SCORE

Algebra
With Classified
answer book

8

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2- Forming Expressions

1. Apples cost *a* pence each.
   Bananas cost *b* pence each.
   Write down an expression for the total cost, in pence, of 3 apples and 5 bananas.
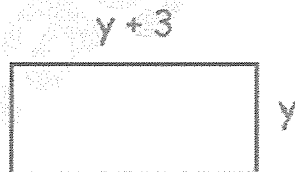
   ....pence

2. Martin is x years old.
   Jennifer is 3 years younger than Martin.
   Connor is twice as old as Martin.

   (a) Write an expression for Jennifer's age.   ....

   (b) Write an expression for Conner's age.   ....

   (c) Write an expression for the sum of the three ages ....

3.

   The diagram shows a rectangle. All measurements are in centimetres.

   Write an expression, in terms of y, in simplest form for the perimeter of the rectangle.

   ....cm

4. Nicola has y marbles.
   Sean has 25 marbles.
   Vicky has 10 marbles.

   Write down an expression for the total number of marbles they have.

   ....

5. The express bus from Dublin to Belfast takes x minutes.

   The standard bus takes 29 minutes longer.

   (a) Write down an expression for the time the standard bus takes.
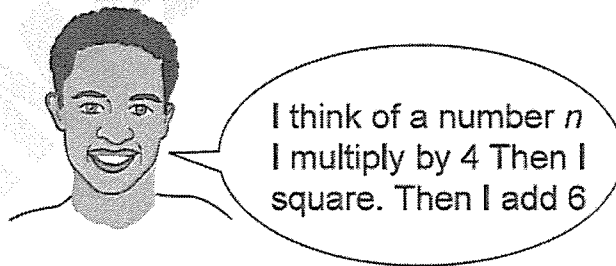
   ....

   The airplane takes half the time the express bus takes.

   (b) Write down an expression for the time the airplane takes.

   ....

6. Pierre says,

   I think of a number *n* I multiply by 4 Then I square. Then I add 6

   Write down an algebraic expression for Pierre's rule.

   ....

7. Fred is 21 years old.
   Hannah is *y* years younger than Fred.
   Write an expression for Hannah's age.   ....

8.

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┌─────────┐      ┌─────────┐      ┌─────────┐      ┌─────────┐
│  Input  │ ───▶ │  × 4    │ ───▶ │  - 15   │ ───▶ │ Output  │
└─────────┘      └─────────┘      └─────────┘      └─────────┘
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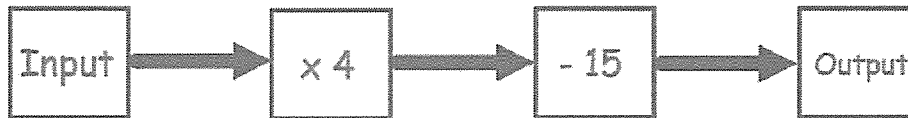
   (a) Write an expression for the output, if the input is y.
   ....

   (b) Write an expression for the input, if the output is x

   ....

9. In a school canteen, a cup of tea costs 60p.

   (a) Write down an expression for the cost, in pence, of *y* cups of tea.

   ....pence

   The canteen sells twice as many cups of coffee as it does cups of tea.

   (b) Write down an expression for the cups of coffee sold when *y* cups of tea are
       sold.

   ....

   Each cup of coffee costs 80p.

   (c) Write down an expression for the cost, in pence, of the cups of coffee sold.

   ....pence

   The canteen also sells biscuits and fruit.

   (d) Write down an expression for the cost, in pence, of *w* biscuits at 15p each
       and 8 pieces of fruit at 30p each.

   ....pence

10. Each pattern below shows a square grid that is 2 squares high. Only one square at each end of the top row is shaded. All squares in the bottom row are shaded.

Imagine one of these patterns that has n squares in the bottom row.

Write an expression for the number of shaded squares shaded. _____

Write an expression for the **fraction** of the pattern that is shaded.

_____

11. Here is some information about three people.

- Jo is 2 years older than Harry.
- Kate is twice as old as Jo.

Write an expression for each person's age using n The fi rst one is given.

Harry's age _____ n _____

Jo's age _____

Kate's age _____

12. In this question, *n* stands for any **whole number**.

(a) For the expression **2n**, tick (✓) the correct statement below.

☐ **2n** must be odd.

☐ **2n** must be even.

☐ **2n** could be odd or even.

Explain your answer.

(b) For the expression **3n**, tick (✓) the correct statement below.

☐ **3n** must be odd.

☐ **3n** must be even.

☐ **3n** could be odd or even.

Explain your answer.

13.(a) I **add** the expressions *n* and *n* + 2

Put a ring round the expression that shows the result.

$2n$ $n^2 + 2$ $4n$ $2n + 2$ $n(n + 2)$

(b) Now I **multiply** the expressions *n* and *n* + 2

Put a ring round the expression that shows the result.

$2n$ $4n$ $n(n + 2)$

$n^2 + 2$ $2n + 2$

14. (a) It is Tina's birthday. We do not know how old Tina is.

Call **Tina's age**, in years, n

The expressions below compare Tina's age to some other people's ages. Use words to compare their ages. The first one is done for you.

Tina's age	n
Ann's age	$n + 3$

Ann is *3 years older than Tina*

Tina's age	n
Barry's age	$n - 1$

Barry is ....

Tina's age	n
Carol's age	$2n$

Carol is ....

(b) In one year's time Tina's age will be $n + 1$

Write **simplified expressions** to show the ages of the other people in one year's time.

	Tina	Ann	Barry	Carol
Age now	n	$n + 3$	$n - 1$	$2n$
Age in one year's time	$n + 1$	....	....	....

15. A ruler costs k pence.

A pen costs m pence.

Match each statement with the correct expression for the amount in pence.

The first one is done for you.

Expression

Statement

5k

The total cost
of 5 rulers

5m

5 – 5m

The total cost
of 5 rulers and 5 pens

500 – 5m

5k + m

How much more a 5 cost pens
than 5 rulers

5(k + m)

5m – 5k

The change from £5,
in pence, when you buy 5
pens

5k – 5m

16. Sophie says:

If n represents a prime number, then
$2n + 1$ will also represent a prime number.

Use an example to explain why she is **wrong**.

17. An expression for the **perimeter** of this shape is shown below.

2a /\ 6

perimeter = ...2a + 9......

3
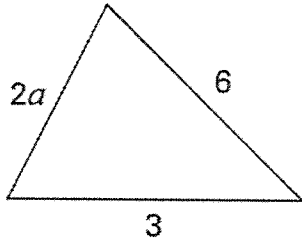
Write an expression for the perimeter of each of these shapes.

Write each expression in its **simplest form.**

7

2t   3t

perimeter = ...

k

2k   7

10

perimeter = ...

e   e

e

3

e
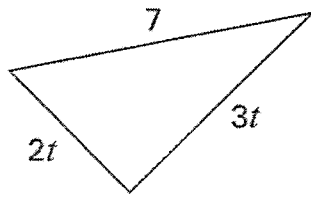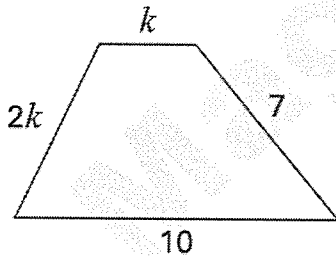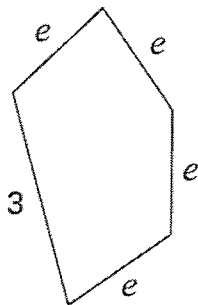
perimeter = ...

18. A teacher has 5 full packets of mints and 6 single mints. The number of mints inside each packet is the same.
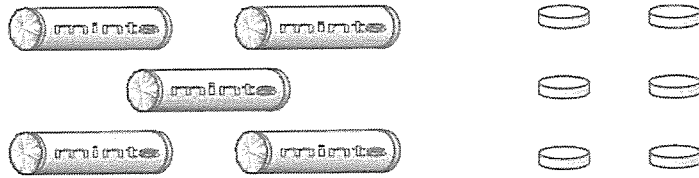
The teacher tells the class:

'Write an expression to show how many mints there are **altogether.**

Call the number of mints inside each packet y'

Here are some of the expressions that the pupils write:

$$5 + 6 + y$$

$$5y6$$

$$5y + 6$$

$$6 + 5y$$

$$5 + 6y$$

$$(5 + 6) \times y$$
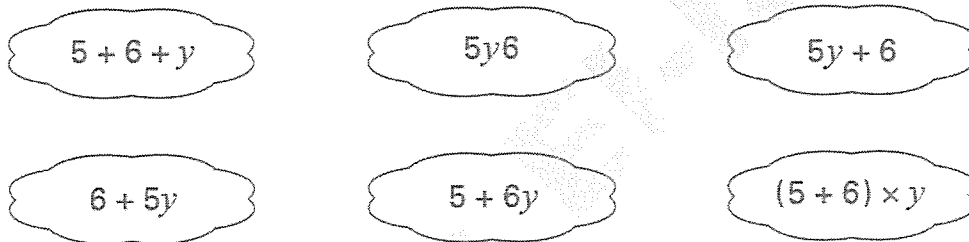
(a) Write down **two** expressions that are correct.

. . . . and . . . .

(b) A pupil says: 'I think the teacher has a total of **56 mints**'.

Could the pupil be correct? Tick ( ) Yes or No.
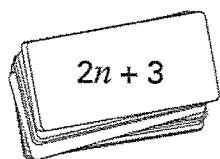
Yes   No

Explain how you know.

☐   ☐

19. A teacher has a large pile of cards.

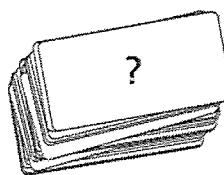An expression for the **total** number of cards is **6n + 8**

$6n + 8$
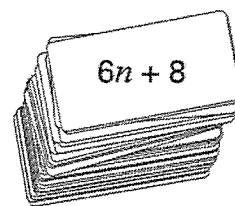
(a) The teacher puts the cards in two piles.

The number of cards in the first pile is **2n + 3**

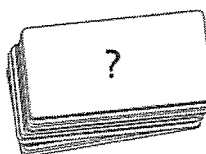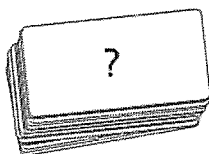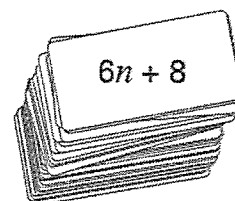$2n + 3$?

first pile   second pile

Write an expression to show the number of cards in the second pile.

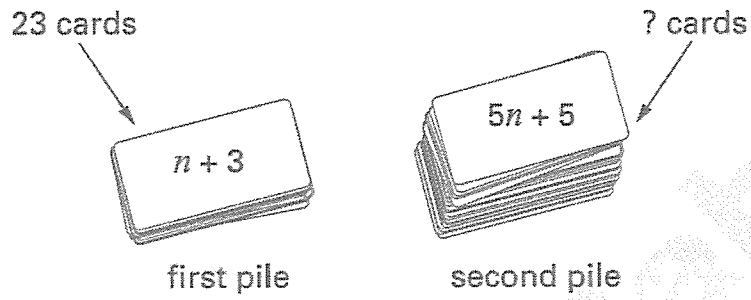(b) The teacher puts all the cards together.

Then he uses them to make **two equal piles**.

$6n + 8$

?   ?

Write an expression to show the number of cards in one of the piles.

(c) The teacher puts all the cards together again,
     then he uses them to make two piles.

     There are **23** cards in the first pile.

23 cards   ? cards

$n + 3$ $5n + 5$

first pile   second pile

How many cards are in the second pile?

Show your working.

. . . .