

Sequence, expressions and formulae – Checkpoint Sec 1 Math

1. No.9

Angelique has 12 sweets.

Mia has 3 more sweets than Angelique.

Oliver has 5 less sweets than Mia.

Find how many sweets they have altogether.

..... [1]

2. No.10

$$a = 3b - c$$

Find the value of a when $b = 11$ and $c = 4$ $a =$ [1]

3. No.11

Here is a sequence of numbers.

80, 40, 20, 10...

Find the term-to-term rule for this sequence.

..... [1]

4. No.11

Draw a line to match each calculation to the correct value.

$$7^0 \times 7^2$$

$$7^0 \times 7^0$$

$$7^6 \div 7^2$$

$$7^2 \times 7$$

$$7^4$$

$$7^3$$

$$7^2$$

$$7$$

$$1$$

[2]

5. No.12

Simplify.

(a) $\frac{7}{x} - \frac{3}{x} + \frac{1}{x}$

..... [1]

(b) $\frac{y}{x} + \frac{m}{2x}$

..... [2]

6. No.23

$$a = 4 \quad \text{and} \quad t = -3$$

Work out the value of $5at^2$

..... [1]

7. No.10

Write each of these as a single fraction.
Give each answer in its simplest form.

$$\frac{6a}{7} - \frac{a}{7}$$

.....

$$\frac{1}{c} + \frac{1}{2c}$$

.....

[2]

8. No.19

Angelique finds coordinates on the straight line $y = 2x + 4$
She finds the x -coordinate from a given y -coordinate.

Draw a ring around the correct function to find x .

$x = 2y + 4$

$x = (y - 4) \div 2$

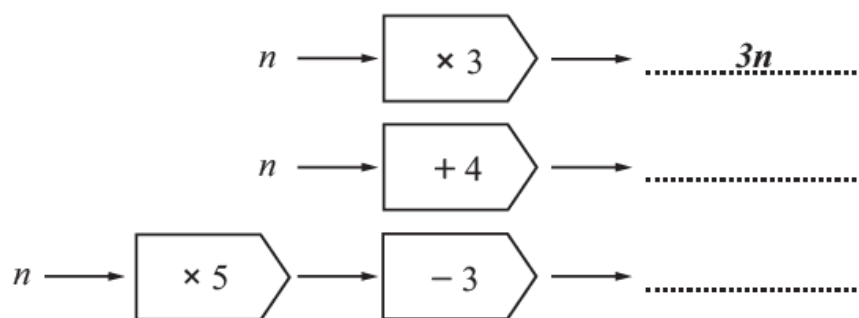
$x = (y \div 2) - 4$

$x = (y + 4) \div 2$

[1]

9. No.2

- (a) Write an algebraic expression for each function machine.
One has been done for you.



[1]

- (b) Complete the function machine for the statement below.

Hassan thinks of a number.
He divides the number by 4
and then adds 2
The answer is 7



[1]

- (c) Work out the number Hassan was thinking of in part (b).

..... [1]

10. No.9

The table shows information about a sequence of patterns made from rods.

Diagram				
Pattern number	1	2	3	4
Number of rods	3	5	7	

(a) Draw the diagram for pattern number 4 in the table.

[1]

(b) − 1 + 1 + 2 + 3 ÷ 2 × 2 × 3

Choose two of these cards to complete the sentence describing the general term.

Number of rods needed = pattern number then

[1]

11. No.28

Tick (✓) the expression that is closest to the square root of $3a^6$

$1.5a^2$

$1.5a^3$

$1.7a^2$

$1.7a^3$

$3a^3$

[1]

12. No.9

Use numbers from the list to complete the sentences.

2 9 14 20 23 35 36

You may use a number more than once.

The square numbers are and

The factors of 18 are and

The multiples of 4 are and

[3]

13. No.12

Simplify.

$$f \times f \times f \times f \times f$$

.....

$$3 \times g \times g \times 2 \times g$$

.....

[2]

14. No.19

A sequence begins

3, -6, 12, -24, 48, ...

(a) Write down the term-to-term rule for this sequence.

..... [1]

(b) Write down the next **two** terms.

..... and [1]

15. No.23

Factorise fully.

$$10ab - 5b^2$$

..... [2]

16. No.4

The cost to hire a hall is \$20 plus \$15 per hour.

(a) Write down a formula for the cost \$C\$ to hire the hall for h hours.

$C =$ [1]

(b) Use the formula to work out the cost to hire the hall for 6 hours.

\$ [1]

17. No.2

Simplify.

$$x^6 \times x^3$$

..... [1]

18. No.4

Simplify.

$$-6p + 4p - 5p$$

..... [1]

19. No.14

Here is a function.

$$x \rightarrow 10x + 2$$

Fill in the missing numbers.

$$3 \rightarrow 32$$

$$7 \rightarrow 72$$

$$4 \rightarrow \boxed{}$$

$$\boxed{} \rightarrow 2$$

[1]

20. No.2

Simplify these expressions.

$$f + f + f + f$$

.....

$$2y + 6 - y + 1$$

.....

[2]

21. No.4

Some trees are planted in rows of 10

Complete the formula to find the total number of trees, t , in r rows.

$$t = \dots\dots\dots [1]$$

22. No.25

Find the n th term for this sequence.

3, 8, 13, 18, 23 ...

$$\dots\dots\dots [2]$$

23. No.8

Here is a formula.

$$V = a(b - 5)^2$$

Work out the value of V when $a = 4$ and $b = 8$

$$V = \dots\dots\dots [1]$$

24. No.30

Find the inverse function of $y = 3x$

$$y = \dots\dots\dots [1]$$

25. No.19

Here is an expression.

$$2xy - 12 + 7y - 5x$$

Write down the third term of this expression.

$$\dots\dots\dots [1]$$

26. No.7

Factorise $6x + 12y - 3z$

$$\dots\dots\dots [1]$$

27. No.16

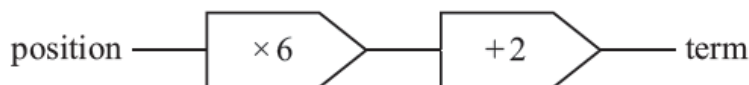
Write down the inverse of this function.

$$y = 2x$$

$$y = \dots\dots\dots [1]$$

28. No.20

The position-to-term rule for a sequence is



(a) Work out the second term of the sequence.

..... [1]

(b) Complete the term-to-term rule for the sequence.

Add

[1]

29. No.2

Blessy thinks of a number and multiplies it by 3

She then subtracts 6

Her final answer is 15

Work out the number Blessy started with.

..... [1]

30. No.7

Draw a ring around the function that corresponds to the rule in the box.

multiply by 4 then subtract 2

$x \rightarrow x^4 - 2$

$x \rightarrow 4(x - 2)$

$x \rightarrow 4x - 2$

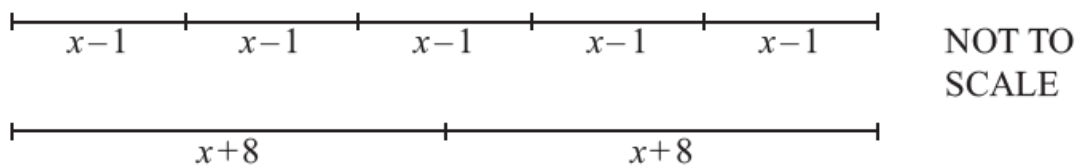
$x \rightarrow 2 - 4x$

[1]

31. No.24

These two lines are the same length.

All measurements are in centimetres.

**(a)** Write down an equation to show that the two lines are the same length.

..... [1]

(b) Work out the length of one line.

..... cm [2]

32. No.1

Temperature can be measured in degrees Celsius ($^{\circ}\text{C}$) or degrees Fahrenheit ($^{\circ}\text{F}$).

Here is a function to change degrees Celsius to degrees Fahrenheit.

$$^{\circ}\text{C} \longrightarrow \boxed{\times 1.8} \longrightarrow \boxed{+ 32} \longrightarrow ^{\circ}\text{F}$$

(a) Use the function to change 25°C to $^{\circ}\text{F}$.

..... $^{\circ}\text{F}$ [1]

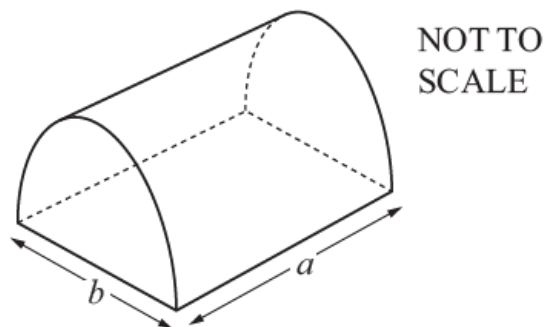
(b) Complete the inverse function.

$$^{\circ}\text{F} \longrightarrow \boxed{\text{.....}} \longrightarrow \boxed{\text{.....}} \longrightarrow ^{\circ}\text{C}$$

[1]

33. No.10

This is a semicircular prism.



(a) Here are the instructions to calculate the area (S) of the curved surface of the prism.

Multiply a and b
 then multiply by π
 then divide by 2

Write down a formula for S in terms of a and b .

$S =$ [1]

(b) Here is a formula for the volume (V) of the prism.

$$V = \frac{\pi ab^2}{8}$$

Work out the volume of the prism when $a = 7.6$ cm and $b = 9.2$ cm.

..... cm³ [2]

34. No.7

Body mass index can be used to measure how healthy a person is.

$$\text{Body mass index} = \frac{M}{H^2}$$

M is mass in kilograms.

H is height in metres.

Yuri is 1.8 m tall and his mass is 64.8 kg.

Calculate Yuri's body mass index.

..... [1]

35. No.19

(a) A sequence begins

14 17 20 23

Write down a formula for the n th term of this sequence.

..... [2]

(b) The n th term of a different sequence is given by the formula

$$\frac{n}{2n+1}$$

Write down the first **three** terms of the sequence.

..... , ... , ... [2]

36. No.20

Simplify.

$$\frac{x}{4} + \frac{x+1}{8}$$

..... [2]

37. No.25

$$6 \times 6 \times 6^a = 1$$

Work out the value of a .

$a =$ [1]

38. No.8

Here is an expression.

$$3a + 4 + 7b$$

Tick (✓) the **third** term in this expression.

 + ☐

3a ☐

4 ☐

7 ☐

7b ☐

[1]

39. No.10(b)

(b) Make r the subject of the equation

$$h = 2(r - 4)$$

$$r = \dots\dots\dots [2]$$

40. No.18

The term-to-term rule of a sequence is multiply by 3

The fourth term of the sequence is 54

Work out the first term of the sequence.

$$\dots\dots\dots [1]$$

41. No.11

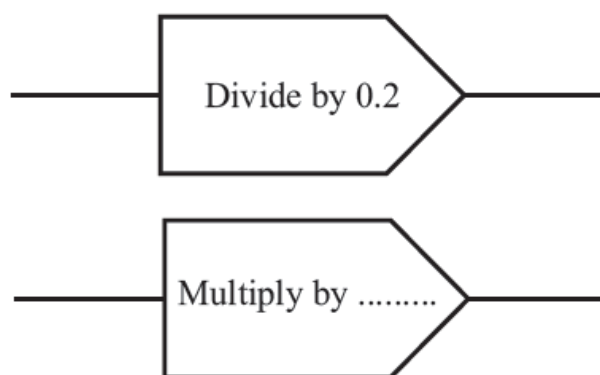
Find the n th term of each sequence.
The first one has been done for you.

Sequence	n th term
3, 6, 9, 12, ...	$3n$
6, 12, 18, 24, ...	
5, 8, 11, 14, ...	

[2]

42. No.22

These two mapping diagrams are **equivalent** to each other.



Complete the second mapping diagram by writing in a whole number.

[1]

43. No.27

Pierre is an electrician.

He uses this formula to work out the amount, $\$C$, to charge for a job that takes t hours.

$$C = 20 + 30t$$

He starts a job at 9.30 am and finishes at 1 pm.

Work out his charge for this job.

\$ [1]

44. No.3

Tick (✓) the expression that is the same as $6 + 2 \times e$

$$8e \quad \square$$

$$2 + 6 \times e \quad \square$$

$$2e + 6 \quad \square$$

$$6 + e^2 \quad \square$$

[1]

45. No.5

A pen costs p cents.

Write down a formula for the cost, C cents, for n pens.

$C =$ [1]

46. No.13

Add together 5 and -1

.....

Add together -2 and -3

.....

Subtract -3 from 5

.....

[2]

47. No.23

The n th term of a sequence is $\frac{n(n+1)}{2}$

Show that the sum of the fifth term and the sixth term is a square number.

[2]

48. No.26

Write as a single fraction.

$$\frac{1}{2x} + \frac{1}{x}$$

..... [1]

49. No.9

Here are the first five terms of a number sequence.

23 20 17 14 11

(a) Write down the 8th term of this sequence.

..... [1]

(b) Work out the n th term of this sequence.

..... [2]

50. No.2

Mia, Lily, Mike, Jamila and Oliver each record the time they take to do their homework.

Mia takes t minutes.

The table gives information about the time the four other students take.

Complete the table.

Description	Expression for time (minutes)
Lily takes 20 minutes longer than Mia.	$t + 20$
Mike takes twice as long as Mia.	
Jamila takes 10 minutes less than Mia.	
Oliver takes	$\frac{t}{2}$

[3]

51. No.7

The diagram shows a row of 7 triangles made from matches.



The number of matches needed to make a row of t triangles is given by the expression $2t + 1$

Work out the number of matches needed for a row of 36 triangles.

..... [1]

52. No.2

(a) Expand the brackets.

$$4(t - 5)$$

..... [1]

(b) Here is a formula.

$$w = 2u + 7$$

Work out the value of w when $u = 19$

$w =$ [1]

53. No.13**(a)** Calculate the value of $(x+5)(x-4)$ when $x = -3$

..... [1]

(b) $(x+5)(x-4) = 286$

Use trial and improvement to find the positive solution of this equation.
Show your trials in the table.

You may not need all the rows.

One value has been done for you.

x	$(x+5)(x-4)$
10	90

 $x =$ [2]**(c)** Expand and simplify $(x+5)(x-4)$

..... [2]

54. No.17

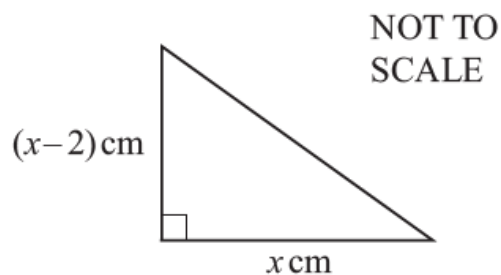
The n th term of a sequence is $2n^2 + 3$

Work out the first three terms of this sequence.

..... [1]

55. No.18

The diagram shows a right-angled triangle with base x cm and height $(x - 2)$ cm.



Write down an expression for the area of the triangle.

..... cm^2 [1]