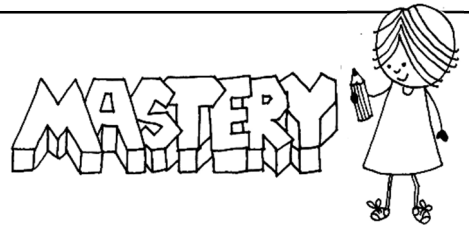
**Year 6 – Algebra**
**Formulas**




**1** Lara has completed the questions below. Which ones are correct? Explain any errors to her.

a) $7p = 21$ $p = 14$

b) $q + 9 = 21$ $q = 12$

c) $3r + 8 = 26$ $r = 6$

d) $7s - 21 = 35$ $s = 2$

**2** Look at the information below. What could the value of n be?

a) $6n + 13 > 50$ **and** $6n < 65$

b) $8n - 7 < 58$ **and** $5n + 9 > 20$

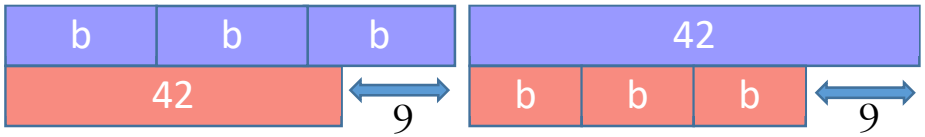
c) $13n + 22 - 4n > 75$ **and** $17n - 6 < 210$

**3** 'Taxis R Us' charges £3.50 plus £2.40 per mile. 'Taxi Cabs' charges £1.70 plus £2.75 per mile. Robbie and Susan have worked out that 'Taxi Cabs' is cheaper for their journey. However, if they needed to travel 1 more mile, 'Taxis R Us' would be cheaper. Try to work out how far Robbie and Susan needed to travel.

**4** Which bar model represents the equation? What does the other represent?

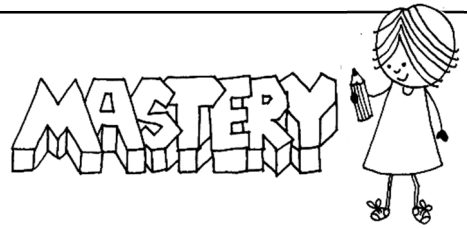
a) $28 = 4a + 8$


b) $3b - 9 = 42$




Primary Solutions

**Year 6 – Algebra**
**Sequences**




**1**

For each sequence (formula shown for $n^{th}$ term), state whether the facts are true or false:

$\underline{3n + 7}$

a) The $27^{th}$ term in the sequence is 88
b) Every term in the sequence is a multiple of 3

$\underline{8n - 4}$

c) Every term in the sequence is a multiple of 4
d) You take away 4 to find the next term in the sequence
e) The $83^{rd}$ term in the sequence is 660

**2**

Below is part of a sequence (not the start). Which of the following formulas for the $n^{th}$ term could describe the sequence?

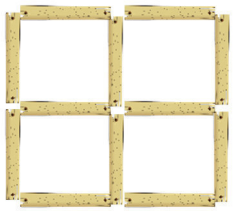
43, 47, 51, 55

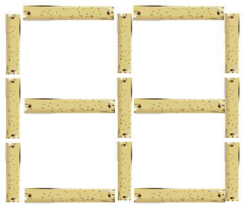
a) $6n + 3$ b) $4n - 5$

c) $4n + 6$ d) $4n + 11$

**3**

Jenny and Robin are both building fences. Jenny's first fence panel uses 7 pieces of wood. After that, she has to add 5 more pieces for every additional panel. Robin's first panel uses 9 pieces of wood. After that, he has to add 6 pieces for every additional panel.


Jenny


Robin

a) Write an expression for the nth term in each sequence
b) After how many panels will Robin have used 20 more pieces of wood than Jenny?

**4**

a) Sara says the formula for how many matchsticks he needs to make n triangles in a single row is $2n - 3$. Explain why this cannot be correct.
b) What is the correct formula?

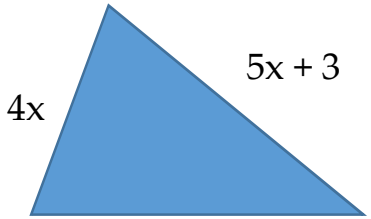
**Year 6 – Algebra**
**Area and Perimeter**

All measurements are in cm / $cm^2$

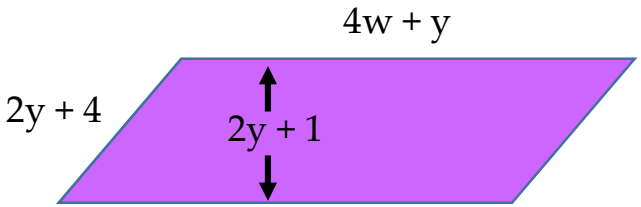
**1** Pete writes down the area and perimeter of the shape below. Which one is right? Can you explain what went wrong with the other?


Area = 30x  Perimeter = 22

**2** Write down an expression for the perimeter of the shape below. Use it to find the length of each side if the perimeter is 109.




**3** This parallelogram has a perimeter of 66.

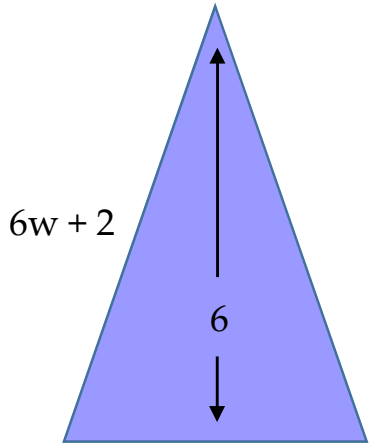



Write an equation for the perimeter.

If y = 3, what is the area?

**4** The perimeter of this isosceles triangle is 15w + 7. Work out an expression for the area of the triangle.

If w = 6, what is the area and perimeter of the triangle?



# Year 6 – Algebra
## Answers

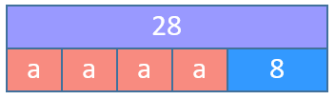
### Formulas

1) a) Incorrect. Lara has answered as if it were 7 + p = 21. The answer should be p = 3.
b) Correct
c) Correct
d) Incorrect. Lara has answered as if it were 7s + 21= 35. The answer should be s = 8

2) a) n could be 7, 8, 9 or 10
b) n could be 3, 4, 5, 6, 7 or 8
c) n could be 6, 7, 8, 9, 10, 11 or 12

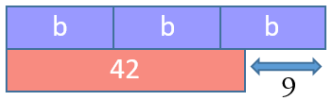
3) They needed to travel **5 miles**, which costs £15.50 with 'Taxis R Us', and £15.45 with 'Taxi Cabs'. If they had travelled 6 miles, it would have been £17.90 with 'Taxis R Us' and £18.20 with 'Taxi Cabs'.

4) a)




The other represents 12 + a = 28.

b)




The other represents 3b + 9 = 42

### Sequences

1) a) This is true
b) False – it will always be 1 more than a multiple of 3
c) This is true
d) False – You add 8
e) This is true

2) a) No – this sequence adds 6 each time, not 4
b) This could represent it
c) No – this sequence will only contain even numbers
d) This could represent it

3) Jenny – 5n + 2
Robin – 6n + 3
Robin starts with two more pieces, and adds one extra to Jenny each time. Therefore, after 19 panels, he will have 20 more pieces.

4) a) This formula suggests that to build one triangle, she will need -1 matchsticks!
b) The correct formula is 2n + 1

### Area and Perimeter

1) Area is correct (30x)
Perimeter is incorrect – Pete thought that 6x + 5 = 11. The perimeter is 12x + 10

2) P = 15x + 4
109 = 15x + 4
x = 7

Therefore the sides are:
4x = 28
5x + 3 = 38
6x + 1 = 43

3) 8w + 6y + 8 = 66
8w + 26 = 66
w = 5
Therefore the area is 7 x 23 = 161cm$^2$

4) The equal side is also 6w + 2, so the base is 3w + 3.
The area is ½ x 6 x (3w+3)
A = 3 x (3w+3) = 9w + 9

If w = 6
P = 97
A = 63