

Year 7 Maths - Autumn 2023

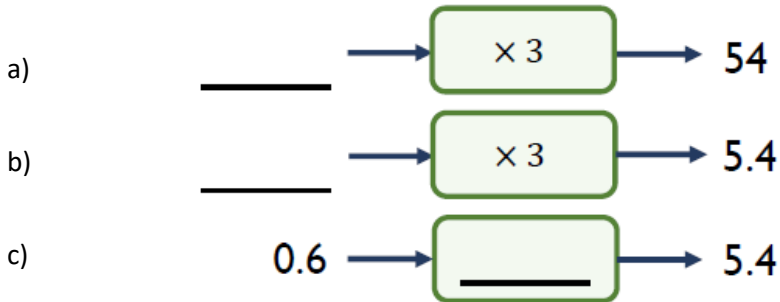
Algebraic Thinking Understand and use notation



Topic/Skill	Definition/Tips	Examples
Operation	A mathematical process.	+ - × ÷
Function	Mathematical relationship between 2 variables . The 2 nd value depends on (is a function of) the 1 st .	
Input	Value that is operated on to produce an output .	
Output	Value that is produced when an input has been operated on.	
Inverse	Each mathematical operation has an opposite that 'undoes' the original operation .	(+ ↔ -) (× ↔ ÷)
Variable	A letter used to represent any number.	<i>x or y</i>
Term*	One part of an expression, equation or formula which may be a number, a variable or a product of both.	$4x + 3y$ has 2 terms
Coefficient	The number in front of the variable (letter).	$4x \rightarrow$ coefficient is 4
Expression	Mathematical statement which contains one or more terms . It can include numbers, variables and arithmetic operations.	$4x + 3y - 2x$
Substitute	Replace letters in an expression with known values.	If $d=5$ then substituting into $3d+6$ would be $(3 \times 5) + 6 = 21$

Questions:

1. Find the missing numbers for these function machines:



2. Simplify these expressions:

- a) $a + a + a + a + a + a$ b) $3b + 2b - b$ c) $\frac{20c}{4}$

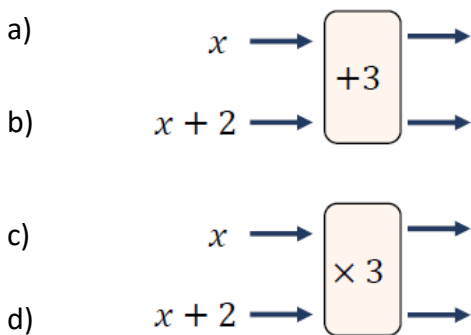
3. What expression will have the greatest value when $x = 3$?

- a) $2x$ b) $x - 2$ c) $3x - 4$

4. Which of these equations form straight line graphs? (it may be more than one)

- a) $x^2 + 3$ b) $x - 6$ c) $4x + 1$ d) $2 - \frac{x}{3}$

5. Write an expression to show each output



6. Substitute $a = 2$, $b = 4$ and $c = 6$ into these expressions

- a) $3a - b$ b) $c + ab$ c) $\frac{a+b}{c}$

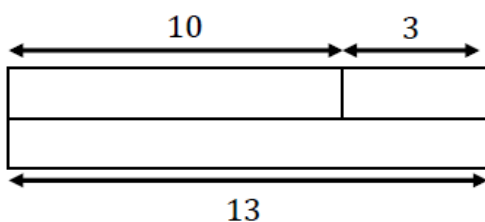
7. True or false, are these expressions equivalent to each other?

- a) $5n \times 2$ b) $2 \times 5n$

8. Place the correct symbol to compare these numbers or expressions. Choose from $=$, \neq , \approx
The first has been done for you.

- a) $10 \approx 9.8674$ b) $-6 \square 8$ c) $2a + a \square 4a - a$
- d) $201,031 \square 200,000$ e) $6y \square 3 \times y$

9. What are the four facts (fact family) represented by this bar model? One has been done for you



- $10 + 3 = 13$
.....
.....
.....

10. Solve these equations. Remember to substitute your answer back into the equation to check.

$$a + 46 = 85 \qquad \frac{c}{6} = 50$$

$$32 = b - 8.2 \qquad 90 = 10d$$

11. Ahmed thinks of a number. He subtracts 18 from this number and gets 13.

a) Show this information as an equation using the letter n

b) Solve the equation to find Ahmed's number.

12. Match these problems involving indices to their solution. You will not use all of the possible answers.

- a) 5^2
- b) 3^3
- c) 4^3
- d) 2^4

Possible answers:

10, 12, 16, 18, 25, 27, 32, 64

Answers

1) a) 18 b) 1.8 c) $x \times 9$ 2) a) $6a$ b) $4b$ c) $5c$ 3) a) 6 b) 4 c) $x + 3$ 4) a) $x + 3$ b) $x + 5$ c) $3x + 6$ d) $3x + 6$ 5) a) $x + 3$ b) $x + 5$ c) $3x + 6$ d) $3x + 6$ 6) a) 2 b) 14 c) 1 d) 7 e) true f) 8 g) b) $x + 3$ h) $x + 5$ i) $3x + 6$ j) $3x + 6$ 7) a) 2 b) 14 c) 1 d) 7 e) true f) 8 g) b) $x + 3$ h) $x + 5$ i) $3x + 6$ j) $3x + 6$ 8) a) 2 b) 14 c) 1 d) 7 e) true f) 8 g) b) $x + 3$ h) $x + 5$ i) $3x + 6$ j) $3x + 6$ 9) a) 2 b) 14 c) 1 d) 7 e) true f) 8 g) b) $x + 3$ h) $x + 5$ i) $3x + 6$ j) $3x + 6$ 10) a) 2 b) 14 c) 1 d) 7 e) true f) 8 g) b) $x + 3$ h) $x + 5$ i) $3x + 6$ j) $3x + 6$ 11) a) $n - 18 = 13$ b) $n = 31$ c) 12) a) 25 b) 27 c) 64 d) 16