We solve the equation:

$$f(x) = 2$$
$$-6x + 7 = 2$$
$$-6x + 7 - 7 = 2 - 7 \quad \text{(subtract 7 from both sides)}$$
$$-6x = -5$$
$$\frac{-6x}{-6} = \frac{-5}{-6} \quad \text{(divide both sides by } -6\text{)}$$
$$x = \frac{5}{6}$$

So the solution is $x = \frac{5}{6}$.*(Optional) We can check this by calculating $f\left(\frac{5}{6}\right)$:*

$$f\left(\frac{5}{6}\right) = -6 \times \frac{5}{6} + 7$$
$$= -5 + 7$$
$$= 2$$