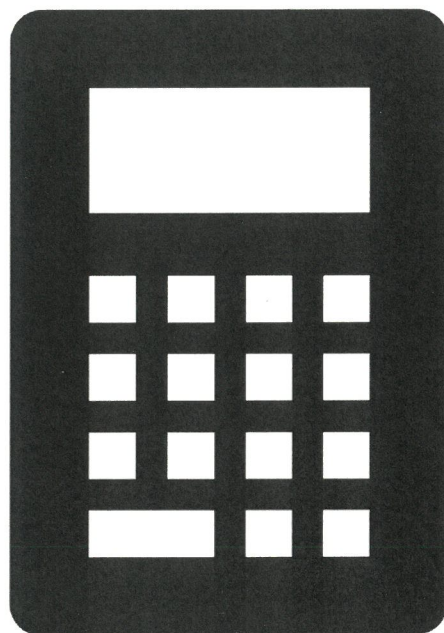


Mathematics Transition to Year 11

Crossover



Name: _____

How to use this booklet

Work across each row of a double page.

Page 1

Page 2

<p>Factors and multiples Fact sheet</p> <p>Write down all of the factors of 33. A factor is a number that divides into another without any remainder.</p> <p>Write down the first 5 multiples of 9. A multiple is a number that results from multiplying one number by another.</p> <p>Write down a common factor of 27 and 54 (excluding 1).</p> <p>Write down the highest common factor of 36 and 24.</p> <p>Write down the lowest common multiple of 7 and 10.</p> <p>Write down the lowest common multiple of 6 and 13.</p>	<p>Topic 1 worked example</p> <p>Handwritten notes and diagrams illustrating factors and multiples.</p>	<p>Topic 1 Practice Questions</p> <p>Practice questions for Topic 1.</p>	<p>Factors and multiples: Practice questions</p> <p>QR codes for answers, copilot, more questions, and video.</p>
<p>Prime factors Fact sheet</p> <p>Divide 50 into prime numbers.</p> <p>All the numbers on the end of the branches are primes so you can stop.</p> <p>Tidy up using powers.</p>	<p>Topic 2 worked example</p> <p>Handwritten notes and diagrams illustrating prime factors.</p>	<p>Topic 2 Practice Questions</p> <p>Practice questions for Topic 2.</p>	<p>Prime factors: Practice questions</p> <p>QR codes for answers, copilot, more questions, and video.</p>
<p>Order of operations: I do, you do example</p> <p>Calculate: $(5 + 4) - 3 \times 3$</p> <p>Calculate: $(2^2 + 3) + 2 \times 2$</p> <p>Calculate: $3 \times 6 - 2$</p> <p>Calculate: $5 \times (11 - 2 \times 5)$</p> <p>Calculate: $(3 + 5)^2 - 2$</p> <p>Calculate: $(5^2 + 2) + 3 \times 2$</p> <p>Calculate: $8 + 16 \times 3 + 2$</p> <p>Insert brackets to make this calculation correct: $2 + 3 - 3^2 = 4$</p>	<p>Topic 3 worked example</p> <p>Handwritten notes and diagrams illustrating order of operations.</p>	<p>Topic 3 Practice Questions</p> <p>Practice questions for Topic 3.</p>	<p>Order of operations: Practice questions</p> <p>QR codes for answers, copilot, more questions, and video.</p>

Remember to use the solutions to mark your work.

Simplify an expression

I do, you do example



Scan for answers



Scan for video

I DO

Simplify the following expression:

$$5a - 2f + 2a + 3f$$

When you simplify an expression, you need to collect like terms. It is a good idea to identify like terms first:

Take note of the signs too

$$\underline{5a} - \underline{2f} + \underline{2a} + \underline{3f}$$

Regroup:

$$\underbrace{5a + 2a}_{7a} - \underbrace{2f + 3f}_{+f}$$

Same as 1f

YOU DO

Simplify the following expression:

$$3b + 4a - 2b + 3a$$

Change the subject

I do, you do example



Scan for answers



Scan for video

I DO

Make c the subject:

$$cb - a = e$$

To make c the subject we use inverse operations to isolate c on one side of the equals sign.

$$cb - a = e$$

$$+a \quad +a$$

$$cb = e + a$$

$$\div b \quad \div b$$

$$c = \frac{e+a}{b}$$

When something isn't divisible, leave the answer as a fraction

YOU DO

Make e the subject:

$$ef + b = a$$

Solve linear equations (unknown on 1 side, int ans)

I do, you do example



Scan for answers



Scan for video

I DO

Solve

$$5x + 7 = 27$$

To solve the equation, we need to use inverse operations.

Sometimes it helps to consider the story of what is happening to x to know what to do first.

multiply x by 5, add 7 and I get 27

Reverse to solve

Whatever you do to one side of the equals sign, you do to the other to keep it equal

$$5x + 7 = 27$$

$$\xrightarrow{-7} 5x = 20$$

$$\xrightarrow{\div 5} x = 4$$

Substitute to check: $5 \times 4 + 7 = 27 \checkmark$

YOU DO

Solve

$$\frac{x+7}{6} = 2$$

★

Simplify the following expression:
 $c + c + c + c + c + c$

★★

Simplify the following expression:
 $8c - 4c$

★★★

Simplify the following expression:
 $4d \times 2$

★★★★


Simplify the following expression:
 $3c - 2d + 2c + 4d$

★★★★★

Simplify the following expression:
 $5c^2 + 5c - 3c^2 + 4c$

★★★★★★

If $x = 5d + 3$ and $y = 2d - 2$, calculate the perimeter of:

x


y

★

Make c the subject:
 $c + e = b$

★★

Make d the subject:
 $dc - f = b$

★★★

Make c the subject:
 $\frac{cb - a}{e} = d$

★★★★

Make a the subject:
 $\frac{\sqrt{a - c}}{b} = e$

★★★★★

Make r the subject:
 $A = \pi r^2$

★★★★★★

Make c the subject:
 $e = ac + 2c$

★

Solve
 $x + 5 = 6$

★★

Solve
 $x \div 5 = 4$

★★★

Solve
 $3x + 8 = 26$

★★★★

Solve
 $2 - 8x = 18$

★★★★★

Solve
 $-4(x - 3) = 32$

★★★★★★

If $a \times 50 = b$, what is the value of
 $\frac{8b}{a}$

Simplify an expression

Practise questions



Scan for answers



Scan for copilot



Scan for more questions

Change the subject

Practise questions



Scan for answers



Scan for copilot



Scan for more questions

Solve linear equations (unknown on 1 side, int ans)



Scan for answers



Scan for copilot



Scan for more questions

Solve linear equations (unknown on 1 side, dec ans)

I do, you do example



Scan for answers

I DO

Solve

$$\frac{x - 14}{8} = 0.7$$

A variable is used in place of a number. This number can be of any number type: i) integer, or ii) decimal/fraction. When solving this equation, rearrange the problem like you normally would but have in mind the value of x may be a non integer value.

$$\begin{aligned} (\times 8) \quad \frac{x - 14}{8} &= 0.7 \quad (\times 8) \\ x - 14 &= 5.6 \\ +14 & \quad +14 \\ x &= 19.6 \end{aligned}$$

YOU DO

Solve

$$10x - 13 = -4$$

Solve linear equations (unknown both sides)

I do, you do example



Scan for answers



Scan for video

I DO

Solve

$$7x + 3 = -74 - 4x$$

The purpose of solving an equation is to find out the value of the unknown, x . A good first step is to get rid of x from one side of the equals sign:

$$\begin{aligned} 7x + 3 &= -74 - 4x \quad \leftarrow \text{Remove the smaller number of } x\text{'s} \\ +4x & \quad +4x \\ 11x + 3 &= -74 \\ \rightarrow -3 & \quad -3 \\ 11x &= -77 \\ \div 11 & \quad \div 11 \\ x &= 7 \end{aligned}$$

Use inverse operations to eliminate terms from one side

YOU DO

Solve

$$3 - 8x = -5 - 4x$$

Solve linear equations with brackets

I do, you do example



Scan for answers

I DO

Solve:

$$-5(x - 3) = 50$$

When solving an equation like this, you can remove the bracket in 1 of 2 ways:

- i) Expand the brackets.
- ii) Divide both sides by the term outside the bracket.

In this example, we will expand the brackets.

$$\begin{aligned} -5(x - 3) &= 50 \\ -5x + 15 &= 50 \quad \leftarrow \text{Now you can rearrange to find } x \\ -15 & \quad -15 \\ -5x &= 35 \\ \div -5 & \quad \div -5 \\ x &= -7 \end{aligned}$$

YOU DO

Solve:

$$3(x + 3) = 33$$

★

Solve
 $x - 0.9 = -1.0$

★★

Solve
 $\frac{x}{5} = 0.8$

★★★

Solve
 $\frac{x - 9}{4} = 0.3$

Solve linear equations (unknown on 1 side, dec ans)

P1 15



Scan for answers



Scan for copilot



Scan for more questions

★★★★

Solve
 $\frac{11 - x}{6} = 0.2$

★★★★★

Solve
 $4(x + 12) = 50$

★

Solve
 $5x = 3x - 12$

★★

Solve
 $5x + 2 = 3x + 14$

★★★

Solve
 $8x + 4 = -8 - 4x$

Solve linear equations (unknown both sides)

P1 15



Scan for answers



Scan for copilot



Scan for more questions

★★★★

Solve
 $10x + 6 = 2(2x - 18)$

★★★★★

I think of a number, I times it by 6 and I add 2. The answer is 2 times my number add 38. What was my number?

★★★★★

Opposite sides of a rectangle are $(8x + 2)$ cm and $(26 - 4x)$ cm in length. Find the length of 1 side

★

Solve:
 $4(x + 5) = 32$

★★

Solve:
 $-6(2x - 7) + 7(x - 4) = 9$

★★★

Solve:
 $18x + 6 = 3(3x + 8)$

Solve linear equations with brackets

Practise questions



Scan for answers



Scan for copilot



Scan for more questions

★★★★

Solve:
 $\frac{1}{3}(8 - 4x) = -6 - 2x$

★★★★★

Solve:
 $2(2x + 5) + 7(7x + 2) = 3(3x + 8)$

★★★★★

Solve:
 $3(2x + 2(5x + 9)) = 6(4x + 5)$

Expand over a single bracket

I do, you do example



Scan for answers



Scan for video

I DO

YOU DO

Expand $3(x + 5)$

Method 1: The claw

Method 2: The grid

x	x	$+5$
3	$3x$	$+15$

$3x^2 + 3x \cdot 5$
 $3x + 15$

Expand $5(x + 4)$

Key point: Every term on the inside of the brackets is multiplied by the term on the outside.

Expand 2 or more binomials

I do, you do example



Scan for answers



Scan for video

I DO

YOU DO

Expand $(x - 8)(x + 3)$

Method 1: The claw

Method 2: The grid

x	x	$+3$
$x - 8$	$x^2 + 3x$	$-8x - 24$

$x^2 + 3x - 8x - 24$
Simplify
 $x^2 - 5x - 24$

Expand $(x - 2)(x + 8)$

Factorise a simple expression

I do, you do example



Scan for answers



Scan for video

I DO

YOU DO

Factorise $8x^2 - 24x$

Factorise $7x^2 + 28x$

Seek the highest common factor of:

$8x^2$ and $-24x$

8 is the HCF of 8 and -24
x is the HCF of x and x^2

The HCF of $8x^2$ and $-24x$ is $8x$

$8x^2 - 24x \equiv 8x(a + b)$

$8x \times a$ must give $8x^2$ so a is x
 $8x \times b$ must give $-24x$ so b is -3

$8x^2 - 24x \equiv 8x(x - 3)$

★

Expand
 $4(x + 3)$

★★

Expand
 $8(3x - 2)$

★★★

Expand
 $-7(6x - 7)$

Expand over a
single bracket

Practise questions



Scan for answers



Scan for copilot



Scan for more
questions

★★★★

Expand
 $5x(4x - 9)$

★★★★★

Expand and simplify
 $7x(6x + 8) + 6x(8x + 4)$

★★★★★

Here is an identity:
 $a(8x + 20) = 56x + 5b$

Find a and b.

★

Expand
 $(x + 4)(x + 4)$

★★

Expand
 $(x - 2)(x - 3)$

★★★

Expand
 $(x + 4)(x - 4)$

Expand 2 or more
binomials

Practise questions



Scan for answers



Scan for copilot



Scan for more
questions

★★★★

Expand
 $(4x + 8)(8x + 3)$

★★★★★

Expand
 $(3x^2 + 3)(5x^3 + 7)$

★★★★★

Expand
 $(x + 8)(x + 8)(x + 7)$

★

Factorise
 $7x + 49$

★★

Factorise
 $5x^2 + 25x$

★★★

Can $10x + 5$ be factorised?

Factorise a simple
expression

Practise questions



Scan for answers



Scan for copilot



Scan for more
questions

★★★★★

A rectangle has an area of $15x + 5$. By fully factorising, give possible dimensions of the rectangle.

★★★★★

Fully factorise
 $4(x + 4) + 4x + 16$

Factorise a quadratic expression

I do, you do example



Scan for answers



Scan for video

I DO

YOU DO

Factorise

$$3x^2 + 10x + 8$$

Diagram showing the quadratic expression with 'a' pointing to $3x^2$, 'c' pointing to 8 , and 'b' pointing to $10x$.

To factorise, you want 2 numbers that multiply together to give ac but add together to give b .

$$ac = 3 \times 8 = 24 \quad b = 10$$

Handwritten notes: 4×6 and $4 + 6$ are shown below the equations, with arrows pointing to the numbers 4 and 6.

Rewrite the problem with b separated into $4x$ and $6x$:

Factorise each half

$$3x^2 + 6x + 4x + 8$$

Must be the same

$$3x(x+2) + 4(x+2)$$

Fully factorise

$$(3x+4)(x+2)$$

Factorise

$$2x^2 + 15x + 25$$

Solve a quadratic by factorising

I do, you do example



Scan for answers



Scan for video

I DO

YOU DO

Solve the following quadratic by factorising:

$$x^2 - 10x + 25 = 0$$

The quadratic is in the form $ax^2 + bx + c$

To factorise a quadratic, think of 2 numbers that multiply to give ac and add to give b :

$$ac = 1 \times 25 = 25 \quad b = -10$$

So -5 and -5 Split b in the quadratic into these 2 numbers

Factorise each side of the green line

$$x^2 - 5x - 5x + 25 = 0$$

$$x(x-5) - 5(x-5) = 0$$

Common bracket

$$(x-5)(x-5) = 0$$

If the product of the 2 brackets is 0, it means 1 or both must equal 0 too:

$$x-5=0 \Rightarrow x=5 \quad x-5=0 \Rightarrow x=5$$

Solve the following quadratic by factorising:

$$x^2 - 9x + 14 = 0$$

Substitute into expressions/formula

I do, you do example



Scan for answers



Scan for video

I DO

YOU DO

If $a = -8$ and $b = 4$, find the value of $7a + 2b$

If $a = 1$ and $b = -4$, find the value of $-3a + 4b$

Substitution in Maths is the act of replacing a letter with a number.

When a letter and number are together, you multiply them

$$7a + 2b$$

Replace b with 4

$$7x - 8 + 2 \times 4$$

$$-56 + 8$$

$$-48$$

★

Factorise
 $x^2 + 12x + 32$

★★

Factorise
 $x^2 - 5x - 14$

★★★

Factorise
 $x^2 - 7x + 10$

★★★★

Factorise
 $x^2 - 36$

★★★★★

Factorise
 $3x^2 + 16x + 16$

★★★★★

Factorise
 $12x^2 + 14x + 4$

Factorise a quadratic expression

Practise questions



Scan for answers



Scan for copilot



Scan for more questions

★

Solve the following quadratic by factorising:
 $x^2 + 10x + 21 = 0$

★★

Solve the following quadratic by factorising:
 $x^2 - 3x - 18 = 0$

★★★

Solve the following quadratic by factorising:
 $x^2 - 9x + 20 = 0$

Solve a quadratic by factorising

Practise questions



Scan for answers



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Scan for more questions

★★★★

Solve the following quadratic by factorising:
 $x^2 - 64 = 0$

★★★★★

Solve the following quadratic by factorising:
 $2x^2 - 13x + 15 = 0$

★★★★★

Solve the following quadratic by factorising:
 $10x^2 + 23x + 12 = 0$

★

If $n = 4$, find the value of
 $4n$

★★

If $n = 2$, find the value of
 $8n + 2$

★★★

If $a = 2$ and $b = 6$, find the value of
 $-4a + 4b$

Substitute into expressions/formula

Practise questions



Scan for answers



Scan for copilot



Scan for more questions

★★★★

If $a = -9$, find the value of
 $a^2 - 3$

★★★★★

$A = \frac{1}{2}(a + b)h$
If $a = 2$, $b = 5$ and $h = 5$,
find A to 1dp.

★★★★★

If $f(x) = -7x + 4$,
calculate $f(5)$

Form expressions and equations

I do, you do example



Scan for answers

I DO

I think of a number (n), I subtract 3 and then multiply it by 6. Write an expression, in terms of n , to represent my number.

Statements like these always provide order that we need to preserve when considering BIDMAS.

- ① I think of a number n
- ② I subtract 3 $n-3$
- ③ multiply by 6 $6(n-3)$

$(n-3)$ is placed in brackets to ensure the subtraction happens before the multiplication.

YOU DO

I think of a number (n), I add 6 and then multiply it by 3. Write an expression, in terms of n , to represent my number.

★
Ashton is 5 years older than Liam. If Ashton is y years old, how old is Liam?

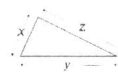
★★
I think of a number (n), I multiply it by 3 and add 2. Write an expression, in terms of n , to represent my number.

★★★
I think of a number (n), I add 2 and then divide it by 4. Write an expression, in terms of n , to represent my number.

★★★★
Steve is y years old. Matt is 2 years older than Steve. Sue is 6 years younger than Steve. Find the sum of their ages.

★★★★★
I think of a number (n), I multiply it by 9 and then add 7. If the answer is my original number subtract 17. What is my number?

★★★★★★
If $x = n + 6$, $y = n - 8$ and $z = 3n + 4$, write a formula for the perimeter, P , in terms of n .



Form expressions and equations

Practise questions



Scan for answers



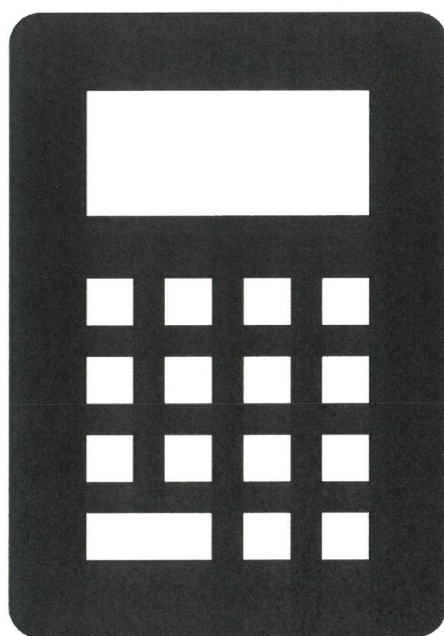
Scan for copilot



Scan for more questions

Mathematics Transition to Year 11

Crossover



Solutions

I DO

YOU DO

Calculate:
 $(5 + 4^2) - 3 \times 3$

In the order that they appear

- B Brackets
- I Indices
- DM Division and multiplication
- AS Addition and subtraction

Apply BIDMAS to answer the brackets first

Brackets $(5 + 4^2) - 3 \times 3$

Brackets $(5 + 16) - 3 \times 3$

Multiplication $21 - 3 \times 3$

Subtraction $21 - 9$

12

Calculate:
 $(2^2 + 3) + 2 \times 2$

$(4 + 3) + 2 \times 2$

$7 + 2 \times 2$

$7 + 4$

11

★ Qu 1

Write down the highest common factor of 36 and 24.

24
 1×24
 2×12
 3×8
 4×6

36
 1×36
 2×18
 3×12
 4×9
 6×6

12 is the HCF.

★ Qu 4

Write down the lowest common multiple of 18 and 5.

$18: 18, 36, 54, 72, 90$
 $5: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90$

90 is the LCM.

★ Qu 2

Write down the lowest common multiple of 7 and 10.

$7: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, \dots$
 $10: 10, 20, 30, 40, 50, 60, 70$

70 is the LCM

★ Qu 5

Write down the highest common factor of 44 and 22.

22
 1×22
 2×11

44
 1×44
 2×22
 4×11

22 is the HCF.

★ Qu 3

Write down the lowest common multiple of 6 and 13.

$6: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78$
 $13: 13, 26, 39, 52, 65, 78$

78 is the LCM.

★ Qu 6

Write down the lowest common multiple of 22 and 8.

$22: 22, 44, 66, 88$
 $8: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88$

88 is the LCM

Prime factors

★

Write down the 4th prime number.

2, 3, 5, 7

↑
4th prime

★★

A number is written as a product of its prime factors as $2^3 \times 7$. Work out the number.

$2 \times 2 \times 2 \times 7$
 14
 28
 56

★★★

Write 45 as a product of primes.

45
 5×9
 3×3

$3 \times 3 \times 5 = 3^2 \times 5$

★★★★

Write 16×2 as a product of primes.

$16 \times 2 = 32$
 $2 \times 2 \times 2 \times 2 \times 2 = 2^5$

★★★★★

Write down the highest common factor of 32 and 52.

$32 = 2 \times 2 \times 2 \times 2 \times 2$
 $52 = 2 \times 2 \times 13$
 $HCF = 2 \times 2 = 4$

★★★★★

Find the smallest number that 27 would need to be multiplied by to give a square number.

$27 = 3 \times 3 \times 3$
 $\text{Square number} = (3 \times 3) \times (3 \times b)$
 $b = 3$

Order of operations

★

Calculate:
 $3 \times 6 - 2$

$18 - 2$
 16

★★

Calculate:
 $5 \times (11 - 2 \times 5)$

$5 \times (11 - 10)$
 5×1
 5

★★★

Calculate:
 $(3 + 5)^2 - 2$

$8^2 - 2$
 $64 - 2$
 62

★★★★

Calculate:
 $(5^2 + 2) + 3 \times 2$

$(25 + 2) + 3 \times 2$
 $27 + 3 \times 2$
 $27 + 6$
 33

★★★★★

Calculate:
 $8 + 16 \div 3$

Evaluate numerator and denominator separately

$2 + 2$

$\frac{8 + 48}{2 + 2} = \frac{56}{4} = 14$

★★★★★

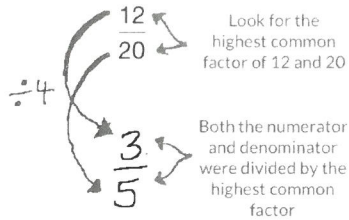
Insert brackets to make this calculation correct:
 $2 + 3 - 3^2 = 4$

$(2 + 3 - 3)^2$
 $2^2 = 4 \checkmark$

Equivalent fractions

I do, you do example

Simplify the following fraction:

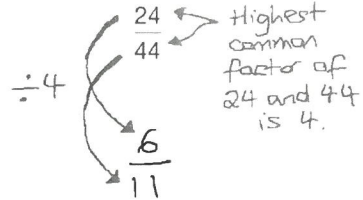


Key notes:

The highest common factor is the highest number that goes into 2 or more numbers without a remainder.

Both the numerator and denominator are divided by the common factor to keep the fraction equivalent (equal).

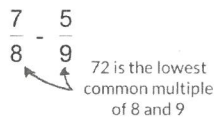
Simplify the following fraction:



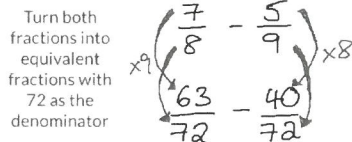
Add or subtract fractions

I do, you do example

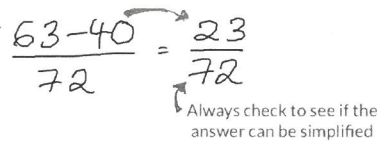
Calculate:



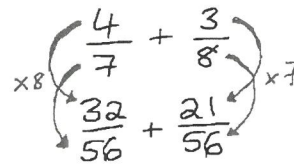
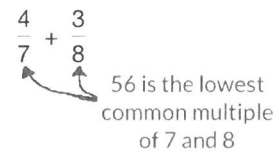
To add or subtract fractions, we must first have common denominators



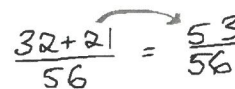
Operate with the numerators:



Calculate:



Operate with the numerators

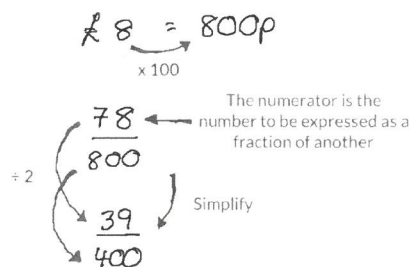


Write one number as a fraction of another

I do, you do example

Express 78p as a fraction of £8. Give your answer in its simplest form.

Before writing one number as a fraction of another, ensure the units are the same.



Express 42p as a fraction of £4. Give your answer in its simplest form.

$$£4 = 400p$$

$$\frac{42}{400} = \frac{21}{200}$$

★ Qu 1

Simplify the following fraction:

$$\frac{20}{28} \div 4 = \frac{5}{7}$$

★ Qu 2

Simplify the following fraction:

$$\frac{35}{55} \div 5 = \frac{7}{11}$$

★ Qu 3

Simplify the following fraction:

$$\frac{10}{26} \div 2 = \frac{5}{13}$$

★ Qu 4

Simplify the following fraction:

$$\frac{24}{42} \div 6 = \frac{4}{7}$$

★ Qu 5

Simplify the following fraction:

$$\frac{20}{130} \div 10 = \frac{2}{13}$$

★ Qu 6

Simplify the following fraction:

$$\frac{54}{78} \div 6 = \frac{9}{13}$$

★

Calculate:

Already has a common denominator

$$\frac{6}{7} - \frac{2}{7} = \frac{6-2}{7} = \frac{4}{7}$$

★★

Calculate:

Lowest common multiple is 6

$$\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{3+2}{6} = \frac{5}{6}$$

★★★

Calculate:

Lowest common multiple is 6

$$\frac{1}{3} + \frac{5}{6} - \frac{1}{2} = \frac{2}{6} + \frac{5}{6} - \frac{3}{6} = \frac{2+5-3}{6} = \frac{4}{6} = \frac{2}{3}$$

Add or subtract fractions

★★★★

Calculate:

Lowest common multiple is 21

$$6\frac{2}{3} - 3\frac{2}{7} = 6\frac{14}{21} - 3\frac{6}{21} = (6-3)\frac{14-6}{21} = 3\frac{8}{21}$$

★★★★★

Calculate:

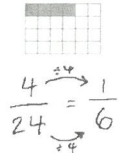
Lowest common multiple is ah

$$\frac{d}{a} + \frac{g}{h} = \frac{dh}{ah} + \frac{ga}{ah} = \frac{dh+ga}{ah}$$

★

Write the number of squares shaded as a fraction of the total

Give your answer in its simplest form.



★★

Write 24 as a fraction of 75.

Give your answer in its simplest form.

$$\frac{24}{75} \div 3 = \frac{8}{25} \div 5 = \frac{8}{125}$$

★★★

In a test out of 75 marks, Nat got 50 marks wrong. Write the number of marks that she got right as a fraction of the total.

Give your answer in its simplest form.

$$75 - 50 = 25$$

$$\frac{25}{75} = \frac{1}{3}$$

Write one number as a fraction of another

★★★★

Express 48cm as a fraction of 11m.

Give your answer in its simplest form.

$$11\text{m} = 1100\text{cm}$$

$$\frac{48}{1100} = \frac{12}{275}$$

★★★★★

$$54 - 13 - 23 = 18$$

$$\frac{18}{54} = \frac{1}{3}$$

★★★★★

The fraction below is equivalent to the fraction of shaded squares. Find the value of b.

$$\frac{5}{6} = \frac{b}{30} \quad b = 25$$

$$\frac{10}{12} = \frac{5}{6} \rightarrow$$

Fraction of an amount (part ii)

I do, you do example

Find $\frac{3}{4}$ of 44

To find a fraction of an amount, divide the number by the denominator and multiply by the numerator.

$$44 \div 4 \times 3$$

$$= 11 \times 3$$

$$= 33$$

I DO

YOU DO

Find $\frac{3}{10}$ of 30

$$30 \div 10 \times 3$$

$$= 3 \times 3$$

$$= 9$$

Multiply or divide fractions

I do, you do example

Calculate:

Whenever you multiply fractions, multiply the numerators together and multiply the denominators

Find the reciprocal of the second fraction

Note: common factor of 7

Simplify where possible

$$\frac{7}{9} \times \frac{7}{8}$$

$$\frac{7 \times 8}{9 \times 7} = \frac{56}{63}$$

$$= \frac{8}{9}$$

I DO

YOU DO

Calculate:

Times the tops

Times the bottoms

Simplify

$$\frac{4}{9} \times \frac{3}{8}$$

$$\frac{4 \times 3}{9 \times 8} = \frac{12}{72}$$

$$= \frac{1}{6}$$

FDP conversion

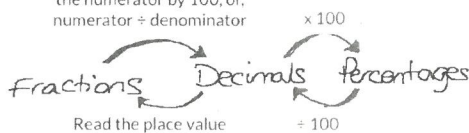
I do, you do example

Order the following numbers from smallest to largest:

$$\frac{47}{50}, 0.39, 28\%$$

To order or compare numbers, they first need to be the same number type:

Convert to an equivalent fraction over 100 then divide the numerator by 100, or, numerator \div denominator



$$\frac{47}{50} = \frac{94}{100} = 0.94, 0.39, 28 \div 100 = 0.28$$

$$0.28, 0.39, 0.94 \rightarrow 28\%, 0.39, \frac{47}{50}$$

Reorder the originals

I DO

YOU DO

Order the following numbers from smallest to largest:

$$\frac{183}{1000}, 0.68, 24\%$$

① $183 \div 1000 = 0.183$

② 0.68

③ 0.24

Converted all of the numbers to decimals

Decimals in order:
 $0.183, 0.24, 0.68$

Original numbers in order:
 $\frac{183}{1000}, 24\%, 0.68$

Fraction of an amount (part ii)

★
Find $\frac{1}{5}$ of 70
 $70 \div 5 \times 1$
 $= 14 \times 1$
 $= 14$

★★
Find $\frac{10}{11}$ of 121
 $121 \div 11 \times 10$
 $= 11 \times 10$
 $= 110$

★★★
Find $2\frac{2}{3}$ of 24
Method 1
 $\frac{8}{3}$ of 24
 $24 \div 3 \times 8$
 $= 8 \times 8$
 $= 64$
since we have $\frac{2}{3}$ and $\frac{2}{3}$
Method 2
 $\frac{2}{3}$ of 24
 $24 \div 3 \times 2$
 $= 8 \times 2$
 $= 16$
 $2 \times 24 + 16$
 $48 + 16 = 64$

★★★★
Decrease 33 by $\frac{6}{11}$
Find $\frac{6}{11}$ of 33
 $33 \div 11 \times 6$
 $= 3 \times 6 = 18$
So, $33 - 18 = 15$

★★★★★
Ruth had £120, from this:
 $\frac{1}{5}$ was spent on food,
 $120 \div 5 \times 1 = 24$
 $\frac{3}{8}$ on rent and bills.
 $120 \div 8 \times 3 = 45$
How much does Ruth have left?
 $120 - 24 - 45 = \pounds 51$

★★★★★
What number is $\frac{5}{12}$ of the way between 38 and 65?
 $65 - 38 = 27$
 $\frac{5}{12}$ of 27
 $= 27 \div 12 \times 5 = 11.25$
 $38 + 11.25 = 49.25$

Multiply or divide fractions

★
Fill in the missing blanks:
 $\frac{2}{3} \times \frac{\square}{\square} = 1$
Find the reciprocal
 $= \frac{2}{3} \times \frac{3}{2}$
 $= \frac{2 \times 3}{3 \times 2} = \frac{6}{6} = 1$

★★
Calculate:
Write any integers over 1 in a fractions problem
 $9 \div \frac{4}{5}$
 $= \frac{9}{1} \div \frac{4}{5}$
 $= \frac{9}{1} \times \frac{5}{4}$
 $= \frac{9 \times 5}{1 \times 4} = \frac{45}{4} = 11\frac{1}{4}$

★★★
Calculate:
 $\frac{2}{5} \div \frac{1}{2}$
 $= \frac{2}{5} \times \frac{2}{1}$
 $= \frac{2 \times 2}{5 \times 1}$
 $= \frac{4}{5}$

★★★★
Calculate: Cancel down fractions
 $\frac{5}{7} \times \frac{5}{6} \div \frac{3}{4}$
 $= \frac{5}{7} \times \frac{5}{6} \times \frac{4}{3}$
 $= \frac{5 \times 5 \times 2}{7 \times 3 \times 3} = \frac{50}{63}$

★★★★★
Calculate: Convert mixed numbers to improper fractions
 $5\frac{7}{8} \div 3\frac{4}{7}$
 $= \frac{47}{8} \div \frac{25}{7}$
 $= \frac{47}{8} \times \frac{7}{25} = \frac{329}{200}$
 $= 1\frac{129}{200}$

★★★★★
Calculate:
 $\frac{c}{g} \times \frac{e}{h}$
 $= \frac{ce}{gh}$

FDP conversion

★ Qu 1
Are the following equal?
0.3 and $\frac{43}{50}$
 $43 \div 50$
 $0.3 \neq 0.86$
Not equal

★ Qu 2
Are the following equal?
0.77 and $\frac{77}{100}$
77 hundredths
 $\frac{77}{100} = \frac{77}{100}$
Equal

★ Qu 3
Are the following equal?
51% and $\frac{9}{20}$
Multiply both numerator and denominator by 5
 $51\% \neq \frac{45}{100}$ out of 100
 $51\% \neq 45\%$
Not equal

★ Qu 4
Are the following equal?
0.15 and $\frac{73}{500}$
 $73 \div 500$
 $0.15 \neq 0.146$
Not equal

★ Qu 5
Are the following equal?
61% and $\frac{61}{100}$
% means out of 100
 $\frac{61}{100} = \frac{61}{100}$

★ Qu 6
Are the following equal?
0.98 and $\frac{49}{50}$
multiply both numerator and denominator by 2
 $0.98 = \frac{98}{100}$
 $98 \div 100$
 $0.98 = 0.98$
Equal

Order numbers

I do, you do example

Order the following from smallest to largest:

0.038, 0.094, 0.41, 0.076, 8.4, 0.16

First thing to do is write each of the numbers in a place value grid:

	u.	t	h	th	
⑥	0	0	3	8	Fill in the gaps with 0s if it makes it easier
④	0	0	9	4	
②	0	4	1	0	This is the second largest since it has 0 units like the other numbers but the tenths column contains the larger number
⑤	0	0	7	6	
①	8	4	0	0	This is the largest number since it has the largest units number
③	0	1	6	0	

Having used the place value columns to order from largest to smallest, reverse the order:

0.038, 0.076, 0.094, 0.16, 0.41, 8.4

I DO

YOU DO

Order the following from smallest to largest:

2.4, 0.036, 0.051, 7.4, 0.31, 0.095

	u.	t	h	th
②	2	4	0	0
⑥	0	0	3	6
⑤	0	0	5	1
①	7	4	0	0
③	0	3	1	0
④	0	0	9	5

0.036, 0.051, 0.095, 0.31, 2.4, 7.4

Operate with integers (+ and -)

Fact sheet

Operate with integers (x and ÷)

Fact sheet

Order numbers

★

Order the following from smallest to largest:
55, 25, 41, 62, 54, 76

T U
5 5 ③
2 5 ⑥ 25, 41, 54,
4 1 ⑤ 55, 62, 76
6 2 ②
5 4 ④
7 6 ①

★★

Order the following from smallest to largest:
57, 96, 30, -4, -93, -13

② ① ③ ④ ⑥ ⑤
-93, -13, -4, 30, 57, 96

★★★

Order the following from smallest to largest:
0.49, 0.065, 0.091, 0.087, 0.51, 4.2

U. t h th
③ 0.490 0.065
⑥ 0.065 0.087
④ 0.091 0.091
⑤ 0.087 0.49
② 0.510 0.51
① 4.200 4.2

★★★★

Order the following from smallest to largest:
 $\frac{17}{50}$, 0.78, 19%

Convert it all to the same number type
④ 0.34, ① 0.78, ③ 0.19 then order
19%, $\frac{17}{50}$, 0.78

★★★★★

Order the following from smallest to largest:
 $\frac{13}{20}$, $\frac{71}{100}$, $\frac{3}{50}$, $\frac{8}{25}$

Convert all the denominators to be the same or convert each fraction into a decimal before ordering
 $\frac{65}{100}$, $\frac{71}{100}$, $\frac{6}{100}$, $\frac{32}{100}$
 $\frac{6}{50}$, $\frac{8}{25}$, $\frac{13}{20}$, $\frac{71}{100}$ ← Make sure you write the originals in order not your converted fractions

6★ Qu 1

What is $1 - (-7)$?

8

6★ Qu 2

What is $5 - (-8)$?

13

6★ Qu 3

What is $(-9) + 2$?

-7

Operate with integers (+ and -)

6★ Qu 4

What is $(-4) - 6$?

-10

6★ Qu 5

What is $(-9) - (-2)$?

-7

6★ Qu 6

What is $(-1) + (-9)$?

-10

6★ Qu 1

What is $(-3) \times (-3)$?

If $3 \times 3 = 9$
then $3 \times -3 = -9$
then $-3 \times -3 = 9$

6★ Qu 2

What is $(-3) \times 5$?

If $3 \times 5 = 15$
then $-3 \times 5 = -15$

6★ Qu 3

What is $1 \times (-3)$?

If $1 \times 3 = 3$
then $1 \times -3 = -3$

Operate with integers (x and ÷)

6★ Qu 4

What is $40 \div (-5)$?

If $40 \div 5 = 8$
then $40 \div -5 = -8$

6★ Qu 5

What is $2 \times (-7)$?

If $2 \times 7 = 14$
then $2 \times -7 = -14$

6★ Qu 6

What is $(-14) \div 2$?

If $14 \div 2 = 7$
then $-14 \div 2 = -7$

Column multiplication

I do, you do example

I DO

Calculate:
299 x 32

$$\begin{array}{r} 299 \\ \times 32 \\ \hline 598 \\ 8970 \\ \hline 9568 \end{array}$$

299 x 2 →

$$\begin{array}{r} 299 \\ \times 30 \\ \hline 8970 \\ 8970 \\ \hline 9568 \end{array}$$

0 place holder since we are multiplying by 30 not 3

Find the sum of the 2 calculations

YOU DO

Calculate:
409 x 31

$$\begin{array}{r} 409 \\ \times 31 \\ \hline 409 \\ 12270 \\ \hline 12679 \end{array}$$

Short division

I do, you do example

I DO

Calculate:
396 ÷ 5

Place the number you are dividing inside the bus stop and the other on the outside:

$$\begin{array}{r} 0 \\ 5 \overline{) 396} \\ \underline{30} \\ 96 \\ \underline{90} \\ 60 \\ \underline{50} \\ 100 \\ \underline{100} \\ 0 \end{array}$$

See how many times 5 goes into 3 and write the answer above 3. Any remainder is passed onto the 9.

$$\begin{array}{r} 07 \\ 5 \overline{) 396} \\ \underline{35} \\ 496 \\ \underline{35} \\ 146 \\ \underline{140} \\ 60 \\ \underline{50} \\ 100 \\ \underline{100} \\ 0 \end{array}$$

See how many times 5 goes into 39. 5 x 7 is 35, so 7 goes on top and there are 4 left to carry onto the 6.

$$\begin{array}{r} 079. \\ 5 \overline{) 396.0} \\ \underline{30} \\ 960 \\ \underline{90} \\ 600 \\ \underline{50} \\ 1000 \\ \underline{1000} \\ 0 \end{array}$$

5 goes into 46 9 times, with 1 left over. The remainder goes on a zero after the decimal point.

$$\begin{array}{r} 079.2 \\ 5 \overline{) 396.0} \\ \underline{30} \\ 960 \\ \underline{90} \\ 600 \\ \underline{50} \\ 1000 \\ \underline{1000} \\ 0 \end{array}$$

5 goes into 10 exactly 2 times. The method stops as we have reached the end of the number and there is no remainder.

YOU DO

Calculate:
147 ÷ 6

$$\begin{array}{r} 024.5 \\ 6 \overline{) 147.30} \\ \underline{6} \\ 87 \\ \underline{72} \\ 150 \\ \underline{120} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

Operate with decimals (+ and -)

I do, you do example

I DO

Calculate:
7.58 + 0.566

When you add or subtract decimals, you can use the column method. When using the method, ensure the decimals are correctly aligned in their place value columns.

$$\begin{array}{r} 7.580 \\ + 0.566 \\ \hline 8.146 \end{array}$$

0's can be used to fill empty place value holders

YOU DO

Calculate:
4.87 - 0.475

$$\begin{array}{r} 4.870 \\ - 0.475 \\ \hline 4.395 \end{array}$$

Column multiplication

★
Calculate:
 73×2

$$\begin{array}{r} 73 \\ \times 2 \\ \hline 146 \end{array}$$

★★
Calculate:
 73×44

$$\begin{array}{r} 73 \\ \times 44 \\ \hline 292 \\ 2920 \\ \hline 3212 \end{array}$$

★★★
Calculate:
 379×26

$$\begin{array}{r} 379 \\ \times 26 \\ \hline 2274 \\ 7580 \\ \hline 9854 \end{array}$$

★★★★
Fill in the missing number:

$$\begin{array}{r} 1 \boxed{4} 4 \\ \times 21 \\ \hline 2880 \\ 3024 \end{array}$$

★★★★★
Calculate:
 711×406

$$\begin{array}{r} 711 \\ \times 406 \\ \hline 4266 \\ 000 \\ 284400 \\ \hline 288666 \end{array}$$

Short division

★
Calculate:
 $42 \div 7$

6

★★
Calculate:
 $225 \div 9$

$$\begin{array}{r} 025 \\ 9 \overline{) 225} \\ \underline{18} \\ 45 \\ \underline{45} \\ 0 \end{array}$$

★★★
Complete the following division calculation:

$$\begin{array}{r} 047 \\ 6 \overline{) 284} \\ \underline{12} \\ 16 \\ \underline{12} \\ 40 \\ \underline{36} \\ 40 \end{array}$$

★★★★
Calculate:
 $354 \div 5$

$$\begin{array}{r} 070.8 \\ 5 \overline{) 354.0} \\ \underline{15} \\ 20 \\ \underline{20} \\ 00 \\ \underline{00} \\ 00 \end{array}$$

★★★★★
Calculate:
 $341.4 \div 12$

$$\begin{array}{r} 028.45 \\ 12 \overline{) 341.40} \\ \underline{24} \\ 10 \\ \underline{12} \\ 84 \\ \underline{84} \\ 00 \\ \underline{00} \\ 00 \end{array}$$

★★★★★
Calculate:
 $177 \div 0.6$

Get the dividing number to be an integer

$$\frac{177}{0.6} = \frac{1770}{6}$$

$$\begin{array}{r} 0295 \\ 6 \overline{) 1770} \\ \underline{12} \\ 57 \\ \underline{54} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

Operate with decimals (+ and -)

★
Calculate:
 $0.4 + 2$

$$\begin{array}{r} 0.4 \\ + 2.0 \\ \hline 2.4 \end{array}$$

★★
Calculate:
 $8 - 0.4$

$$\begin{array}{r} 8.0 \\ - 0.4 \\ \hline 7.6 \end{array}$$

★★★
Calculate:
 $0.8 + 0.4$

$$\begin{array}{r} 0.8 \\ + 0.4 \\ \hline 1.2 \end{array}$$

★★★★
Calculate:
 $3.5 + 2.4$

$$\begin{array}{r} 3.5 \\ + 2.4 \\ \hline 5.9 \end{array}$$

★★★★★
Calculate:
 $4.51 + 0.726$

$$\begin{array}{r} 4.510 \\ + 0.726 \\ \hline 5.236 \end{array}$$

★★★★★
Calculate:
 $0.853 - 0.01$

$$\begin{array}{r} 0.853 = 0.853853... \\ - 0.010000 \\ \hline 0.843853 \end{array}$$

Money problems

I do, you do
example

I DO

A shop lists for sale:
🍏 76p, 🥥 56p, 🍌 £0.84

How much (in £) does it cost to buy 4 🥥
and 2 🍏?

When adding or subtracting any form of
number, it is important to ensure they are
measured in the same unit (e.g. £).

Apple: £0.76 Coconut: £0.56
Banana: £0.84

$$4 \times \text{coconut} = 4 \times 0.56 = \pounds 2.24$$

$$2 \times \text{apple} = 2 \times 0.76 = \pounds 1.52$$

$$\text{Total} = \begin{array}{r} 2.24 \\ + 1.52 \\ \hline \pounds 3.76 \end{array}$$

YOU DO

A shop lists for sale:
🍏 £0.31, 🍏 £0.37, 🍒 72p

How much (in £) does it cost to buy 3 🍏
and 2 🍒?

Apple = £0.37 Cherries = £0.72

$$3 \times \text{apple} = 3 \times 0.37 = \pounds 1.11$$

$$2 \times \text{cherries} = 2 \times 0.72 = \pounds 1.44$$

$$\text{Total} = \begin{array}{r} 1.11 \\ + 1.44 \\ \hline \pounds 2.55 \end{array}$$

Percentage of an
amount

I do, you do
example

I DO

Calculate:

39% of 50

Non-calculator
technique

Calculator
technique

If 100% is 50
÷10 → 10% is 5
÷10 → 1% is 0.5
5% is 2.5

39% is 10% × 4 - 1%
So, 5 × 4 - 0.5
19.5

39% as a
decimal

$$0.39 \times 50 = 19.5$$

Key note:
You can use this
technique
without a
calculator too

YOU DO

Calculate:

73% of 80

Non-calculator
technique

If 100% is 80
10% is 8
1% is 0.8
5% is 4

73% is 10% × 7 + 1% × 3
So, 8 × 7 + 0.8 × 3
56 + 2.4
58.4

Calculator
technique

$$0.73 \times 80 = 58.4$$

Operate with decimals (x and ÷)

Calculate:
3.4 x 100

340

Calculate:
2.1 ÷ 1000

0.0021

Calculate:
2.6 x 6

26 x 6 ÷ 10

$$\begin{array}{r} 26 \\ \times 6 \\ \hline 156 \end{array}$$

156 ÷ 10 = 15.6

Calculate:

0.49 ÷ 0.7

$$\frac{0.49}{0.7} = \frac{4.9}{7} = 0.7$$

Calculate:

0.1 x 0.001

1 ÷ 10 → 0.1
1 ÷ 1000 → 0.001
1 x 1 ÷ 10 ÷ 1000
1 ÷ 10 ÷ 1000
0.1 ÷ 1000
0.0001

23
x 42

46
920

966

966 ÷ 10 ÷ 10 = 9.66
Area = 1/2 x 9.66 x 4.83 = 23.1966

A shop lists items for sale:

£0.56, £0.35, £0.19

How much does it cost to buy 1 and 1?

$$\begin{array}{r} 0.56 \\ + 0.35 \\ \hline \pounds 0.91 \end{array}$$

A shop lists for sale:

£0.69, £0.43, £0.80

How much does it cost to buy 3 and 3?

$$\begin{array}{r} 3 \times 0.43 = 1.29 \\ 3 \times 0.80 = 2.40 \\ \hline \pounds 3.69 \end{array}$$

A shop lists for sale:

£0.83, 15p, 13p
£0.15, £0.13

How much (in £) does it cost to buy 5 and 3?

$$\begin{array}{r} 5 \times 0.18 = 0.65 \\ 3 \times 0.15 = 0.45 \\ \hline \pounds 1.10 \end{array}$$

A shop lists for sale:

£0.72, 46p, 75p
£1.84 + £1.50 = £3.34

If I buy 2 and 4, how much change (in £) do I get from £10?

10 - 3.34 = £6.66

A shop lists for sale:

£0.63, £0.59, 41p

10 ÷ 0.59 = 16.94915254

What is the maximum number of that I can buy with £10?

So 16

A shop lists for sale:

22p, £0.30, 74p
£0.88 + £2.96 = £3.84

If I buy 4 and 4, what percentage (to 1dp) of the total does the 4 represent?

2.96 ÷ 3.84 × 100 ≈ 77.1%

Money problems

Calculate:
70% of 60

0.7 x 60

42

Calculate:
35% of 20

0.35 x 20

7

Calculate:
89% of 70

0.89 x 70

62.3

Percentage of an amount

When finding a percentage of an amount on a calculator, explain the following:

20 x 0.53

Same as 53% of 20

Calculate:
15.5% of 50

0.155 x 50

7.75

150 students either walk or bus to school. 54% of students walk. 40% of the boys take the bus.

B	W	Total
12	48	60
57	33	90
Total	69	150

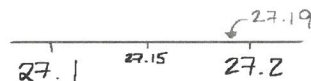
total set up a two-way table to solve

Basic rules of rounding (inc dp and bounds)

I do, you do example

Round 27.19 to 1 decimal place.

Rounding to 1 decimal place means we want our answer to have only 1 number after the decimal point.



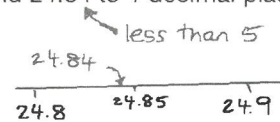
As can be seen by the number line, 27.19 is closer to 27.2 than 27.1. Any number greater than or equal to 27.15 (the half way mark) would round to 27.2. Anything lower would round to 27.1.

When rounding to 1 decimal place, look at the number in the 2nd decimal place to decide whether we round up or not. 5 or more rounds up, less than 5 rounds down.

I DO

YOU DO

Round 24.84 to 1 decimal place.



24.84 rounds to 24.8

Squares, cubes and roots

6★ Qu 1
What is $5^3 - \sqrt{81}$?
 $= 125 - 9$
 $= 116$

6★ Qu 2
What is $4^3 - \sqrt{49}$?
 $= 64 - 7$
 $= 57$

6★ Qu 3
What is $2^3 - \sqrt{144}$?
 $= 8 - 12$
 $= -4$

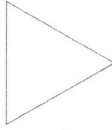
6★ Qu 4
What is $\sqrt[3]{8} + 5^2$?
 $= 2 + 25$
 $= 27$

6★ Qu 5
What is $2^3 - \sqrt{100}$?
 $= 8 - 10$
 $= -2$

6★ Qu 6
What is $\sqrt[3]{64} + 4^2$?
 $= 4 + 16$
 $= 20$

Names and properties of polygons


★
Name the polygon family that the following shape belongs to:



Triangle

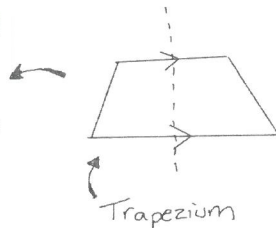
★★
I am a 8 sided shape. All of my sides and all of my angles are equal. What am I called?
 Regular octagon

★★★
Give the correct Mathematical name for the following shape:



Rhombus

★★★★
I am 4 sided shape. I have 1 pair of parallel sides. I have no right angles. I have only 1 line of symmetry. What shape am I?



Basic rules of rounding (inc dp and bounds)

1★ Qu 1
Round 99.89 to 1 decimal place.
 99.89 (more than 5)
 So rounds to 99.9

1★ Qu 2
Round 50.11 to 1 decimal place.
 50.11 (less than 5)
 So rounds to 50.1

1★ Qu 3
Round 54.81 to 1 decimal place.
 54.81 (less than 5)
 So rounds to 54.8

5★ Qu 4
Round 7.675 to 2 decimal places.
 7.675 (5 or more)
 So rounds to 7.68

5★ Qu 5
Round 4.603 to 2 decimal places.
 4.603 (less than 5)
 So rounds to 4.60

5★ Qu 6
Round 8.538 to 2 decimal places.
 8.538 (more than 5)
 So rounds to 8.54