

Area of square = side \times side
 $294 = x \times x$

$$\begin{array}{r} 049 \\ 6 \overline{)294} \\ \underline{24} \\ 54 \\ \underline{48} \\ 6 \end{array}$$

$$SA = 6 \times x^2$$

↑
length of side

$$\begin{array}{r} 6x^2 = 294 \\ \div 6 \quad \div 6 \end{array}$$

$$\begin{array}{r} x^2 = 49 \\ \sqrt{} \quad \sqrt{} \end{array}$$

$$x = \sqrt{49}$$

$$x = 7$$

x	40	9
7	280	63

$$\begin{array}{r} 280 \\ 63+ \\ \hline 343 \\ 1 \end{array}$$

$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

$$\begin{aligned} \text{volume} &= 7 \times 7 \times 7 \\ &= 49 \times 7 \\ &= 343 \text{ cm}^3 \end{aligned}$$

$$34-3$$

1. Here are two fractions.

$$\frac{7}{5}$$

$$\frac{5}{7}$$

Work out which of the fractions is closer to 1
 You must show all your working.

$$5 \times 7 = 35$$

$$\frac{7}{5} = \frac{49}{35}$$

$$\frac{5}{7} = \frac{25}{35}$$

$$\frac{49}{35} = 1 \frac{14}{35}$$

$$\begin{aligned} 1 - \frac{25}{35} &= \frac{35}{35} - \frac{25}{35} \\ &= \frac{10}{35} \end{aligned}$$

$$\frac{10}{35} < \frac{14}{35}$$

$\frac{5}{7}$ is closer
to 1

(Total for Question is 3 marks)

2. (a) Work out $\frac{2}{5} + \frac{1}{4}$

$$5 \times 4 = 20$$

$$\frac{2}{5} = \frac{8}{20}$$

$$\frac{1}{4} = \frac{5}{20}$$

$$\frac{8}{20} + \frac{5}{20} = \frac{13}{20}$$

$$\frac{13}{20}$$

(2)

- (b) Write down the value of 2^{-3}

$$2^{-3} = \frac{1}{2^3}$$

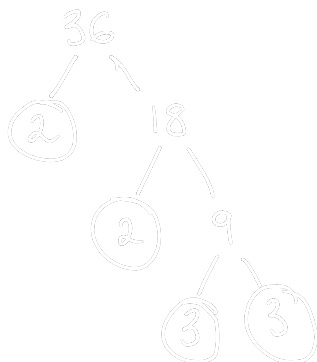
$$2^{-3} = \frac{1}{8}$$

$$\frac{1}{8}$$

(1)

$$2^3 = 2 \times 2 \times 2 = 8$$

(Total for Question is 3 marks)



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

Square numbers <30

1 ×
4 ×
9
16
25

Prime Numbers

2 17
3 19
5 23
7 29
11
13

$2+7=9$

$3+13=16$

$5+11=16$

$2+23=25$

(Either)

2	7
3	13
5	11
2	23

3. Jim thinks of a number.

$\frac{2}{3}$ of Jim's number is 48

Work out $\frac{5}{6}$ of Jim's number.

Let x be Jim's number

$$\frac{2}{3}x = 48$$

$$(\times 3) \quad (\times 3)$$

$$2x = 144$$

$$(\div 2) \quad (\div 2)$$

$$x = 72$$

$$\frac{5}{6} \times 72 = 60$$

60

(Total for Question is 2 marks)

$$6000 - 6324 - 7000$$

Arrows indicate the differences: $6000 - 6324 = 324$ and $6324 - 7000 = 676$.

$$6000$$

For the smallest number, we are looking for the negative that is furthest away from 0.

$$-6, -5, 0, 6, 12$$

For these two, we need to compare the values in the second decimal place.

$$0.78$$

So $0.708 < 0.78$

The smallest value has the lowest number in its first decimal place.

$$0.078, 0.708, 0.78, 0.87$$

20% can be written as $\frac{20}{100}$ 20% out of a possible 100%
 $= 0.2 = \frac{1}{5}$

4. Write 20% as a fraction.

$$\frac{20\%}{100\%} = \frac{20}{100} = \frac{2}{10} = \frac{1}{5}$$

Simplification

$$\frac{1}{5}$$

(Total for Question is 1 mark)

5. Here is a list of four fractions.

$$\frac{4}{16}$$

$$\frac{2}{8}$$

$$\frac{15}{60}$$

$$\frac{3}{9}$$

One of these fractions is **not equivalent** to $\frac{1}{4}$

Write down this fraction.

$$\frac{4}{16} \div \frac{4}{4} = \frac{1}{4}$$

$$\frac{3}{9} \div \frac{3}{3} = \frac{1}{3}$$

$$\frac{1}{3} \neq \frac{1}{4}$$

$$\frac{2}{8} \div \frac{2}{2} = \frac{1}{4}$$

$$\frac{15}{60} \div \frac{15}{15} = \frac{1}{4}$$

They can never be equal as they are born in their simplest forms

fraction $\div \frac{\text{numerator}}{\text{numerator}}$

this is the same as dividing by 1, so doesn't affect the value of the fraction. it only simplifies it.

$$\frac{3}{9}$$

(Total for Question is 1 mark)

7, 14
 7×1 odd
 7×2 first even number
 odd \times even = even

$$4 \times t$$

$$4 \times 3 \times t = 12t$$

3 lots of $4t$

$$4t + 4t + 4t = 12t$$

$$12t$$

BIDMAS - Subtraction and addition can be conducted in any order.

$$8a - 3a = 5a$$

$$8 - 3 = 5$$

$$5a + 2a = 7a$$

$$5 + 2 = 7$$

$$7a$$

6. (a) Work out $2\frac{1}{7} + 1\frac{1}{4}$ = $2 + \frac{1}{7} + 1 + \frac{1}{4}$
Mixed numbers

$$(2 + 1) + \left(\frac{1}{7} + \frac{1}{4}\right) = 3 + \frac{1}{7} + \frac{1}{4}$$

LCM of 7 and 4 To add 2 fractions, we need them to share a common denominator.
 $7 \times 4 = 28 = \text{common denominator}$

$$\frac{1}{7} = \frac{4}{28} \quad \frac{1}{4} = \frac{7}{28}$$

$$\frac{4}{28} + \frac{7}{28} = \frac{11}{28} = \left(\frac{1}{4} + \frac{1}{7}\right)$$

Then we also have the 3 to add on
 $3 + \frac{11}{28} = 3\frac{11}{28}$

$$3\frac{11}{28} \quad (2)$$

(b) Work out $1\frac{1}{5} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.

Converting a mixed number into an improper fraction

$$1\frac{1}{5} \rightarrow \frac{5}{5} + \frac{1}{5} = \frac{6}{5}$$

$$\frac{6}{5} \div \frac{3}{4} = \frac{6}{5} \times \frac{4}{3} = \frac{6 \times 4}{5 \times 3} = \frac{24}{15}$$

Improper fraction

- needs to be converted into a mixed number

$$1\frac{24-15}{15} = 1\frac{9}{15} = 1\frac{3}{5}$$

When dividing a fraction, you can simply multiply by the reciprocal of the second fraction.

9 and 15 share a factor of 3, so $\frac{9}{15}$ can be divided by $\frac{3}{3}$ to simplify it.

$$1\frac{3}{5} \quad (2)$$

(Total for Question is 4 marks)

7. Write $\frac{4}{50}$ as a percentage.

Fraction $\xrightarrow{\div}$ decimal $\xrightarrow{\times 100}$ percentage

$$4 \div 50 = 0.08$$

$$0.08 \times 100 = 8\%$$

(Total for Question 7 is 1 mark)

.....8.....%

8. Write $\frac{9}{10}$ as a decimal.

$$\frac{9}{10} = 9 \div 10 = 0.9$$

FRACTION DECIMAL
divide
÷

.....0.9.....

(Total for Question is 1 mark)

FRACTION DECIMAL
÷ divide

$$\frac{9}{10} = 9 \div 10 = 0.9$$

.....0.9.....

9. Write 0.3 as a percentage.

DECIMAL PERCENTAGE
x100

$$0.3 \times 100 = 30\%$$

.....30.....%

(Total for Question is 1 mark)

10. Last year the cost of a season ticket for a football club was £560

This year the cost of a season ticket for the club has been increased to £600

Write down the increase in the cost of a season ticket as a fraction of last year's cost.

Increase $600 - 560 = \text{£}40 \text{ increase}$ ①
Original amount $\text{£}560$

$$\frac{40}{560} \quad \text{①}$$

(Total for Question is 2 marks)

11. Alan, Bispah and Chan share a sum of money.

Alan gets $\frac{1}{8}$ of the money.

Bispah gets $\frac{1}{2}$ of the money.

Chan gets the rest of the money.

Alan gets £2.50

(a) Work out how much money Bispah gets.

Alan gets $\frac{1}{8}$ of the total. Alan gets £2.50

$$\begin{aligned} \frac{1}{8}t &= £2.50 & t = \text{total money} \\ \times 8 & \quad \times 8 \\ t &= 2.50 \times 8 \\ t &= £20 \end{aligned}$$

Bispah gets $\frac{1}{2}$ of the total (t)

$$\begin{aligned} B &= \frac{1}{2}t = \frac{1}{2} \times 20 \\ &= £10 \end{aligned}$$

$$\begin{array}{r} \text{£ } 10 \end{array} \quad \begin{array}{c} \textcircled{1} \\ (2) \end{array}$$

(b) Find the ratio

amount of money Alan gets : amount of money Chan gets

Give your answer in the form $a:b$ where a and b are whole numbers.

$$A = £2.50 \quad t = £20$$

$$B = £10$$

Chan's Share:

$$C = 20 - 10 - 2.50 = 7.50 \quad \textcircled{1}$$

Alan : Chan

$$\begin{aligned} &£2.50 : £7.50 \\ \div 2.50 & \quad \div 2.50 \\ &1 : 3 \end{aligned} \quad \textcircled{1}$$

← we need a ratio with whole numbers

$$\begin{array}{r} 1 : 3 \end{array} \quad \begin{array}{c} \textcircled{1} \\ (3) \end{array}$$

(Total for Question is 5 marks)

$$3 \times 5 = 15$$

$$15 + 7 = 22$$

22 ✓

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

$$= 4 \times 2$$

$$= 8$$

8 ✓

() ✓

12. Sue has 2 cats.

Each cat eats $\frac{1}{4}$ of a tin of cat food each day.

Sue buys 8 tins of cat food.

Has Sue bought enough cat food to feed her 2 cats for 14 days?

You must show how you get your answer.

$$\frac{1}{4} \times 2 = \frac{2}{4} = \frac{1}{2} \quad \checkmark$$

2 cats will eat $\frac{1}{2}$ a tin each day

$$\frac{1}{2} \times 14 = 7 \quad \checkmark$$

Sue needs 7 tins to feed her cats for 14 days

Yes, Sue has bought enough tins because she needs 7 tins to feed her cats for 14 days, however she has bought 8 tins ✓

(Total for Question is 3 marks)

13. Here are some fractions.

$$\frac{9}{12} = \frac{3}{4} \quad \frac{6}{8} = \frac{3}{4} \quad \frac{18}{24} = \frac{3}{4} \quad \frac{10}{16} = \frac{5}{8} \quad \frac{15}{20} = \frac{3}{4}$$

One of these fractions is **not** equivalent to $\frac{3}{4}$

(a) Which fraction?

$$\frac{10}{16} \quad \checkmark$$

(1)

(b) Work out $\frac{1}{12} + \frac{5}{6}$

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

$$\frac{1}{12} + \frac{10}{12} = \frac{11}{12} \quad \checkmark$$

$$\frac{11}{12} \quad \checkmark$$

(2)

(Total for Question 13 is 3 marks)

14. Harry has 20 sweets.
He gives 7 of the sweets to Nadia.

What fraction of the 20 sweets does Harry have now?

Total: 20 sweets

Harry has left: $20 - 7 = 13$ sweets

$$\frac{13}{20}$$

$$\frac{13}{20}$$



$$(6 \times 8) - 5 = 48 - 5 = 43$$

$$43$$



$$(17 \div 13) \boxed{?} = 10 \Rightarrow 4 \boxed{+6} = 10$$

15. Find the number that is exactly halfway between $\frac{1}{10}$ and $\frac{3}{5}$

$$\left(\frac{1}{10} + \frac{3}{5}\right) \div 2 = \frac{7}{10} \div 2 = \frac{7}{20} = 0.35$$

①

$$\frac{7}{20} \text{ ①}$$

Write down the factors of 12.

Write your answer in the space provided.

You must write down all the stages in your working.

Write down the factors of 12.

Factor → a number which another number can be divided by to give a whole number

3 4 ✓

(Check for Question 15.2 marks)

16. Find $\frac{1}{3}$ of 30

$$\frac{1}{3} \times 30 = 10$$

$$30 \div 3$$

10 ✓

1 mark

$\frac{7}{10}$ ✓

$$18 \div 6 = 3$$

18 ✓

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Factor → a number which another number can be divided by to give a whole number

3

4 ✓

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

$$\text{Find } \frac{1}{3} \text{ of } 30$$

$$\frac{1}{3} \times 30 = 10$$

$$30 \div 3$$

10 ✓

(Total for Question 16 is 2 marks)

17. Write 0.7 as a fraction.

$$\frac{7}{10}$$
 ✓

(Total for Question 17 is 1 mark)

$$18 \div 6 = 3$$

18 ✓

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

18. Write $\frac{3}{4}$ as a decimal. $\rightarrow 3 \times \frac{1}{4} = 3 \times 0.25$

$$\begin{array}{r} 0.25 \\ 0.25 \\ 0.25 \\ \hline 0.75 \\ 1 \end{array}$$

0.75 ✓

(Total for Question 18 is 1 mark)

19. Jenny has 12 marbles.

$\frac{1}{4}$ of these 12 marbles are large. \rightarrow # Large M: $\frac{1}{4} \times 12 = 3$

The rest of these 12 marbles are small. \rightarrow # small M: $12 - 3 = 9$ ✓

Each large marble has a weight of 70 grams.

Each small marble has a weight of 50 grams.

Work out the total weight of the 12 marbles.

$$\begin{aligned}\text{Weight of large marbles} &= \# \text{ large M} \times \text{Weight of large M} \\ &= 3 \times 70\text{g} = 210\text{g} \quad \checkmark\end{aligned}$$

$$\begin{aligned}\text{Weight of small marbles} &= \# \text{ small M} \times \text{Weight of small M} \\ &= 9 \times 50\text{g} = 450\text{g}\end{aligned}$$

$$\begin{array}{r} + 210 \\ 450 \\ \hline 660 \end{array}$$

$$\begin{aligned}\text{Total weight} &= \text{W. Large M} + \text{W. small marbles} \\ &= 210\text{g} + 450\text{g} \quad \checkmark \\ &= 660\text{g}\end{aligned}$$

660 ✓ grams

(Total for Question is 4 marks)

20. In a shop, a TV has a normal price of £500
The shop has a sale.

On Monday, the normal price of the TV is reduced by $\frac{1}{10}$ to give the sale price.

On Tuesday, the sale price of the TV is reduced by 20%

Chris wants to buy the TV.

He has £400 to spend on the TV.

Does Chris have enough money to buy the TV on Tuesday?

You must show how you get your answer.

Sale price on Monday = $0.9 \times £500 = \frac{9 \times £500}{10} = 9 \times 50 = £450$

Sale price on Tuesday = $0.8 \times \text{SPM}$
 $= 0.8 \times £450$
 $= £360$

$$\begin{array}{r} 450 \quad 4 \\ \times 0.8 \\ \hline 3600 \\ 0000 \\ \hline 3600 \end{array}$$

Chris has £400. $£400 < £360$

\therefore Chris can afford the TV on Tuesday (Yes)

21. Show that

$$2\frac{1}{3} \times 3\frac{3}{4} = 8\frac{3}{4}$$

1) Convert mixed number to improper fractions.

$$2\frac{1}{3} = \frac{7}{3} \quad \text{and} \quad 3\frac{3}{4} = \frac{15}{4} \quad \checkmark$$

2) multiply improper fractions

$$\begin{aligned}
 2\frac{1}{3} \times 3\frac{3}{4} &= \frac{7}{\cancel{3}} \times \frac{\cancel{15}^5}{4} \quad \checkmark \quad \begin{array}{l} \div 3 \\ \text{whole number} \end{array} \\
 &= \frac{7 \times 5}{1 \times 4} = \frac{35}{4} = \frac{32}{4} + \frac{3}{4} \quad \begin{array}{l} \text{fractional part} \end{array} \\
 &= 8 + \frac{3}{4} \\
 &= 8\frac{3}{4} \quad \checkmark
 \end{aligned}$$

(Total for Question is 3 marks)

22. Write 0.37 as a fraction.

$\frac{37}{100}$ ✓

(Total for Question is 1 mark)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

23. Write

$$\frac{1}{4}$$

as a percentage.

$$\frac{1}{4} \xrightarrow[\times 25]{\times 25} \frac{n}{100}$$

$$\frac{1}{4} = \frac{25}{100}$$

25 ✓ %

(Total for Question is 1 mark)

24. Work out $\frac{1}{3}$ of 24

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

$$\frac{a}{b} \times c = \frac{a \times c}{b}$$

8 ✓

(Total for Question is 1 mark)

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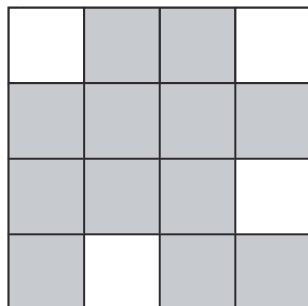
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25. Write 40% as a fraction.

$$40\% = \frac{40}{100}$$

$$\frac{40}{100} \checkmark$$

(Total for Question is 1 mark)



Shaded : 12

Total : 16

26. What fraction of the shape is shaded?
Give your answer in its simplest form.

$$\frac{\text{\# of Shaded Squares}}{\text{Total \# of Squares}}$$

$$\text{Fraction of shape shaded} = \frac{12}{16} = \frac{3}{4}$$

$\div 4$ (over 12 and 16)
 $\div 4$ (under 12 and 16)

$$\frac{3}{4} \checkmark$$

(Total for Question is 2 marks)

27. Write 31% as a fraction.

% is same as fraction with 100 on denominator

$$\frac{31}{100} \quad \textcircled{1}$$

28. Write 17 as a fraction of 30

$$\frac{17}{30} \text{ (1)}$$

$$\frac{17}{30}$$

29. Write the following fractions in order of size.
Start with the smallest fraction.

	$\frac{5}{8}$	$\frac{2}{3}$	$\frac{4}{9}$	$\frac{3}{5}$
	↓	↓	↓	↓
convert to decimals →	0.625	0. $\dot{6}$	0.4	0.6 (1)
	↓ ×100	↓ ×100	↓ ×100	↓ ×100
Percentage to 1dp →	62.5%	66.7%	44.4%	60%
	(3)	(4)	(1)	(2)

$$\frac{4}{9}, \frac{3}{5}, \frac{5}{8}, \frac{2}{3} \quad (1)$$

30. Rachel, Samina and Tom share £600 between them.

Rachel gets $\frac{2}{5}$ of the £600 $\rightarrow 600 \times \frac{2}{5} = \pounds 240$ (Rachel) STEP 1 ①

Samina gets $\frac{1}{4}$ of the money that is left over. $\rightarrow 600 - 240 = \pounds 360$ STEP 2 ①

Tom gets the rest of the money. STEP 3 ① $360 \times \frac{1}{4} = \pounds 90$ (Samina)

Tom says, $600 - 240 - 90 = \pounds 270$ (Tom)

"I would have got more money if we had shared the £600 equally between us."

Is Tom correct?

You must show how you get your answer.

STEP 4

If all shared equally Tom would get $\frac{600}{3} = \pounds 200$

So Tom is **NOT** correct since $\pounds 200 < \pounds 270$ ①