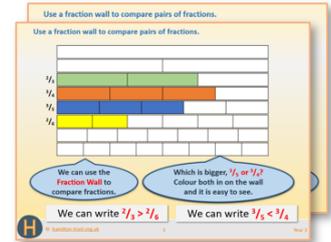


Week 5, Day 4

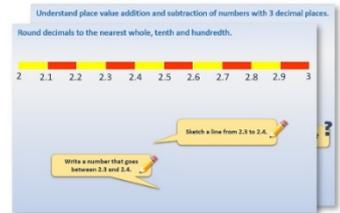
Algebra (1)

Each day covers one maths topic. It should take you about 1 hour or just a little more.

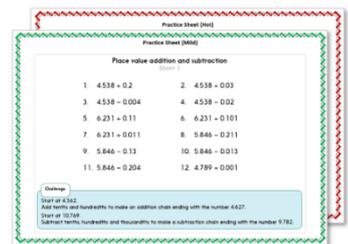
1. If possible, watch the **PowerPoint presentation** with a teacher or another grown-up.



OR start by carefully reading through the **Learning Reminders**.



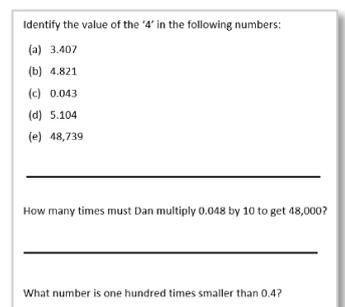
2. Tackle the questions on the **Practice Sheet**. There might be a choice of either **Mild** (easier) or **Hot** (harder)! Check the answers.



3. Finding it tricky? That's OK... have a go with a grown-up at **A Bit Stuck?**

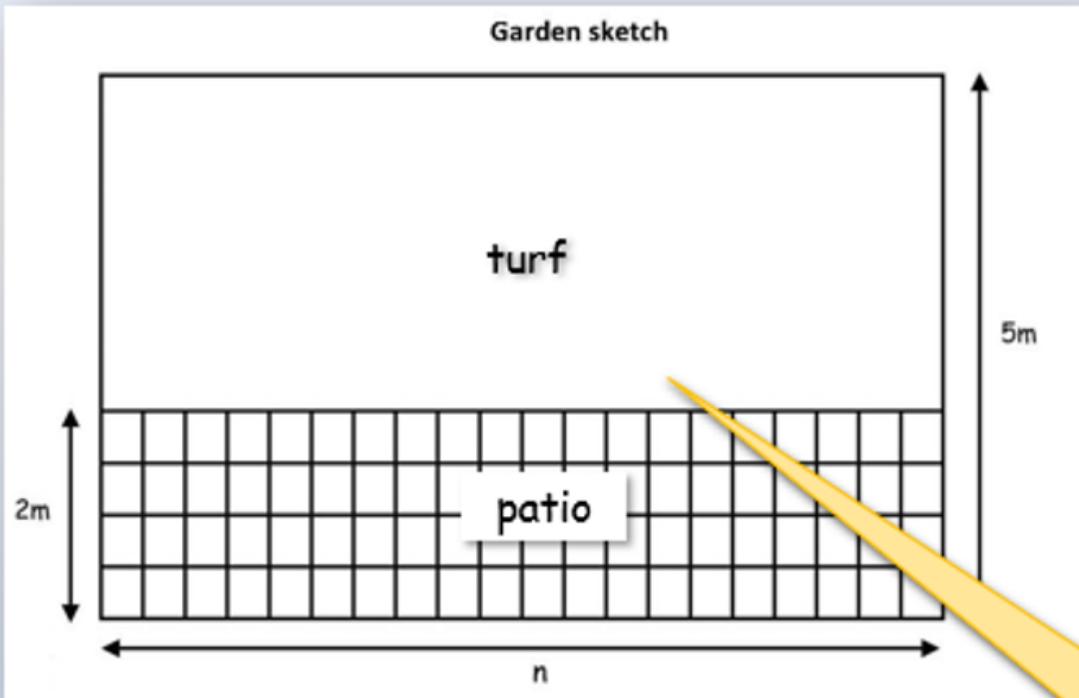


4. Have I mastered the topic? A few questions to **Check your understanding**. Fold the page to hide the answers!



Learning Reminders

Understand and use simple formulae.



Houses are built on different plots. The back gardens are 3 metres long but they will be different widths.

Each will have a patio area, the width of the plot and 2 metres deep. The rest of the garden will be turfed.

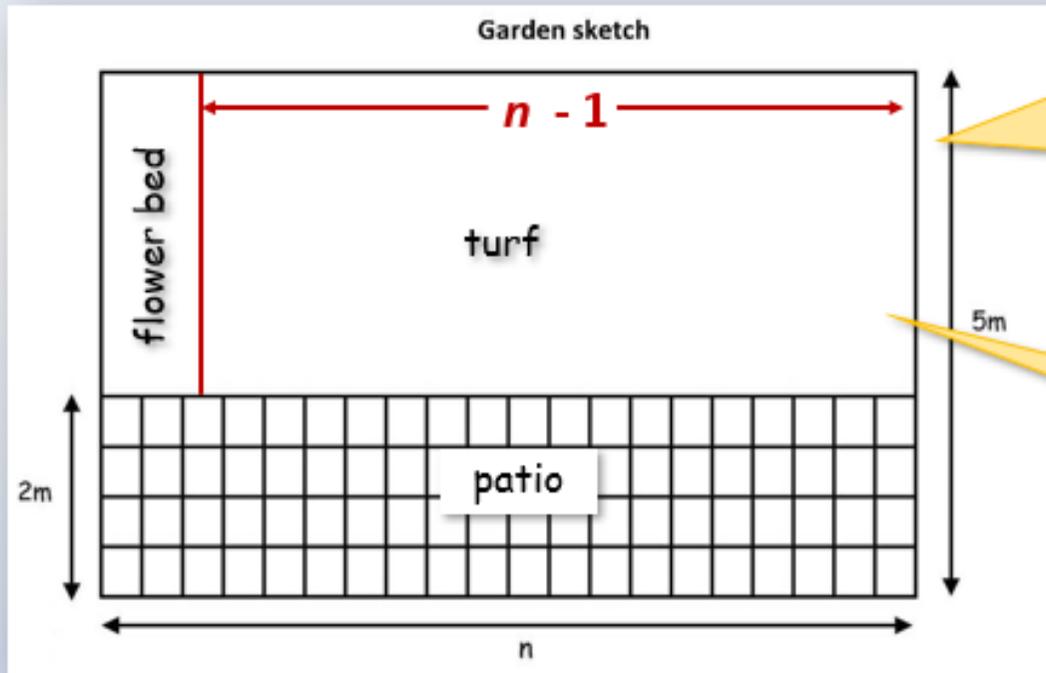
We can use ' n ' to stand for the width of the garden, so the patio area is $2 \times n$ metres squared, which we can write as $2n \text{ m}^2$ for short.

Write a formula for the area of the turf.

$3n$ square metres or $3n \text{ m}^2$

Learning Reminders

Understand and use simple formulae.



They have decided to leave a 1m border along one side of the turf for a flowerbed. So what is the turf width now?

So, what is the turf area now?

**$3 \times (n - 1)$ square metres
or $3(n - 1) m^2$**

What would be the area of the turf if they left a border of 1m along each side?

**3 times $(n - 2)$ square metres
or $3(n - 2) m^2$**

Practice Sheet Mild

Algebra ages

David is 7, his sister Annie is 2 years older than him. How old will Annie be when David is 10? 20? 50?
Write a formula for Annie's age where n is David's age.

David's brother is 3 years older than Annie. How old will his brother be when David is 10? 20? 50?
Write a formula to find the brother's age, where n is David's age.

David has a sister who is 4 years younger than him. Write a formula to find the sister's age where n is David's age.

David was born on 5th September, so on 5th December he is his age in years plus 3 months. This Christmas he will be 7 years old, so how can we calculate his age in months?

What will be his age in months next December?

What will his age be in months the December after he has his 10th birthday?

What about when he is n years old?

Write a formula that could be used to calculate *your* own age in months.

Practice Sheet Hot

Write a formula

Discuss how these prices/amounts would be worked out with a partner, and then write a formula using n . Make $n=5$ in each example to see if the answer makes sense using your formula.

1. Stamps cost 52p each. The cost of n stamps is...
2. The number of wheels on n cars is...
3. The number of months in n number of years is...
4. For n fence panels, ... fence posts are needed.
5. The change from £10 after buying n apples at 25p each is...
6. The time to cook a chicken weighing n kg, at 45 minutes per kilogram and 20 minutes extra is...
7. The distance travelled when a bike wheel turns 20 times and the circumference of the wheel is n , is...
8. The price of an item costing n pounds after VAT of 20% added.

Practice Sheets Answers

Algebra ages (mild)

How old will Annie be when David is 10? **12** 20? **22** 50? **52**

Write a formula for Annie's age where n is David's age. **$n + 2$**

How old will his brother be when David is 10? **15** 20? **25** 50? **55**

Write a formula to find the brother's age, where n is David's age. **$n + 5$**

Write a formula to find the sister's age where n is David's age. **$n - 4$**

David was born on 5th September, so on 5th December he is his age in years plus 3 months. This Christmas he will be 7 years old, so how can we calculate his age in months?

$$7 \times 12 = 84 \quad 84 + 3 = 87 \text{ months}$$

What will be his age in months next December?

$$8 \times 12 = 96 \quad 96 + 3 = 99 \text{ months}$$

What will his age be in months the December after he has his 10th birthday?

$$10 \times 12 = 120 \quad 120 + 3 = 123 \text{ months}$$

What about when he is n years old?

$$12n + 3$$

Write a formula (hot)

1. The cost of n stamps is $52n$ (in pence) or $0.52n$ (in pounds).
2. The number of wheels on n cars is $4n$.
3. The number of months in n years is $12n$.
4. For n fence panels, $n + 1$ fence posts are needed.
5. The change from £10 after buying n apples at 25p each is $£(10 - 0.25n)$.
6. The time to cook a chicken weighing n kg, at 45 minutes per kilogram and 20 extra minutes is $45n + 20$ minutes.
7. The distance travelled when a bike wheel turns 20 times and the circumference of the wheel is n , is $20n$.
8. The price of an item cost n pounds after VAT of 20% added is $£1.2n$.

A Bit Stuck? Using formulas

There are 6 eggs in a box. So, in n boxes there are $6n$ eggs.
How many eggs are in 5 boxes? 10 boxes? 100 boxes?

The perimeter of a regular octagon is $8n$, where n is the length of one side in centimetres.
What is the perimeter of an octagon whose sides are 5cm long? 10cm long? 20cm long?

The number of fence posts needed for n fence panels is $n + 1$.
How many fence posts are needed for 4 fence panels? 10 fence panels? 20 fence panels?

Tickets to see a band are priced £15. There is a one-off booking fee of £3.
So, the cost in pounds of tickets to see the band is $15n + 3$.
How much would it cost to buy 2 tickets? 5 tickets? 10 tickets?

Esme has £10 in her savings account. Each week she saves another £5.
After n weeks, the number of pounds she has in her account is $5n + 10$.
How much is in her savings account after 4 weeks? After 10 weeks?
After a year (52 weeks)?

Dylan has £100 in his savings account. He decides to spend £5 a month on a magazine. He doesn't spend anything else from his savings account.
After n months, the number of pounds he has left is $100 - 5n$.
How much does he have left after 4 weeks? 10 weeks?
If he kept doing this, how long would be before he ran out of money?
 $n - \square$ months

Check your understanding

Questions

If the perimeter of a regular shape is $5 \times n$, where n is the length of a side, what is the shape?
Find the perimeter when $n = 6.5$ cm.

Darren draws a function machine. It trebles a number and then subtracts 6. Sophie sees that one of the outputs is 15. What was the input?
Then Darren inputs 11. What output will Sophie see?
Write the formula for Darren's machine.

Formula A is $3n$.

Formula B is $n + 6$.

What number can n represent which will make these two formulae equal the same amount?

Fold here to hide answers

Check your understanding

Answers

If the perimeter of a regular shape is $5 \times n$, where n is the length of a side, what is the shape? **The shape is a pentagon.**

Find the perimeter when $n = 6.5$ cm. **$5 \times 6.5 = 32.5$ cm**

Darren draws a function machine. It trebles a number and then subtracts 6. Sophie sees that one of the outputs is 15. What was the input? **7 Use inverse operations adding 6 to 15 then dividing by 3.**

Then Darren inputs 11. What output will Sophie see? **27**

Write the formula for Darren's machine. **$3n - 6$**

Formula A is $3n$.

Formula B is $n + 6$.

What number can n represent which will make these two formulae equal the same amount? **$n = 3$**