

Name _____

Date _____

2.1 Constructing expressions — worked answers

Use letters to represent numbers, use the correct order of operations in algebraic expressions, and write and understand expressions. · 56 questions

A · Fluency — Turn words and situations into expressions.

- 1 Write an expression for: **x more than y**.

Answer: $x + y$

"x more than y" is written as $x + y$.

- 2 Write an expression for: **x less than y**.

Answer: $y - x$

"x less than y" is written as $y - x$.

- 3 Write an expression for: **m more than two times n**.

Answer: $m + 2n$

"m more than two times n" is written as $m + 2n$.

- 4 Write an expression for: **a less than three times b**.

Answer: $3b - a$

"a less than three times b" is written as $3b - a$.

- 5 Write an expression for: **p multiplied by q**.

Answer: pq

"p multiplied by q" is written as pq .

- 6 Write an expression for: **n divided by 4**.

Answer: $n/4$

"n divided by 4" is written as $n/4$.

- 7 Write an expression for: **5 more than n**.

Answer: $n + 5$

"5 more than n" is written as $n + 5$.

- 8 Write an expression for: **6 less than n**.

Answer: $n - 6$

"6 less than n" is written as $n - 6$.

- 9 Write an expression for: **n doubled**.

Answer: $2n$

"n doubled" is written as $2n$.

- 10 Write an expression for: **k tripled**.

Answer: $3k$

"k tripled" is written as $3k$.

- 11 Write an expression for: **half of x**.

Answer: $x/2$

"half of x" is written as $x/2$.

- 12 Write an expression for: **a quarter of y**.

Answer: $y/4$

"a quarter of y" is written as $y/4$.

- 13 Write an expression for: **n squared**.

Answer: n^2

"n squared" is written as n^2 .

- 14 Write an expression for: **3 more than twice x**.

Answer: $2x + 3$

"3 more than twice x" is written as $2x + 3$.

- 15 Write an expression for: **4 less than half of w**.

Answer: $w/2 - 4$

"4 less than half of w" is written as $w/2 - 4$.

- 16 Write an expression for: **the sum of c and d, all multiplied by 5**.

Answer: $5c + 5d$

"the sum of c and d, all multiplied by 5" is written as $5c + 5d$.

- 17 Sofia has a bag containing n counters. She puts in two more counters. Write an expression for the number of counters in the bag.

Answer: $n + 2$

The expression is $n + 2$.

- 18 Sofia has a bag containing n counters. She takes out three counters. Write an expression for the number of counters in the bag.

Answer: $n - 3$

The expression is $n - 3$.

- 19 The temperature on Tuesday was t °C. Write an expression for a temperature 2 °C higher than Tuesday's.

Answer: $t + 2$

The expression is $t + 2$.

- 20 The temperature on Tuesday was t °C. Write an expression for a temperature 3 °C lower than Tuesday's.

Answer: $t - 3$

The expression is $t - 3$.

- 21 The temperature on Tuesday was t °C. Write an expression for twice Tuesday's temperature.

Answer: $2t$

The expression is $2t$.

- 22 In a clothes shop T-shirts cost \$t and shirts cost \$s. Write an expression for the cost of one T-shirt and one shirt.

Answer: $s + t$

The expression is $s + t$.

- 23 In a clothes shop T-shirts cost \$t and shirts cost \$s. Write an expression for the cost of four T-shirts and two shirts.

Answer: $2s + 4t$

The expression is $2s + 4t$.

- 24 Tacos cost \$t each and burritos cost \$b each. Write an expression for the total cost of two tacos and four burritos.

Answer: $4b + 2t$

The expression is $4b + 2t$.

B · Reasoning — Correct notation, terms and equivalence.

- 25 Write $x \times 3$ in the correct algebraic form.

Answer: $3x$

Always write the number before the letter, so $x \times 3$ is written $3x$.

- 26 Write $y \div 5$ in the correct algebraic form.

Answer: $y/5$

A division is written as a fraction: $y \div 5$ is written $y/5$.

- 27 Write $1 \times a$ in its simplest form.

Answer: a

You never write the 1 in front of a letter, so $1 \times a$ is just a .

- 28 Write $a \times a$ in index form.

Answer: a^2

$a \times a$ is written a^2 , read as “a squared”.

- 29 How many terms are there in the expression $5n + 4$?

Answer: 2

The terms are $5n$ and 4 , so there are 2 terms.

- 30 What is the coefficient of n in the expression $7n - 2$?

Answer: 7

The coefficient is the number that multiplies the variable, so it is 7.

- 31 In the equation $5n + 4 = 19$, what is the value of the constant on the left-hand side?

Answer: 4

A constant is a number on its own. On the left-hand side that number is 4.

- 32 Which of these is an **equation** rather than an expression?

☐ $5n + 4$

☐ $3x - 7$

☐ $2y + 1 = 9$

☐ $p \times q$

Answer: $2y + 1 = 9$

An equation contains an equals sign; an expression does not.

- 33** Which expression is **equivalent** to $5n + 4$?

☐ $5 \times n + 4$
☐ $5 + 4n$
☐ $4 \times n + 5$
☐ $9n$

Answer: $5 \times n + 4$

$5n$ means $5 \times n$, so $5 \times n + 4$ is the same expression written a longer way.

- 34** Zara says $2n + 3$ and $3 + 2n$ are equivalent. Is she right?

☐ Yes
☐ No

Answer: Yes

Addition can be done in either order, so $2n + 3 = 3 + 2n$.

- 35** Zara says $2n - 3$ and $3 - 2n$ are equivalent. Is she right?

☐ Yes
☐ No

Answer: No

Subtraction cannot be reversed. If $n = 5$ then $2n - 3 = 7$ but $3 - 2n = -7$.

- 36** Pedro was asked for the total cost of one T-shirt at \$ t and one shirt at \$ s . He wrote $t \times s$. Write the correct expression.

Answer: $s + t$

You add the two costs together, so the answer is $t + s$. Multiplying would give an area, not a total cost.

C · Challenge — Perimeters, ages and two-step wording.

- 37** A rectangle has width x cm. Its length is six times its width. Write an expression for its perimeter, in cm.

Answer: $14x$

Length = $6x$, so perimeter = $2(x + 6x) = 2 \times 7x = 14x$.

- 38** A rectangle has width x cm and length six times its width. Write an expression for its area, in cm^2 .

Answer: $6x^2$

Area = $x \times 6x = 6x^2$.

- 39** A green rectangle has width x cm and a length six times its width. A blue rectangle has width y cm and a length 3 cm more than twice its width. Write an expression for the difference in the lengths (green – blue).

Answer: $6x - 2y - 3$

Green length $6x$, blue length $2y + 3$. Difference = $6x - (2y + 3) = 6x - 2y - 3$.

- 40** Three consecutive integers start at n . Write a simplified expression for their total.

Answer: $3n + 3$

$n + (n + 1) + (n + 2) = 3n + 3$.

- 41** A number is n . Write an expression for the number that is 4 more than double it.

Answer: $2n + 4$

Double it first ($2n$), then add 4.

- 42** A number is n . Write an expression for double the number that is 4 more than n .

Answer: $2n + 8$

Add 4 first ($n + 4$), then double: $2(n + 4) = 2n + 8$. Notice this is not the same as $2n + 4$.

- 43** Ella is half of Mathew's age. Mathew is x years old. Kathryn is three times Mathew's age. Write an expression for the total of Ella's and Kathryn's ages.

Answer: $7x/2$

Ella is $x/2$ and Kathryn is $3x$, so the total is $7x/2$.

- 44** A taxi charges \$3 plus \$2 for every kilometre travelled. Write an expression for the cost of a journey of k kilometres.

Answer: $2k + 3$

The \$2 is charged k times, giving $2k$, and the \$3 is charged once.

D · Word problems — Expressions from real situations.

- 45** A bag of rice has mass m kg. Write an expression for the mass of 7 identical bags, in kg.

Answer: $7m$

7 lots of m is $7m$.

- 46** A pack of pens costs \$ p . Ravi pays with a \$20 note. Write an expression for his change, in dollars.

Answer: $-p + 20$

Change = $20 - p$.

- 47** A school has s students. 40 more students join. Write an expression for the new number of students.

Answer: $s + 40$

Add the 40 to s .

- 48** A cinema has r rows with 12 seats in each row. Write an expression for the total number of seats.

Answer: $12r$

12 seats in each of r rows: $12r$.

- 49** A rope of length r metres is cut into 5 equal pieces. Write an expression for the length of one piece, in metres.

Answer: $r/5$

Divide the length by 5.

- 50** Water costs \$ w per litre. Write an expression for the cost of 3 litres of water and a \$2 delivery charge.

Answer: $3w + 2$

3 litres cost $3w$, then add the fixed \$2.

- 51** A phone plan costs \$12 a month plus \$0.50 for each extra minute. Write an expression for the cost of a month with e extra minutes.

Answer: $e/2 + 12$

Each extra minute costs half a dollar, so e minutes cost $e/2$.

- 52** Ahmed is a years old. His sister is 3 years younger. Write an expression for the sum of their two ages.

Answer: $2a - 3$

$$a + (a - 3) = 2a - 3.$$

- 53** A square has side length s cm. Write an expression for its perimeter, in cm.

Answer: $4s$

Four equal sides, so $4s$.

- 54** A square has side length s cm. Write an expression for its area, in cm^2 .

Answer: s^2

$$\text{Area} = s \times s = s^2.$$

- 55** A class has b boys and g girls. Each student needs 3 pencils. Write an expression for the total number of pencils needed.

Answer: $3b + 3g$

There are $b + g$ students, and each needs 3 pencils: $3(b + g) = 3b + 3g$.

- 56** A train ticket costs $\$t$. A group buys 4 adult tickets and 2 child tickets. A child ticket costs half an adult ticket. Write an expression for the total cost, in dollars.

Answer: $5t$

Child ticket = $t/2$, so the total is $4t + 2 \times t/2 = 4t + t = 5t$.