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Final Push Maths 2

Foundation Paper Revision

Answers

NUMBER OPERATIONS: LONG MULTIPLICATION AND LONG DIVISION

1 3.943 × 6.7

26.4181

3·943
6·7×
27'6'0²1
23⁵6'5'80
26'4'181

2 8.59 × 0.024

8·59
0·024×
3'43'6
17'1'80
0·20'6'16

0·20616

3 2683.2 ÷ 43

÷ × − ↓

62·4

62·4
43|2683·2
−258↓
103
−86
172
172
0

1	43	6	258
2	86	7	301
3	129	8	344
4	172	9	387
5	215	10	430

4 84206.4 ÷ 48

1754·3
48|84206·4
−48↓
362
−336↓
260
−240↓
206
−192↓
144
144
0

1754·3

1	48
2	96
3	144
4	192
5	240
6	288
7	336
8	384
9	432
10	480

VECTORS

1 $\boldsymbol{a} = \begin{pmatrix} 7 \\ -5 \end{pmatrix}$ $\boldsymbol{b} = \begin{pmatrix} 3 \\ 9 \end{pmatrix}$

Find the solution to 4**a** + 3**b**

$$4\begin{pmatrix} 7 \\ -5 \end{pmatrix} + 3\begin{pmatrix} 3 \\ 9 \end{pmatrix} = \begin{pmatrix} 28 \\ -20 \end{pmatrix} + \begin{pmatrix} 9 \\ 27 \end{pmatrix} = \begin{pmatrix} 37 \\ 7 \end{pmatrix}$$

2 $\boldsymbol{a} = \begin{pmatrix} 12 \\ 7 \end{pmatrix}$ $\boldsymbol{b} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}$

Find the solution to 3**a** - **b**

$$3\begin{pmatrix} 12 \\ 7 \end{pmatrix} - \begin{pmatrix} -4 \\ 6 \end{pmatrix} = \begin{pmatrix} 36 \\ 21 \end{pmatrix} - \begin{pmatrix} -4 \\ 6 \end{pmatrix} = \begin{pmatrix} 40 \\ 15 \end{pmatrix}$$

3 $\boldsymbol{a} = \begin{pmatrix} 9 \\ 8 \end{pmatrix}$ $\boldsymbol{b} = \begin{pmatrix} 11 \\ -2 \end{pmatrix}$

Find the solution to 8**a** + 7**b**

$$8\begin{pmatrix} 9 \\ 8 \end{pmatrix} + 7\begin{pmatrix} 11 \\ -2 \end{pmatrix} = \begin{pmatrix} 72 \\ 64 \end{pmatrix} + \begin{pmatrix} 77 \\ -14 \end{pmatrix} = \begin{pmatrix} 149 \\ 50 \end{pmatrix}$$

BEST BUYS

1 Barnaby sells 8 chocolate bars for £3.40. Juliet sells 5 chocolate bars for £2.20.
Who provides the best value for money?

Barnaby: $8\overline{)3.40}$ $= 0.425$ Julie: $5\overline{)2.20}$ $= 0.44$

Barnaby provides the best value as $0.425 < 0.44$

2 Three taxi companies operate in a town. Their prices are as follows:

Cars n Cabs	ABC Carriages	Green Taxis
Collection £1.95	Collection £1.60	Collection £4.00
28p per mile	31p per mile	17p per mile

David wants to travel 17 miles.
Which company offers the cheapest price?

Cabs n Cars
$1.95 + (0.28 \times 17) = 1.95 + 4.76$
$= 6.71$

Green Taxis
$4.00 + (0.17 \times 17) = 6.89$

ABC Carriages $1.60 + (0.31 \times 17) = 1.60 + 5.27$
$= 6.87$

3 A bag costs £95 in a shop. Online, the same bag can be purchased for $135 plus $12 postage and packaging.
The exchange rate is £1.00 : $1.48.
Where is the best place to buy the bag?

$135 + 12 = 147$

$\times 1.48$ ~~1.90 : 147~~ 1.48

$\div 1.48$ (1.48 : 147 → 1.00 : 99.3243...) $\div 1.48$

Buy the bag in the shop for £95 as it is £4.32 cheaper.

EXPANDING AND FACTORISING

1 Expand $5(3x + 9)$

	$3x$	$+9$
5	$15x$	$+45$

$5(3x+9) = 15x + 45$

2 Expand $6x(8x - 12)$

	$8x$	-12
$6x$	$48x^2$	$-72x$

$6x(8x-12) = 48x^2 - 72x$

3 Expand and simplify $(7x - 5)(3x - 6)$

	$3x$	-6
$7x$	$21x^2$	$-42x$
-5	$-15x$	$+30$

$(7x-5)(3x-6) = 21x^2 - 57x + 30$

4 Factorise $9x^3 + 24x^2$

$3 \times 3 \times x \times x \times x$

$3 \times 2 \times 2 \times 2 \times x \times x$

$3x^2(3x + 8)$

5 Factorise $45x^2 - 36x$

$3 \times 3 \times 5 \times x \times x$

$2 \times 2 \times 3 \times 3 \times x$

$9x(5x - 4)$

6 Expand and simplify $7(6x + 5) - 3(5x - 4)$

	$6x$	$+5$
7	$42x$	$+35$

	$5x$	-4
3	$15x$	-12

$42x + 35 - (15x - 12) = 42x + 35 - 15x + 12$

$= 27x + 47$

SIMLUTANEOUS EQUATIONS

1 Solve for x and y.

$5x + 3y = 73$ — i
$12x - 5y = 41$ — ii

Multiply i x 12, ii x 5

$60x + 36y = 876$ — iii
$60x - 25y = 205$ — iv

Subtract iii - iv

$61y = 671$

$\therefore y = 11$

Substitute in (i)

$5x + 3(11) = 73$

$5x = 40$

$x = 8$

Check in (ii)

$12(8) - 5(11) = 96 - 55 = 41$ ✓

2 Solve for x and y.

$9w + 2v = 122$ — (i)
$4w - 3v = 27$ — (ii)

Multiply (i) x 3, (ii) x 2

$27w + 6v = 366$ — (iii)
$8w - 6v = 54$ — (iv)

Add (iii) + (iv)

$35w = 420$

$w = 12$

Substitute in (i)

$9(12) + 2v = 122$

$2v = 122 - 108$

$= 14$

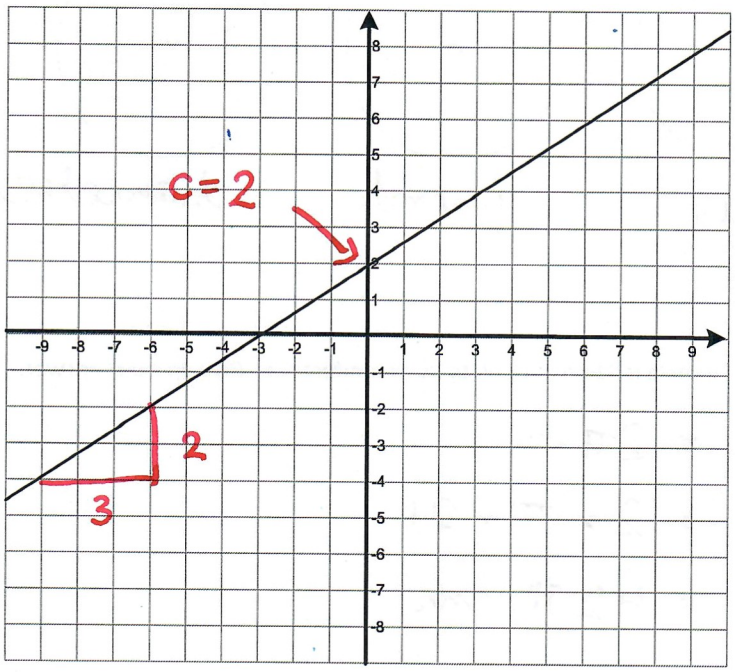
$\therefore v = 7$

Check in (ii)

$4w - 3v = 4(12) - 3(7) = 48 - 21 = 27$ ✓

GRAPHS

1 L is a line segment shown on the graph below.
Write down the equation for line L.



$m = \frac{\text{rise}}{\text{run}} = \frac{2}{3}$ $\quad y = mx + c$

$\therefore y = \frac{2}{3}x + 2$

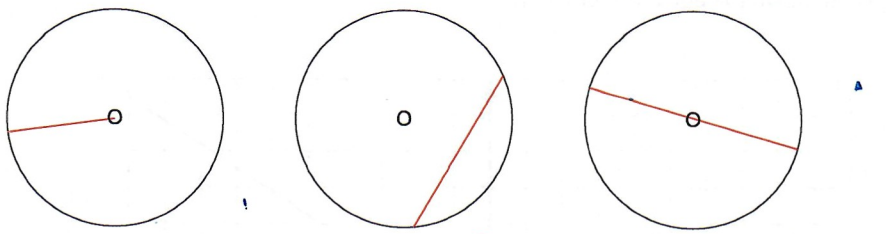
2 Fill the missing values into the table below for the graph $y = x^2 + x - 5$ in the range $-3 \leq x \leq 3$.

x	-3	-2	-1	0	1	2	3
y	1	-3	-5	-5	-3	1	7

x^2	9	4	1	0	1	4	9
$x^2 + x$	6	2	0	0	2	6	12
$x^2 + x - 5$	1	-3	-5	-5	-3	1	7

CIRCLES

1 Name the lines shown on these circles in red.



radius Chord diameter

2 The radius of a circle is 21cm. Calculate its circumference. Give an exact answer.

$C = 2\pi r$

$= 2 \times \pi \times 21$

$= 42\pi$ cm

3 The diameter of a circle is 54cm. Calculate its area giving the answer correct to 3 significant figures.

$A = \pi r^2$ $\quad r = \frac{d}{2} = \frac{54}{2} = 27$

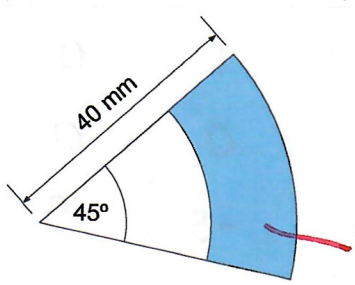
$= \pi \times 27^2$

$= 729\pi \text{ cm}^2$ (Exact answer)

$= 729 \times 3.141592654$

$\approx 2290.221044 \text{ cm}^2 \approx 2290 \text{ cm}^2$ to 3 sig figs

4 What is the area of the shaded section in the diagram below when the ratio of the unshaded to total radius is 3:5?



5 is total so $\frac{40}{5} = 8$

Area $= \pi r^2 \times \frac{45}{360}$

$= 24^2\pi \times \frac{1}{8} = \frac{576\pi}{8} = 72\pi$

Area $= \pi r^2 \times \frac{45}{360}$

$= \frac{1600\pi}{8}$

$= 200\pi$

$200\pi - 72\pi = 128\pi$

$\approx 402.1238597 \text{ mm}^2$

SEQUENCES

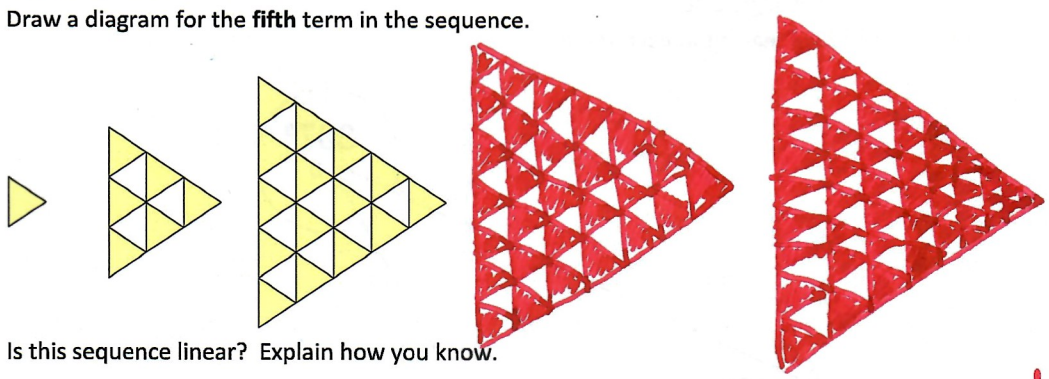
1 Below is the start of a sequence. Write the next three terms in the sequence.

3, 3, 6, 9, 15, 24, 39, 63

Add previous two terms

2 Below is a sequence.

a Draw a diagram for the **fifth** term in the sequence.



b Is this sequence linear? Explain how you know.

No it increases by a greater amount each time.

3 $\frac{n+12}{6}$ is the nth term for a sequence.

What is the twenty-fifth term in the sequence?

$$\frac{25+12}{6} = \frac{37}{6} = 6\frac{1}{6}$$

4 Below is a linear sequence.

23 29 35 41 47

Find the nth term.

23 29 35 41 47

+6 +6 +6 +6

6n

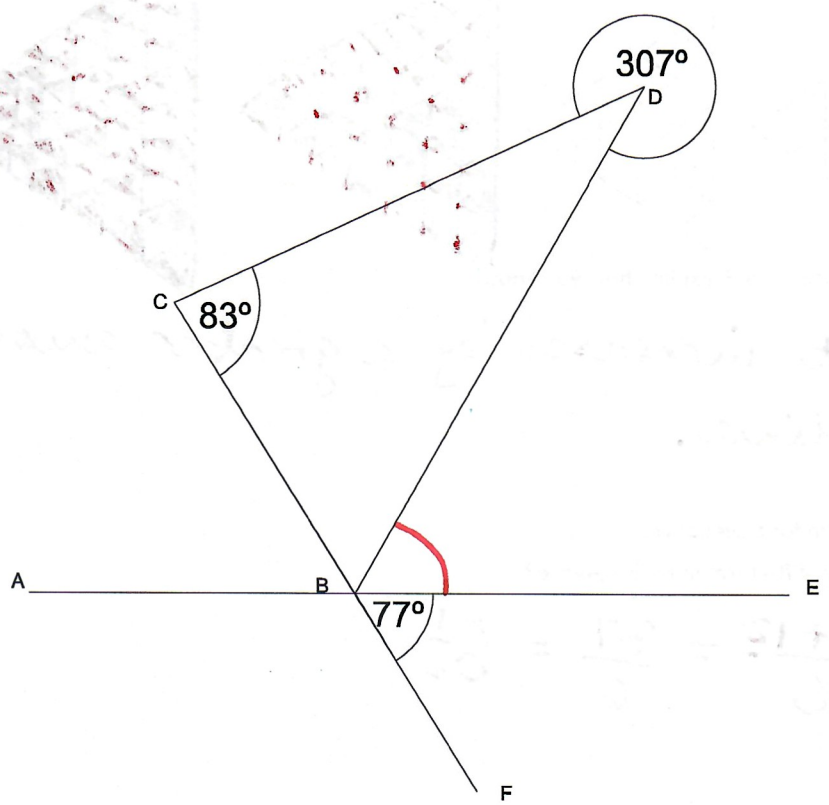
If $n = 1$, $6n = 6(1) = 6$ however it needs to be 23

So $23 - 6 = 17$ So nth term $= 6n + 17$

GEOMETRY

1 AE is a straight line.
BCD is a triangle.

The reflex part of angle BDC is 307°.
Angle BCD is 83°.
Angle FBE is 77°.
Find angle DBE.
Give reasons at each stage.



$\angle ABC = 77°$ (Vertically opposite angles are equal)

$\angle CDB = 360 - 307 = 53°$ (Angles about a point total 360°)

$\angle CBD = 180 - (83 + 53) = 44°$ (Angles in a triangle total 180°)

$\angle DBE = 180 - (44 + 77) = 59°$ (Angles on a straight line total 180°)

RATIO

1 Bill, Mary and Jacob share 195 sweets in the ratio 6:4:3.
How many sweets does each person get?

6+4+3 = 13
195 ÷ 13 = 15 (One part)

Bill 6×15 = 90
Mary 4×15 = 60
Jacob 3×15 = 45

2 John, Julie and Joel put some money into a pot. The ratio that they put in is 8:5:7.
Joel puts in £1155. How much money is there in total?

1155 ÷ 7 = 165 (one part) ↑ Joel

8+5+7 = 20

20 × 165 = £3300

3 Beatrice, Ben and Billy play a game. The ratio of scores is 23:13:8. Billy scores 75 fewer points than Ben. How many points does Beatrice score?

Beatrice : 23
Ben: 13
Billy : 8

13 − 8 = 5 parts difference
75 ÷ 5 = 15
23 × 15 = 345 points

4 Write the ratios 28:35:84 as fractions in their simplest form.

28:35:84 simplifies to 4:5:12 4+5+12 = 21

$\frac{4}{21} : \frac{5}{21} \quad \frac{12}{21}$ So in simplest form: $\frac{4}{21} : \frac{5}{21} : \frac{4}{7}$

5 Write 15:25 in the form 1:n

15:25 ÷15
1 : 1·6 ÷15

6 The ratio of sand to cement of a concrete mixture is 5:2. The mixture of sand to gravel is 3:7.
Lilly-May wants to make 800kg of concrete. How much sand, cement and gravel does she need?

S: 214·2857143

S	C	G
5	2	
3		7

S	C	G
15	6	35

800 ÷ 56 = 14·28571456

7 Charlotte fills a bucket with water. She adds concentrate cleaner so that the ratio of concentrate to water is 2:15. She uses 60% of the mixture cleaning the kitchen floor. There is 1.2 litres of mixture left in the bucket. How much concentrate did she use?

$\frac{1·2}{60} \times 100 = 2\ l$

$\frac{2}{17}$ = one part $\quad \frac{2}{17} \times 2 = \frac{4}{17}\ l$

e - exterior angles $\frac{360}{n} \times 2$

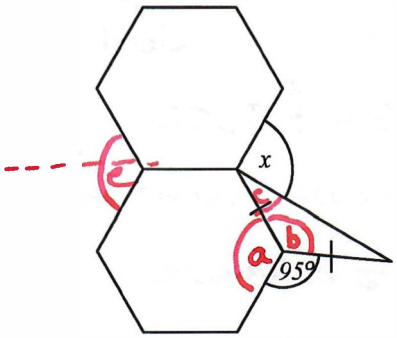
$\frac{360}{6} \times 2 = 120$

$\therefore x = 120 - 17\frac{1}{2} = 102\frac{1}{2}°$

WRITING EQUATIONS FROM PROBLEMS

Geometry: With these, it might be helpful to draw a diagram. **It is essential to write the equation.**

1 Two regular hexagons are placed next to each other so that their sides match up and meet exactly. A triangle is placed between the hexagons as shown in the diagram below. Find the size of angle x.



Interior angle in a hexagon = $\frac{180(6-2)}{6}$

$= 30(4)$

$= 120$

$\therefore a = 120°$

Angles about a point total 360° $b = 360 - (95 + 120)$

$= 360 - 215$

$= 145$

Base angles in an isosceles triangle are equal

$\therefore c = \frac{180 - 145}{2} = 17\frac{1}{2}$

Everyday problems

2 David thinks of a number. He doubles his number then adds twelve. He divides the result by 5 and ends up with 15. What was David's original number?

$\frac{2x+12}{5} = 15 \Rightarrow 2x + 12 = 75 \Rightarrow 2x = 63 \Rightarrow x = 31\frac{1}{2}$

3 Anita is ten years older than Barry. Barry is twelve years younger than Charlie. The total of their ages is 127. How old is each person?

$b + 10 + b + b + 12 = 127$

$3b + 22 = 127$

$3b = 105$

$\therefore b = 35$

A = 45, B = 35, C = 47

4 Maxwell is twice Sael's age. Memphis is 8 years younger than Sael. Their total age is 92. How old is each person?

$m + m + 8 + 2(m + 8) = 4m + 24 = 92$

$\therefore 4m = 68$

$\therefore m = 17$

Max – 50 Memphis – 17

Sael – 25

TWO WAY TABLES AND PROBABILITY

1 The staff of Years 10 and 11 decided to organise three residential trips for the children in their combined year groups.
A total of 207 students went to Normandy of which 123 were in Year 11.
The total number of students going to Cornwall was 188.
Sixty-eight Year 10 students and seventy-two Year 11 students went to Scotland.
Altogether, 286 Year 11 students went on one of the trips.

a Complete the table below.

	Normandy	Cornwall	Scotland	Total
Year 10	84	97	68	249
Year 11	123	91	72	286
Total	207	188	140	535

b A student is chosen at random. What is the probability that the student is a Year 10 student that went to Cornwall?

$$\frac{97}{535}$$

c Of the Year 11 students, a student is chosen at random. What is the probability that the student is going to Normandy?

$$\frac{123}{286}$$

d Giving your answer to three decimal places, what percentage of the Year 10 students ~~study~~ went to Scotland?

$$\frac{72}{140} \times 100 = 51.428571\ldots$$

$$\approx 51.429\ \%$$

INDICES

1 What is the value of $12^0 \times 9$?

$1 \times 9 = 9$

2 What is $m^3 \times 5m^6 \times 2m \times 3m$?

$30m^{11}$

3 What is the value of $\left(\frac{2}{3}\right)^3$?

$\frac{2 \times 2 \times 2}{3 \times 3 \times 3} = \frac{8}{27}$

4 What is $\frac{u^5 \times u^7}{u \times u^6 \times u^5}$?

$\frac{u^{12}}{u^{12}} = 1$

5 Write $\frac{5 \times 5^8}{5^9 \times 5^7}$ in the form 5^n where n is an integer.

$\frac{5^9}{5^{16}} = 5^{-7}$

6 Write $\frac{343^3 \times 729^7 \times 81^5}{27^{11} \times 9^{12}}$ in the form 3^n where n is an integer.

$\frac{(3^5)^3 \times (3^6)^7 \times (3^4)^5}{(3^3)^{11} \times (3^2)^{12}} = \frac{3^{15} \times 3^{42} \times 3^{15}}{3^{33} \times 3^{24}} = \frac{3^{72}}{3^{57}} = 3^{15}$

PIE CHARTS

1 In a school, St James' School of the Arts, students are given the options of studying French, German, Italian or Spanish.

The table below shows how many students study each language.

French	292
German	199
Italian	352
Spanish	237

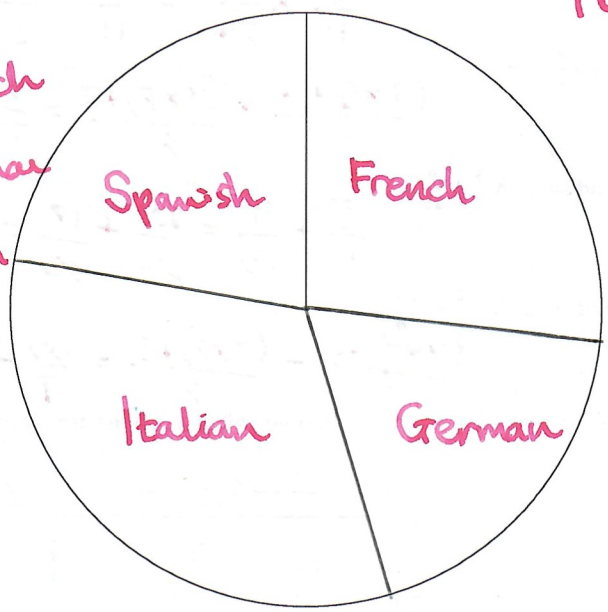
292
199
352
237
1080

3 | 1080
360

108°

a Use the circle below to draw a pie chart displaying this information.

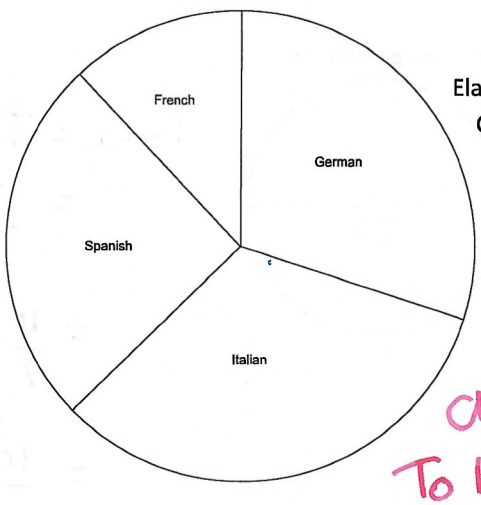
292 ÷ 3 = 97⅓° French
199 ÷ 3 = 66⅓° German
352 ÷ 3 = 117⅓° Italian
237 ÷ 3 = 79° Spanish



b What percentage of students study Spanish?

$\frac{237}{1080} \times 100 = 21.9\dot{4}$

c Another school, St Cuthbert's High School, offers the same four subjects.



Elaine says that more people study German at St Cuthbert's High School than at St James' School of the Arts.

d Is ~~Billy~~ Elaine correct? Explain how you know.

Elaine maybe correct but we dont know. Pie Charts show relative proportions. To know, you would need to know the number of students at St Cuthbert's High School

FRACTIONS

1 Change $5\frac{9}{16}$ into an improper fraction.

$\frac{(5\times16)+9}{16} = \frac{89}{16}$

2 Solve and simplify $\frac{12}{14}\times\frac{21}{30} =$

$\frac{\cancel{12}^{2}}{\cancel{14}_{2}} \times \frac{\cancel{21}^{3}}{\cancel{30}_{5}} = \frac{3}{5}$

3 Solve and simplify $\frac{8}{11} \div 24 =$

$\frac{8}{11}\times\frac{1}{24} = \frac{1}{11}\times\frac{1}{3} = \frac{1}{33}$

4 Multiply $7\frac{4}{5}\times 9\frac{7}{8} =$

$\frac{(7\times5)+4}{5}\times\frac{(9\times8)+7}{8} = \frac{39}{5}\times\frac{79}{8} = \frac{3081}{40} = 77\frac{1}{40}$

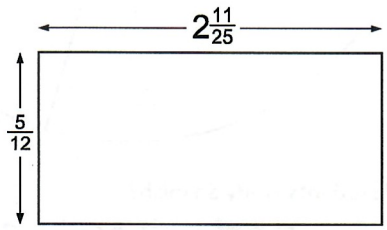
5 Solve and simplify $\frac{5}{6}+\frac{9}{15} =$

$\frac{5}{6}+\frac{9}{15} = \frac{25}{30}+\frac{18}{30} = \frac{43}{30} = 1\frac{13}{30}$

6 Solve and simplify $9\frac{2}{7}-7\frac{3}{8} =$

$\frac{(9\times7)+2}{7} - \frac{(7\times8)+3}{8} = \frac{65}{7}-\frac{59}{8} = \frac{520}{56}-\frac{413}{56} = \frac{107}{56} = 1\frac{51}{56}$

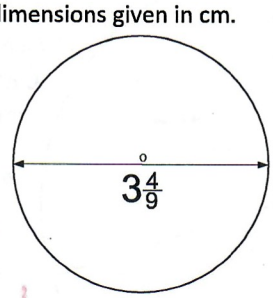
7 What is the area of the rectangle below. All dimensions are given in cm.



$\frac{(2\times25)+11}{25}\times\frac{5}{12} = \frac{61}{25}\times\frac{5}{12}$

$= \frac{305}{300} = 1\frac{5}{300} = 1\frac{1}{60}\ cm^2$

8 What is the area of the circle? All dimensions given in cm.



Take $\pi \approx \frac{22}{7}$

$d = 3\frac{4}{9} = \frac{(3\times9)+4}{9} = \frac{31}{9}$

$r = \frac{31}{18}$

Area $= \pi r^2$

$= \frac{22}{7}\times\frac{31}{18}\times\frac{31}{18}$

$= \frac{11}{7}\times\frac{31}{9}\times\frac{31}{18}$

$= \frac{10571}{1134}$

$= 9\frac{365}{1134}\ cm^2$

PERCENTAGES AND DECIMALS

1 Write 9% as a decimal. 0.09

2 Write 0.6 as a percentage. 60%

3 Change $\frac{17}{20}$ into a percentage. 85%

4 Change $\frac{7}{8}$ into a decimal. 0.875

$$8\overline{)7.000} \quad 0.875$$

5 What is 48% of 260? $\frac{48}{100} \times 260 = \frac{12}{25} \times 260 = \frac{12}{5} \times 52 = \frac{624}{5} = 124\frac{4}{5}$

6 Bill, Charlie and Dave try to save money in their savings account.
Bill earns £3100 a month and has a ratio of spend: savings of 3:2.
Charlie earns £2200 each month and saves $\frac{7}{8}$ths of this amount.
Dave spends 68% of the £2700 that he earns each month.
Who saves the most money?

Bill: $\frac{2}{5} \times 3100 = £1240$

Charlie: $\frac{7}{8} \times 2200 = £1925$

Dave: $100 - 68 = 32$
$0.32 \times 2700 = £864$

Charlie saves the most money.

7 A coat was in a sale where you saved 30%. The sale price of the coat was £120. How much was the original price of the coat?

$100 - 30 = 70$ → $\frac{120}{70} \times 100 = £171.43$ p (to nearest penny)

8 Gabriella puts £400 into her savings account and leaves it there for three years. Her bank account pays 4.8% compound interest per annum. How much money is in her bank account at the end of the three years?

Multiplier $\frac{100 + 4.8}{100} = 1.048$

$P R^T = 400 \times 1.048^3$
$= £460.41$ (to nearest penny)

9 Round 16.23463 to three significant figures. 16.2

10 Round 7.13050 to two decimal places. 7.13

FACTORS, MULTIPLES AND PRIMES

1 A rectangle has a perimeter of 48cm. Each length of each side is an integer.

a. How many different sized rectangles can be made with these parameters?

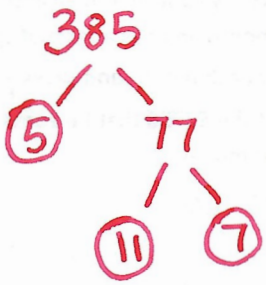
1×23, 2×22, 3×21, 4×20, 5×19, 6×18, 7×17, 8×16, 9×15
10×14 11×13, 12×12

12

b. What is the range in the area of the rectangles?

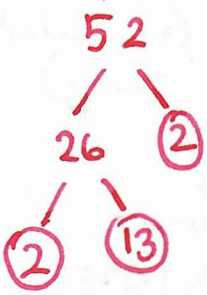
144 − 23 = 121

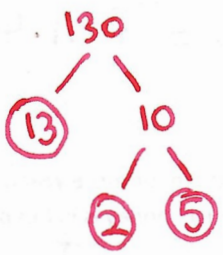
2 Write 385 as a product of its prime factors.

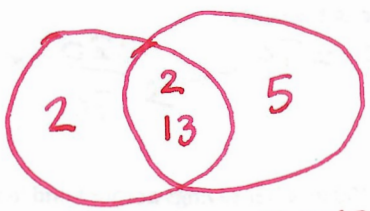


385 = 5×7×11

3 Bill and Ben both drive trains. When they can, they like to share their breaks. On Wednesday, Bills train takes a round trip that takes 52 minutes. Ben's train takes a round trip that takes 130 minutes. If they both start work and their first train sets off at precisely 5am, what time would they be both back at the station when they could meet up again?







$\frac{260}{60} = 4\frac{20}{60}$

Lcm = 2×2×5×13
= 260

They both meet at 9.20 am.

4 List all the factors of 96 that are greater than 18.

1×96
2×48
3×32
4×24
6×18
8×12

{18, 24, 32, 48, 96}

RECIPES

Charlotte loves baking. She wants to make some buns for a cake stall. She needs to make **50 buns** altogether.

Recipe for Chocolate Cupcakes with Buttercream (Serves 20)

375g unsalted butter, softened

275g caster sugar

4 medium free-range eggs

5 tbsp cocoa powder, dissolved in 3 tbsp boiling water

225g self-raising flour

300g icing sugar

2½ tbsp vanilla extract

1½ tbsp milk

Charlotte's dad is going shopping and Charlotte has asked him to get some ingredients. She has looked and sees that she only needs butter, icing sugar, self-raising flour and cocoa powder.

How much of each ingredient does Charlotte's dad have to buy?

$50 \div 20 = 2\frac{1}{2}$

$2\frac{1}{2} \times 375 = 937.5$

$2\frac{1}{2} \times 300 = 750$

$2\frac{1}{2} \times 225 = 562.5$

$2\frac{1}{2} \times 5 = 12\frac{1}{2}$

Butter ..937.5.. g

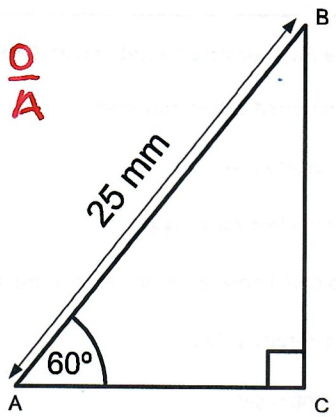
Icing sugar ..750.. g

Self raising flour ..562.5.. g

Cocoa Powder ..12½..tbsp

TRIGONOMETRY AND PYTHAGORAS' THEOREM

1 ABC is a right-angled triangle. Find the length of the side AC.



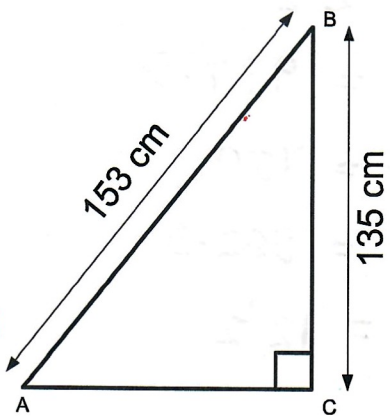
$S = \frac{O}{H}$ $C = \frac{A}{H}$ $T = \frac{O}{A}$

$\cos 60 = \frac{AC}{25}$

$AC = 25 \cos 60$

$= 12{\cdot}5 \text{ mm}$

2 ABC is a right angled triangle. What is the length of side AC?



$a^2 + b^2 = c^2$

$\therefore a^2 = c^2 - b^2$

$= 153^2 - 135^2$

$= 23409 - 18225$

$= 5184$

$\therefore a = \sqrt{5184}$

$= 72 \text{ cm}.$

FREQUENCY TABLES

In a netball competition, the organisers collect data from each hole to see if they have set the scores correctly.

The score for the round is shown in the table below.

Score	Frequency	c.f
$0 \leq s < 12$	6	6
$12 \leq s < 18$	19	25
$18 \leq s < 25$	16	41
$25 \leq s < 32$	8	49
$32 \leq s < 45$	2	51

Part b.

a What is the modal class?

$12 \leq s < 18$ is the modal class because the frequency is 19

b In which class interval does the median fall?

$6 + 19 + 16 + 8 + 2 = 51$

$\frac{51}{2} = 25.5$ · so the 26th person is the one we need.

$18 \leq s < 25$ is the median class interval.

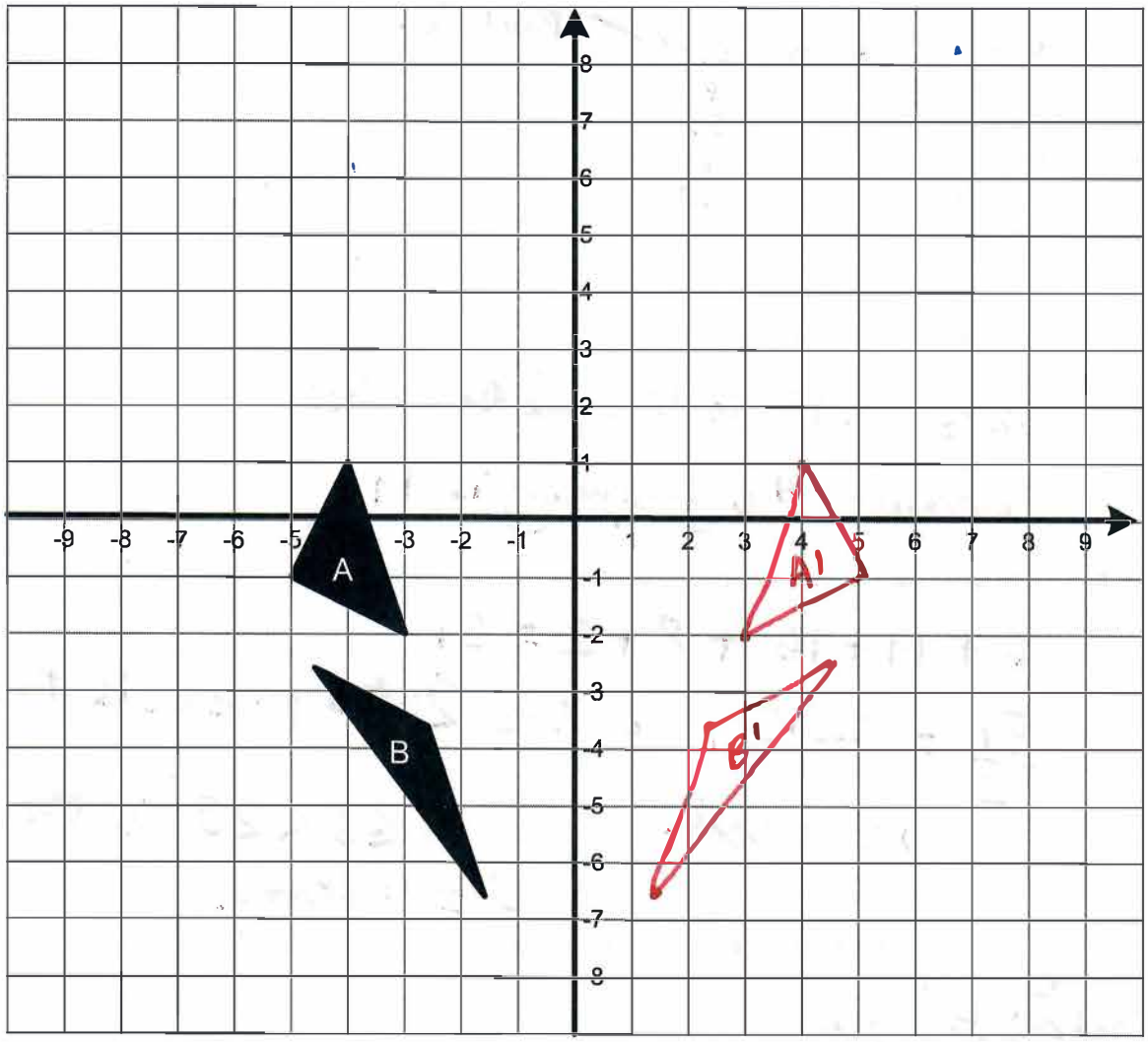
c Calculate an estimate of the mean average points scored.

Midpoint (x)	fx
$\frac{0+12}{2} = 6$	$6 \times 6 = 36$
$\frac{12+18}{2} = 15$	$15 \times 19 = 285$
$\frac{18+25}{2} = 21\frac{1}{2}$	$21\frac{1}{2} \times 16 = 344$
$\frac{25+32}{2} = 28\frac{1}{2}$	$28\frac{1}{2} \times 8 = 228$
$\frac{32+45}{2} = 38\frac{1}{2}$	$2 \times 38\frac{1}{2} = 77$
$\Sigma f = 51$	$\Sigma fx = 970$

$$\bar{x} = \frac{\Sigma fx}{\Sigma f} = \frac{970}{51} = 19.019607\ldots$$

REFLECTIONS

Reflect the shapes below in the y-axis.



Write down the co-ordinates of the reflection of each triangle.

A' (3, -2) (5, -1) (4, 1)

B' (1½, -6½) (2½, -3½) (4½, -2½)

STEM AND LEAF DIAGRAMS

Below is data representing the time that a car takes to complete one circuit of a race track.

216	341	231	258	344	184	204	283	207	249	204	255	292
325	231	346	246	237	193	189	354	358	350	295	215	384

1 Put this information into a stem and leaf diagram.

1	84 93 89
2	16 31 58 04 83 07 49 04 55 92 31 46 37 95 15
3	41 44 25 46 54 58 50 84

Key 3|41 = 341

1	84 89 93
2	04 04 07 15 16 31 31 37 46 49 55 58 83 92 95
3	25 41 44 46 50 54 58 84

2 What is the range of time for drivers to complete one lap?

384 − 184 = 200

3 What is the median of the data that has been collected?

$$\frac{49 + 55}{2} = \frac{104}{2} = 52$$

4 Is there a mode and if so, what is it?

204 and 231 are both more common so the data can be said to be bimodal.
At GCSE – no there isn't.

LINEAR EQUATIONS WITH FRACTIONS

Solve each of these equations giving your answers as mixed numbers or fractions.

1 $5x - 5 = 7$

$5x = 7 + 5$

$= 12$

$\therefore x = \frac{12}{5} = 2\frac{2}{5}$

$5 \overline{)12}\ 2\text{r}2$

2 $3x + 2 = 34$

$3x = 34 - 2$

$= 32$

$\therefore x = \frac{32}{3}$

$= 10\frac{2}{3}$

3 $\frac{x}{7} + x = 12$

$\frac{x}{7} + x = 12$

$\therefore \frac{x}{7} = 12 - x$

$x = 7(12 - x)$

$= 84 - 7x$

$\therefore 8x = 84$

$\therefore x = 10\frac{1}{2}$

4 $5x + 34 = 8x - 16$

$5x + 34 = 8x - 16$ (−5x)

$34 = 3x - 16$ (+16)

$50 = 3x$ (÷3)

$16\frac{2}{3} = x$

$\therefore x = 16\frac{2}{3}$