

MATHEMATICS GRADE 8




DATE:
TOPIC: COMMON FRACTIONS

CONCEPTS & SKILLS TO BE ACHIEVED:

By the end of the unit learners should know and be able to:

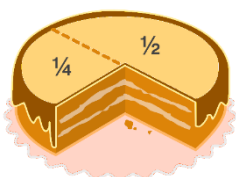
- **Perform calculations using fractions:**
 - Addition & subtraction of common fractions
 - identifying equivalent fractions
 - Finding fractions of whole numbers
 - In contexts involving common fractions & mixed numbers
 - Multiplication of common fractions (including mixed numbers)
 - Division of whole numbers and common fractions by common fractions.
 - Using reciprocal relationships
 - Calculate the squares, cubes, square roots and cube roots of common fractions.
 - Calculate percentages
 - Finding percentages of whole numbers
 - Calculating percentages of part of a whole
 - Calculating percentage increase or decrease or amounts if this is given
 - Using equivalent forms
 - Of common factors
 - Between common fractions, decimal fractions and percentages.

PAPER BASED RESOURCES	DBE Workbook, Sasol-Inzalo book, your textbooks,
ONLINE RESOURCES	All online resources are indicated by the icon : 

DAY 1:

LESSON DEVELOPMENT

DAY 1: Revision & Equivalent Fractions:



NOTE TO LEARNER:
What is a fraction?

- A fraction is a measure of how something is to be divided or shared out. In the diagram of the cake there are two fractions: $\frac{1}{4}$ and $\frac{1}{2}$



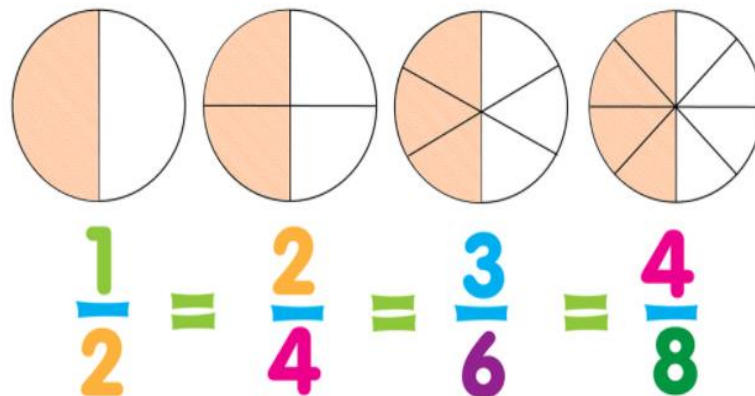
- Using fractions can help us to describe quantities accurately. These include:
 - Parts of a whole (*half of the cake*)
 - Parts of a collection (*two thirds of learners in a class*)
 - Parts of non-physical quantities (*55 hundredths of the marks*)
 - Measures (*Sam is 1,45 m tall*)
- Fractions can be described using different notations:
 - Common fractions
 - Decimal fractions
 - Percentages



▪ **What is an equivalent fraction?**

Equivalent fractions are fractions that have the same value but are in different form.

- Below is an example of some equivalent fractions:



▪ **What do we do with equivalent fractions?**

- Convert fractions to other notations.
- Reduce common fractions by writing it in its simplest form.
- Compare fractions by writing them with a common denominator.
- Add and subtract common fractions



Let's look at equivalent fractions:

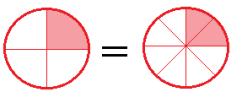
These are the things we need to remember about equivalent fractions:

- 1. We can describe the same part of a whole with different fractions:
- 2. We need to be able to specify equivalent fractions.
- 3. We need to be able to produce equivalent fractions.

Let's look at some examples:

e.g 1 :

Describing the same parts as different fractions:



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

Specifying equivalent fractions:

One quarter = two eights

What would another equivalent fraction be?

$\frac{2}{8}$

← x 3

← x 3

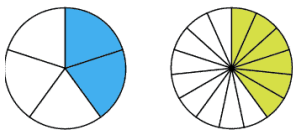
 $=$
 $\frac{6}{24}$

Remember that $\frac{2}{8}$ does not simply mean "two over eight" it is referring to the parts of a whole "two eights"

To find more equivalent fractions we will either multiply or divide BOTH the numerator and denominator by the same number.

e.g 2:

Describing the same parts as different fractions:

$\frac{2}{5}$
 $\frac{6}{15}$


Specifying equivalent fractions:

Two fifths = six fifteenths

What would another equivalent fraction be?

$\frac{6}{15}$

← x 2

← x 2

 $=$
 $\frac{12}{30}$



There are more ways ask questions on equivalent fractions, let's look at some examples:



1. Olwethu bought a slab of chocolate like the one pictured above.

a)	How many blocks of chocolate in this slab?	24
b)	If she eats half the slab, what fraction of the slab did she eat?	$\frac{12}{24}$ or $\frac{1}{2}$
c)	She plans on sharing this slab equally between 4 people, how many blocks will each person get?	$24 \div 4 = 6$ or $\frac{1}{4} \times 24 = 6$
d)	Olwethu eats three quarters of her slab. Her friend Kitana, has the same slab of chocolate and she eats six eights of her slab. Did one of them eat more chocolate? Explain your answer	<p>They eat the same amount , because it is equivalent fractions OR They eat the same amount because:</p> <p>$\frac{1}{4}$ of 24 = 6 so $6 \times 3 = 18$ pieces</p> <p>$\frac{1}{8}$ of 24 = 3 so $3 \times 6 = 18$ pieces</p>

2. A pizza is normally divided into 8 pieces / slices

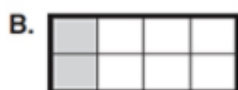
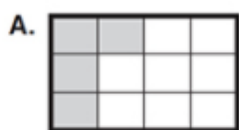


a)	If the pizza is divided equally between people and each person gets one eight. How many people are there?	Eight
b)	How many pieces would there be in three quarters of the pizza?	6

3. Each learner in a grade is one forty eighth of the grade, how many learners are there in each of the following?

a)	One twelfth of the grade	$48 \div 12 = 4$
b)	One third of the grade	$48 \div 3 = 16$
c)	One sixth of the grade	$48 \div 6 = 8$

4. Which of the following diagrams is $\frac{1}{4}$ shaded ?



Solution: B



5. Write your answers in words and fraction notation, and explain your answers:

a)	Express $\frac{3}{8}$ in sixteenths and fortieths.	$\frac{3}{8} = \frac{6}{16} = \frac{15}{40}$ <p>Three eights is six sixteenths or fifteen fortieths</p>
b)	Express $\frac{7}{10}$ in fortieths and hundredths.	$\frac{7}{10} = \frac{28}{40} = \frac{70}{100}$ <p>Seven tenths is 28 fortieths or 70 hundredths</p>

6. Decide whether the two given numbers are equal or not. Explain your answer. If they are not equal, state which one is bigger and explain why you say so.

a)	$\frac{5}{8}$ and $\frac{3}{5}$	$\frac{5}{8} = \frac{25}{40}$ (multiply both by 5) $\frac{3}{5} = \frac{24}{40}$ (multiply both by 8) $\therefore \frac{5}{8}$ is bigger
b)	$\frac{7}{10}$ and $\frac{5}{8}$	$\frac{7}{10} = \frac{56}{80}$ (multiply both by 8) $\frac{5}{8} = \frac{50}{80}$ (multiply both by 10) $\therefore \frac{7}{10}$ is bigger

To find more equivalent fractions we will either multiply or divide BOTH the numerator and denominator by the same number.
The DENOMINATOR SHOULD BE SAME THEN.

CONSOLIDATION

IT IS IMPORTANT TO REMEMBER:

- That equivalent fractions are fractions that have the same value but are in different form.
- We can find more equivalent fractions by multiplying or dividing the numerator and denominator by the SAME value.
- These questions can require answers in fraction form or as whole numbers.
- Questions can be context focused.

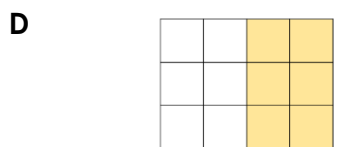
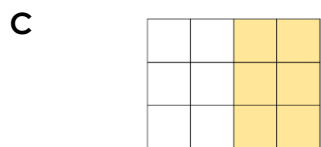
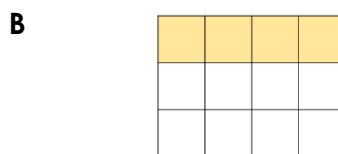
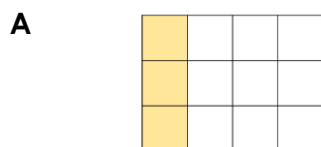


HOMEWORK:



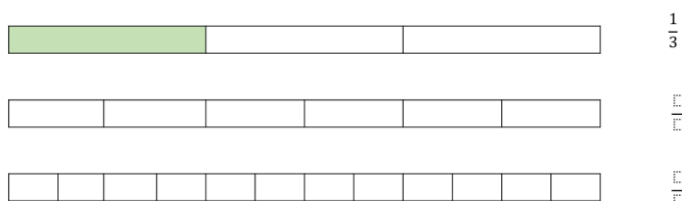
Do the following exercises, applying what you have learnt today. FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM AT THE END OF THE SECTION.

1. Choose the correct diagram below (A-D) where the shaded blocks will be an equivalent fraction for:



- 1.1) $\frac{1}{2}$ 1.2) $\frac{20}{24}$ 1.3) $\frac{1}{4}$ 1.4) $\frac{2}{6}$

2. Use the diagram below to answer the following:



- a) Shade the diagrams above to give an equivalent fraction for $\frac{1}{3}$.
b) Write down the equivalent fraction that the diagram represents next to it

3. Fill in the “missing” part of the fraction to make the following statements true

3.1) $\frac{1}{2} = \frac{\quad}{10}$

3.2) $\frac{6}{8} = \frac{42}{\quad}$

3.3) $\frac{24}{50} = \frac{12}{\quad}$

3.4) $\frac{1}{20} = \frac{\quad}{100}$

4. Choose from the symbols $>$; $<$ or $=$ to make the following statements true:

4.1) $\frac{5}{8}$ $\frac{3}{5}$

4.2) $\frac{7}{10}$ $\frac{5}{8}$

4.3) $\frac{8}{2}$ $\frac{5}{12}$

4.4) $\frac{3}{4}$ $\frac{11}{12}$

5. Demi ate $\frac{3}{8}$ of her pizza while Manu ate 40% of his pizza. Who ate the most? (Given that the pizzas are the same size.)



6. Jim and Chris have the same amount of Mathematics homework. Jim completed $\frac{2}{5}$ of his homework, while Chris completed $\frac{2}{3}$ of his homework. What fraction of his homework must Jim still complete to catch up with Chris?

DAY 2:

LESSON DEVELOPMENT

CLASSWORK:

TODAY WE WILL FOCUS ON:

1. ADDING &
2. SUBTRACTING FRACTIONS



WE NEED TO REMEMBER:



- ☺ In order to add or subtract fractions, the unit must be the same.
- ☺ We therefore need to ensure that the DENOMINATOR is the same.
- ☺ We can find a common denominator by:
 - Finding the product of the denominators*
 - Finding the LCM of the denominators*

Let's look at how to find common denominators:

Finding the product of the denominators:



$$\frac{2}{4} \text{ and } \frac{1}{6}$$

$$\text{So } 4 \times 6 = 24$$

Therefore :

$$\frac{2}{4} \times \frac{6}{6} = \frac{12}{24}$$

$$\frac{1}{6} \times \frac{4}{4} = \frac{4}{24}$$

Now we can add or subtract the fractions.

Remember : the denominator is the bottom part of the fraction.

Remember product means multiply.

Remember that you need to multiply the numerator and denominator (top and bottom) of the fraction with the value that will give you the common denominator.
(look at the example on the left)

Finding the LCM of the denominators



$$\frac{4}{6} \text{ and } \frac{3}{8}$$

Therefore we need to find the multiples of each denominator:

Multiples of 6 : 6 ; 12 ; 18 ; 24

Multiples of 8 : 8 ; 16 ; 24

$$\frac{4}{6} \times \frac{4}{4} = \frac{16}{24}$$

$$\frac{3}{8} \times \frac{3}{3} = \frac{9}{24}$$

Now we can add or subtract the fractions

We cannot add or subtract the fractions as is, because the denominators are not the same.


Remember to write down the multiples of each denominator until you get the FIRST (lowest common multiple).

24 is the FOURTH multiple of 6
24 is the THIRD multiple of 8


So 6 is multiplied by FOUR
And 8 is multiplied by THREE

Let's practice finding common denominators:

Write the following fractions with common denominators using the LCM:

	e.g 1: $\frac{2}{9}$ & $\frac{7}{12}$	Factors of 9 : 9; 18; 27; 36; 45; 54; 63; <u>72</u> Factors of 12: 12; 24; 36; 48; 60; <u>72</u> $\frac{2}{9} \times \frac{8}{8} = \frac{16}{72}$ $\frac{7}{12} \times \frac{6}{6} = \frac{42}{72}$
	e.g 2: $\frac{1}{4}$ & $\frac{3}{8}$	Factors of 4: 4; <u>8</u> Factors of 8 : <u>8</u> $\frac{1}{4} \times \frac{2}{2} = \frac{2}{8}$ $\frac{3}{8} \times \frac{1}{1} = \frac{3}{8}$

Write the following fractions with common denominators using the product of the denominators:

	e.g 1: $\frac{2}{3}$ & $\frac{4}{5}$	$3 \times 5 = 15$ $\frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$ $\frac{4}{5} \times \frac{3}{3} = \frac{12}{15}$
	e.g 2: $\frac{3}{8}$ & $\frac{4}{9}$	$8 \times 9 = 72$ $\frac{3}{8} \times \frac{9}{9} = \frac{27}{72}$ $\frac{4}{9} \times \frac{8}{8} = \frac{32}{72}$

Let's look at how to add and subtract fractions:

- Fractions with the same denominator.
- Add or subtract the NUMERATOR (top).
- Write the final value over the common denominator.

1. Simply the following:

1.1) $\frac{6}{14} + \frac{3}{14}$

1.2) $\frac{7}{9} - \frac{4}{18}$

1.3) $1\frac{3}{4} + \frac{5}{6}$

1.4) $\frac{9}{12} - (\frac{5}{6} - \frac{2}{3})$

1.5) $\frac{3}{8} - \frac{5}{16} + \frac{1}{2}$

Solutions:

$$1.1) = \frac{9}{14}$$

$$1.2) = \frac{14}{18} - \frac{4}{18} \\ = \frac{10}{18} \\ = \frac{5}{9}$$

$$1.3) = \frac{7}{4} + \frac{5}{6} \\ = \frac{21}{12} + \frac{10}{12} \\ = \frac{31}{12} \\ = 2 \frac{7}{12}$$

$$1.4) = \frac{9}{12} - \left(\frac{5}{6} - \frac{4}{6} \right) \\ = \frac{9}{12} - \left(\frac{1}{6} \right) \\ = \frac{9}{12} - \frac{2}{12} \\ = \frac{7}{12}$$

$$1.5) = \frac{6}{16} - \frac{5}{16} + \frac{8}{16} \\ = \frac{6-5+8}{16} \\ = \frac{9}{16}$$

2. Khanya bought a bag of sweets. On the first day she ate $\frac{1}{6}$ of her sweets. That afternoon her brother ate another $\frac{1}{3}$ of the sweets. What fraction of the sweets does she still have left over?

3. Sofia's family is participating in a scavenger hunt. Sofia collected $\frac{7}{16}$ of the clues, her brother collected $\frac{1}{4}$ of the clues and her mom collected $\frac{2}{8}$ of the clues. Have they collected all the clues to solve the scavenger hunt?

Solutions:

$$2) \frac{1}{6} + \frac{2}{6} = \frac{3}{6} \text{ parts eaten}$$

$$\frac{6}{6} - \frac{3}{6} = \frac{3}{6} \text{ left over}$$

$$\text{Simplified} = \frac{1}{2}$$

$$3) \frac{7}{16} + \frac{4}{16} + \frac{4}{16} = \frac{15}{16}$$

No they do not have all the clues yet. They still need one sixteenth.



CONSOLIDATION

IT IS IMPORTANT TO REMEMBER:

- We need to find a common denominator before adding or subtracting fractions.
- You need to simplify fractions as far as possible.
- You still need to use BODMAS when answering questions.



HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM AT THE END OF THE UNIT.**



1. Simplify the following:

1.1 $\frac{5}{12} + \frac{1}{12}$

1.2 $\frac{5}{12} + \frac{2}{3}$

1.3 $\frac{5}{12} + 2 + \frac{3}{8}$

1.4 $\frac{5}{8} - \frac{3}{8}$

1.5 $\frac{3}{10} - \frac{1}{4}$

1.6 $\frac{8}{15} + \frac{2}{15} - \frac{3}{5}$

1.7 $\frac{4}{5} - \frac{3}{4} + \frac{1}{2}$

1.8 $2\frac{1}{2} - \frac{3}{8}$

1.9 $\frac{2}{3} - \frac{5}{8} + \left(\frac{3}{4} - \frac{1}{2}\right)$

1.10 $\frac{9}{10} - \left(\frac{2}{3} - \frac{4}{5}\right)$

2. Are the following statements true or false? Show all your calculations to motivate your answer.

2.1 $\frac{3}{10} + \frac{20}{100} = \frac{6}{10} - \frac{2}{20}$

2.2 $\frac{1}{4} + \frac{5}{25} = \frac{1}{10} + \frac{1}{5}$

3. Are the following statements true or false? Show all your calculations to motivate your answer.

3.1 David and Tumi are painting a wall in their house. David painted $\frac{1}{3}$ of the wall and Tumi painted $\frac{1}{2}$ of the wall. Calculate the fraction of the wall that is painted?

3.2 A farmer had some sheep. One-night wolves killed $\frac{1}{20}$ of his sheep. A week later the farmer sold $\frac{2}{5}$ of the original amount. What fraction of sheep does the farmer still have?

3.3 After a party there are 3 cartons of pizza's left. (All cartons are the same size.)



- In the first carton there is $\frac{1}{3}$ of a pizza left.
- In the second carton there is $\frac{1}{6}$ of a pizza left.
- In the third carton there is $\frac{5}{12}$ of a pizza left.

Will it be possible to fit all the leftover pizza pieces in one carton?

DAY 3 & 4 :

LESSON DEVELOPMENT

CLASSWORK:

TODAY WE WILL FOCUS ON:

1. MULTIPLYING AND
2. DIVIDING FRACTIONS.

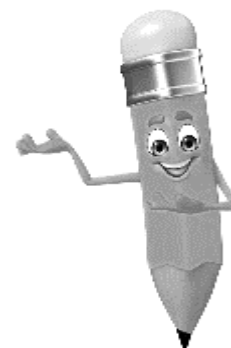


MULTIPLYING FRACTIONS: THESE ARE THE STEPS WE NEED TO REMEMBER:

- ☺ *Multiply the numerators*
- ☺ *Multiply the denominators*
- ☺ *Simplify as far as possible*
- ☺ **Remember that when you have mixed fractions (with whole numbers) it is easiest to convert it into an improper fraction.**

e.g 1. Simplify:

a)	$\frac{3}{4} \times \frac{6}{9}$ $= \frac{18}{36}$ $= \frac{3}{4}$	b)	$\frac{2}{7} \times 3$ $= \frac{2}{7} \times \frac{3}{1}$ $= \frac{6}{7}$	c)	$\frac{2}{3} \times \frac{1}{2} \times \frac{3}{4}$ $= \frac{2 \times 1 \times 3}{3 \times 2 \times 4}$ $= \frac{6}{24}$ $= \frac{1}{4}$
d)	$1\frac{1}{2} \times 4\frac{4}{7}$ $= \frac{3}{2} \times \frac{32}{7}$	e)	$\frac{6}{7} \times \frac{1}{3} + \frac{6}{7} \times \frac{1}{2}$ $= \frac{6}{21} + \frac{6}{14}$	f)	$\left(\frac{5}{6} + \frac{2}{3}\right) \times \frac{1}{5}$ $= \left(\frac{5}{6} + \frac{4}{6}\right) \times \frac{1}{5}$ $= \frac{9}{6} \times \frac{1}{5}$





$= \frac{64}{14}$	$= \frac{2}{7} + \frac{3}{7}$	$= \frac{9}{30}$
$= 6 \frac{12}{14}$	$= \frac{5}{7}$	$= \frac{3}{10}$
$= 6 \frac{6}{7}$		

DIVIDING FRACTIONS:

THESE ARE THE STEPS WE NEED TO REMEMBER:

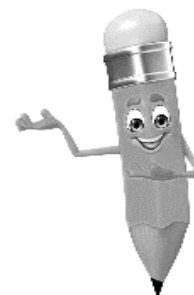
- ☺ Keep the first fraction
- ☺ Change the \div into a \times
- ☺ Swop the second fraction around (to find the reciprocal).
- ☺ Multiply as per usual
- ☺ Simplify as far as possible

e.g 1. Simplify:

a)	$\frac{3}{4} \div \frac{6}{9}$ $= \frac{3}{4} \times \frac{9}{6}$ $= \frac{27}{24}$ $= 1 \frac{3}{24}$ $= 1 \frac{1}{8}$	b)	$\frac{2}{7} \div 3$ $= \frac{2}{7} \div \frac{3}{1}$ $= \frac{2}{7} \times \frac{1}{3}$ $= \frac{2}{21}$	c)	$\frac{2}{3} \div \frac{1}{2} \div \frac{3}{4}$ $= \frac{2}{3} \times \frac{2}{1} \times \frac{4}{3}$ $= \frac{16}{9}$ $= 1 \frac{7}{9}$
d)	$1 \frac{1}{2} \div 4 \frac{4}{7}$ $= \frac{3}{2} \div \frac{32}{7}$	e)	$\frac{6}{8} \div \frac{1}{3} + \frac{6}{8} \div \frac{1}{2}$ $= \frac{6}{8} \times \frac{3}{1} + \frac{6}{8} \times \frac{2}{1}$	f)	$\left(\frac{5}{6} + \frac{2}{3}\right) \div \frac{1}{5}$ $= \left(\frac{5}{6} + \frac{4}{6}\right) \times \frac{5}{1}$ $= \frac{9}{6} \times \frac{5}{1}$



$= \frac{3}{2} \times \frac{7}{32}$	$= \frac{18}{8} + \frac{12}{8}$	$= \frac{45}{6}$
$= \frac{21}{64}$	$= \frac{30}{8}$	$= 7 \frac{5}{10}$
	$= 3 \frac{6}{8}$	$= 7 \frac{1}{2}$
	$= 3 \frac{3}{4}$	



CONSOLIDATION

IT IS IMPORTANT TO REMEMBER:

- That you need to be able to convert values into improper fractions.
- You need to be able to simplify fractions to mixed fractions/numbers in the simplest form.
- For MULTIPLICATION: multiply the numerators with each other and the denominators with each other.
- For DIVISION: change the x to ÷ and turn the second fraction upside down (reciprocal form).



HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM AT THE END OF THE UNIT.**



1. Simplify the following:

1.1) $\frac{3}{10} \times \frac{2}{5}$

1.2) $5 \times \frac{9}{10}$

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

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

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

1.6) $9 \div \frac{2}{3}$

1.7) $2 \frac{1}{10} \div \frac{3}{5}$

1.8) $\left(\frac{1}{3} + \frac{1}{2}\right) \times \frac{6}{7}$

1.9) $\frac{6}{7} \times \frac{1}{3} - \frac{1}{2}$

1.10) $2 \frac{1}{3} + \frac{1}{4} \div \frac{3}{8}$

1.11) $\frac{3}{4} - \frac{2}{5} \times \frac{5}{6}$

1.12) $6 \frac{1}{2} - \left(\frac{1}{3} \times \frac{3}{4}\right) \div \frac{2}{3}$

2. Choose the correct answer:

$$8 - 4 \div \frac{2}{3} =$$

a) 6

b) 2

c) $\frac{16}{3}$

d) $7 \frac{5}{6}$

3. A restaurant is open for 7 hours during the day. Each chef works a shift of $1\frac{3}{4}$ hours. How many shifts are there per day?
4. Joe found $\frac{1}{4}$ of a pizza left in the fridge. He wants to share it with 2 of his friends. What fraction of the original pizza will each person get to eat?
5. Michelle is making a recipe that needs $\frac{3}{4}$ cup of sugar as an ingredient. How many millilitres of sugar does Michelle need to make $\frac{2}{3}$ of the recipe? (Accept that a cup is 250ml.)

DAY 5:

LESSON DEVELOPMENT

CLASSWORK:

TODAY WE WILL FOCUS ON:

1. SQUARES, CUBES &
2. ROOTS OF FRACTIONS.



THESE ARE THE THINGS WE NEED TO REMEMBER:

☺ The **SQUARE of a fraction** is equal to the square of the numerator divided by the square of the denominator.

$$\begin{aligned} \text{e.g 1: } & \left(\frac{2}{3}\right)^2 \\ & = \frac{2^2}{3^2} \\ & = \frac{4}{9} \end{aligned}$$

☺ The **CUBE of a common fraction** is the cube of the numerator divided by the cube of the denominator.

$$\begin{aligned} \text{e.g 1: } & \left(\frac{2}{3}\right)^3 \\ & = \frac{2^3}{3^3} \\ & = \frac{8}{27} \end{aligned}$$

☺ The **SQUARE ROOT of a common fraction** is the square root of the numerator divided by the square root of the denominator.

$$\begin{aligned} \text{e.g 1: } & \sqrt{\frac{16}{25}} \\ & = \frac{\sqrt{16}}{\sqrt{25}} \\ & = \frac{4}{5} \end{aligned}$$

☺ The **CUBE ROOT of a common fraction** is the cube root of the numerator divided by the cube root of the denominator.





$$\begin{aligned}
 \text{e.g 1: } & \sqrt[3]{\frac{512}{27}} \\
 &= \frac{\sqrt[3]{512}}{\sqrt[3]{27}} \\
 &= \frac{8}{3} \\
 &= 2\frac{2}{3}
 \end{aligned}$$

Let's look at a few more examples:

e.g 1 $\sqrt{\frac{4}{9}} = \frac{2}{3}$

e.g 2 $\sqrt[3]{\frac{27}{1000}} = \frac{3}{10}$

e.g 3 $\left(\frac{4}{7}\right)^2 = \frac{16}{49}$

e.g 4 $\left(\frac{5}{12}\right)^3 = \frac{125}{1728}$

e.g 5 What number multiplied by itself will give $\frac{9}{16}$?

$$\sqrt{\frac{9}{16}}$$



CONSOLIDATION

IT IS IMPORTANT TO REMEMBER:

- How to perform calculations with squares and cubes of fractions.
- How to perform calculations with square roots and cube roots of fractions.



HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM AT THE END OF THE UNIT**



1.Simplify the following:

1.1 $\frac{2}{3} \times \frac{2}{3}$

1.2 $\frac{2}{3} \times \frac{2}{3} \times \frac{2}{3}$

1.3 $\left(\frac{3}{5}\right)^2$



1.4 $\left(-\frac{1}{4}\right)^3$

1.5 $\sqrt{\frac{49}{100}}$

1.6 $\sqrt{\frac{50}{72}}$

1.7 $-\sqrt{\frac{25}{81}} + \frac{5}{9}$

1.8 $\sqrt{1\frac{11}{25}}$

1.9 $\sqrt[3]{\frac{27}{64}}$

1.10 $\sqrt[3]{\frac{125}{1000}}$

1.11 $\sqrt[3]{-\frac{2}{16}}$

1.12 $\left(\sqrt{\frac{4}{9}}\right)^2$

1.13 $\left(\sqrt[3]{\frac{1}{8}}\right)^3$

1.14 $\frac{\sqrt[3]{216}}{6}$

1.15 $\frac{-\frac{3}{4} + \sqrt{\left(\frac{3}{2}\right)^2} \div 4}{2}$

2. Choose from the symbols $>$; $<$ or $=$ to make the following statements true:

2.1 $\sqrt{\frac{1}{81}}$ $\frac{1}{8}$

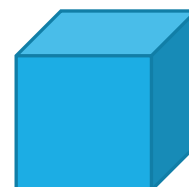
2.2 $\sqrt{\frac{16}{25}}$ $\sqrt[3]{\frac{64}{125}}$

2.3 $\sqrt{1\frac{1}{3} + \frac{4}{9}}$ $\sqrt{\frac{16}{36}}$

3. The area of a square is given as $\frac{49}{81} m^2$
Determine the length of the sides of the square.

4. The length of the sides of a cube is $\frac{5}{6} m$ each.

- (i) Calculate the volume of the cube.
- (ii) Calculate the length of the sides of a new cube if the volume of the original cube is reduced with $\frac{61}{216} m^3$.



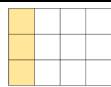


Common Fractions Grade 8:

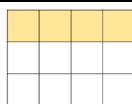
HOMWORK ACTIVITIES Memorandum Day 1-5

QUESTION 1

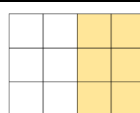
A



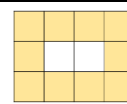
B



C



D



1.1

$$\frac{1}{2} = \frac{6}{12}$$

C

1.2

$$\frac{20}{24} = \frac{10}{12}$$

D

1.3

$$\frac{1}{4} = \frac{3}{12}$$

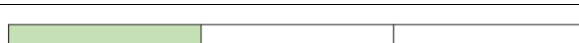
A

1.4

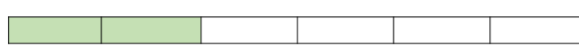
$$\frac{2}{6} = \frac{4}{12}$$

B

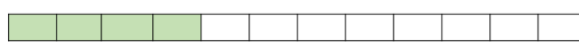
QUESTION 2



$$\frac{1}{3}$$



$$\frac{2}{6}$$



$$\frac{4}{12}$$

QUESTION 3

3.1

$$\frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$$

3.2

$$\frac{6}{8} \times \frac{7}{7} = \frac{42}{56}$$

3.

$$\frac{24 \div 2}{50 \div 2} = \frac{12}{25}$$

3.4

$$\frac{1}{20} \times \frac{5}{5} = \frac{5}{100}$$

QUESTION 4

4.1

$$\frac{5}{8} \times \frac{5}{5} = \frac{25}{40}$$

$$\frac{3}{5} \times \frac{8}{8} = \frac{24}{40}$$

$$\therefore \frac{5}{8} > \frac{3}{5}$$

4.2

$$\frac{7}{10} \times \frac{4}{4} = \frac{28}{40}$$

$$\frac{5}{8} \times \frac{5}{5} = \frac{25}{40}$$

$$\therefore \frac{7}{10} > \frac{5}{8}$$

4.3

$$\frac{2}{3} \times \frac{6}{6} = \frac{12}{18}$$

$$\frac{12}{18} \times \frac{1}{1} = \frac{12}{18}$$

$$\therefore \frac{2}{3} = \frac{12}{18}$$

4.4

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

$$\frac{11}{12} \times \frac{1}{1} = \frac{11}{12}$$

$$\therefore \frac{3}{4} < \frac{11}{12}$$

QUESTION 5

5.1

$$\text{Manu: } 40\% = \frac{40}{100} = \frac{4}{10} = \frac{16}{40}$$

$$\text{Demi: } \frac{3}{8} = \frac{15}{40}$$

Therefore Manu ate the most

5.2

$$\text{Jim: } \frac{2}{5} \times \frac{3}{3} = \frac{6}{15}$$

$$\text{Chris: } \frac{2}{3} \times \frac{5}{5} = \frac{10}{15}$$

Therefore Jim must still complete $\frac{4}{15}$ of his homework to catch up with Chris.



MEMORANDUM: DAY 2:

QUESTION 1

1.1	$\frac{5}{12} + \frac{1}{12}$ $= \frac{5+1}{12}$ $= \frac{6}{12}$ $= \frac{1}{2}$	1.2	$\frac{5}{12} + \frac{2}{3}$ $= \frac{5}{12} + \frac{2}{3} \times \frac{4}{4}$ $= \frac{5}{12} + \frac{8}{12}$ $= \frac{13}{12}$ $= 1\frac{1}{12}$	1.3	$\frac{5}{12} + 2 + \frac{3}{8}$ $= \frac{5}{12} + \frac{2}{1} + \frac{3}{8}$ $= \frac{5}{12} \times \frac{2}{2} + \frac{2}{1} \times \frac{24}{24} + \frac{3}{8} \times \frac{3}{3}$ $= \frac{10}{24} + \frac{28}{24} + \frac{9}{24}$ $= \frac{47}{24}$
1.4	$\frac{5}{8} - \frac{3}{8}$ $= \frac{5-3}{8}$ $= \frac{2}{8}$ $= \frac{1}{4}$	1.5	$\frac{3}{10} - \frac{1}{4}$ $= \frac{3}{10} \times \frac{2}{2} - \frac{1}{4} \times \frac{5}{5}$ $= \frac{6}{20} - \frac{5}{20}$ $= \frac{1}{20}$	1.6	$\frac{8}{15} + \frac{2}{15} - \frac{3}{5}$ $= \frac{8}{15} + \frac{2}{15} - \frac{3}{5} \times \frac{3}{3}$ $= \frac{8}{15} + \frac{2}{15} - \frac{9}{15}$ $= \frac{1}{15}$
1.7	$\frac{4}{5} - \frac{3}{4} + \frac{1}{2}$ $= \frac{4}{5} \times \frac{4}{4} - \frac{3}{4} \times \frac{5}{5} + \frac{1}{2} \times \frac{10}{10}$ $= \frac{16}{20} - \frac{15}{20} + \frac{10}{20}$ $= \frac{11}{20}$		1.8	$2\frac{1}{2} - \frac{3}{8}$ $= \frac{5}{2} - \frac{3}{8}$ $= \frac{5}{2} \times \frac{4}{4} - \frac{3}{8}$ $= \frac{20}{8} - \frac{3}{8}$ $= \frac{17}{8}$	
1.10	$\frac{9}{10} - \left(\frac{2}{3} - \frac{4}{5}\right)$ $= \frac{9}{10} - \left(\frac{2}{3} \times \frac{5}{5} - \frac{4}{5} \times \frac{3}{3}\right)$ $= \frac{9}{10} - \left(\frac{10}{15} - \frac{12}{15}\right)$ $= \frac{9}{10} - \left(-\frac{2}{15}\right)$ $= \frac{9}{10} + \frac{2}{15}$ $= \frac{9}{10} \times \frac{3}{3} + \frac{2}{15} \times \frac{2}{2}$		1.9	$\frac{2}{3} - \frac{5}{8} + \left(\frac{3}{4} - \frac{1}{2}\right)$ $= \frac{2}{3} \times \frac{8}{8} - \frac{5}{8} \times \frac{3}{3} + \left(\frac{3}{4} - \frac{1}{2} \times \frac{2}{2}\right)$ $= \frac{16}{24} - \frac{15}{24} + \left(\frac{3}{4} - \frac{2}{4}\right)$ $= \frac{1}{24} + \frac{1}{4} \times \frac{6}{6}$ $= \frac{1}{24} + \frac{6}{24}$ $= \frac{7}{24}$	

ALWAYS SIMPLIFY ANSWER

You may leave your answer as an improper fraction



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QUESTION 2

2.1

$$\frac{3}{10} + \frac{20}{100} = \frac{6}{10} - \frac{2}{20}$$

$$\begin{aligned} LHS &= \frac{3}{10} + \frac{20}{100} \\ &= \frac{30}{100} + \frac{20}{100} \\ &= \frac{50}{100} \\ &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} RHS &= \frac{6}{10} - \frac{2}{20} \\ &= \frac{12}{20} - \frac{2}{20} \\ &= \frac{10}{20} \\ &= \frac{1}{2} \end{aligned}$$

$\therefore LHS = RHS$

TRUE

2.2

$$\frac{1}{4} + \frac{5}{25} = \frac{1}{10} + \frac{1}{5}$$

$$\begin{aligned} LHS &= \frac{1}{4} + \frac{5}{25} \\ &= \frac{1}{25} + \frac{20}{100} \\ &= \frac{45}{100} \\ &= \frac{9}{20} \end{aligned}$$

$$\begin{aligned} RHS &= \frac{1}{10} + \frac{1}{5} \\ &= \frac{1}{10} + \frac{2}{10} \\ &= \frac{3}{10} \end{aligned}$$

$\therefore LHS \neq RHS$

FALSE

QUESTION 3

3.1

$$\begin{aligned} \frac{1}{3} + \frac{1}{2} \\ &= \frac{2}{6} + \frac{3}{6} \\ &= \frac{5}{6} \end{aligned}$$

The fraction of the wall painted is $\frac{5}{6}$

3.2

$$\begin{aligned} \text{Sheep dead and sold} &= \frac{1}{20} + \frac{2}{5} \\ &= \frac{1}{20} + \frac{8}{20} \\ &= \frac{9}{20} \end{aligned}$$

\therefore fraction of sheep does the farmer still have $= \frac{20}{20} - \frac{9}{20} = \frac{11}{20}$

3.3

$$\begin{aligned} \frac{1}{3} + \frac{1}{6} + \frac{5}{12} \\ &= \frac{4}{12} + \frac{2}{12} + \frac{5}{12} \\ &= \frac{11}{12} \end{aligned}$$

It will be possible to fit all the leftover pizza pieces in one carton $\left(\frac{11}{12} < \frac{12}{12}\right)$



MEMORANDUM: DAY 3



QUESTION 1

1.1	$\frac{3}{10} \times \frac{2}{5}$ $= \frac{6}{50}$ $= \frac{3}{25}$	1.2	$5 \times \frac{9}{10}$ $= \frac{45}{10}$ $= \frac{9}{2}$	1.3	$\frac{3}{4} \times \frac{8}{9}$ $= \frac{24}{36}$ $= \frac{2}{3}$
1.4	$\frac{3}{4} \div \frac{5}{6}$ $= \frac{3}{4} \times \frac{6}{5}$ $= \frac{18}{20}$ $= \frac{9}{10}$	1.5	$\frac{5}{8} \div \frac{2}{3}$ $= \frac{5}{8} \times \frac{3}{2}$ $= \frac{15}{16}$	1.6	$9 \div \frac{2}{3}$ $= \frac{9}{1} \times \frac{3}{2}$ $= \frac{27}{2}$
1.7	$2 \frac{1}{10} \div \frac{3}{5}$ $= \frac{21}{10} \times \frac{5}{3}$ $= \frac{105}{30}$ $= \frac{7}{2}$	1.8	$\left(\frac{1}{3} + \frac{1}{2}\right) \times \frac{6}{7}$ $= \left(\frac{2}{6} + \frac{3}{6}\right)$ $\times \frac{6}{7}$ $= \left(\frac{5}{6}\right) \times \frac{6}{7}$ $= \frac{5}{7}$	1.9	$\frac{6}{7} \times \frac{1}{3} - \frac{1}{2}$ $= \frac{6}{21} - \frac{1}{2}$ $= \frac{2}{7} - \frac{1}{2}$ $= \frac{4}{14} - \frac{7}{14}$ $= -\frac{3}{14}$
1.10	$2 \frac{1}{3} + \frac{1}{4} \div \frac{3}{8}$ $= \frac{3}{7} + \frac{1}{4} \times \frac{8}{3}$ $= \frac{3}{7} + \frac{2}{3}$ $= \frac{9}{21} + \frac{14}{21}$ $= \frac{23}{21}$	1.11	$\frac{3}{4} - \frac{2}{5} \times \frac{5}{6}$ $= \frac{3}{4} - \frac{10}{30}$ $= \frac{3}{4} - \frac{1}{3}$ $= \frac{9}{12} - \frac{4}{12}$ $= \frac{5}{12}$	1.12	$6 \frac{1}{2} - \left(\frac{1}{3} \times \frac{3}{4}\right) \div \frac{2}{3}$ $= \frac{13}{2} - \left(\frac{1}{4}\right) \times \frac{3}{2}$ $= \frac{13}{2} - \frac{3}{4}$ $= \frac{52}{8} - \frac{3}{8}$ $= \frac{49}{8}$

QUESTION 2

2.1	$8 - 4 \div \frac{2}{3}$
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$$\begin{aligned} &= 8 - \frac{4}{1} \times \frac{3}{2} \\ &= 8 - \frac{12}{2} \\ &= 8 - 6 \\ &= 2 \end{aligned}$$

B

QUESTION 3

3.1

$$\begin{aligned} &7 \div 1\frac{3}{4} \\ &= \frac{7}{1} \div \frac{4}{4} \\ &= \frac{7}{1} \times \frac{4}{7} \\ &= 4 \end{aligned}$$

3.2

$$\begin{aligned} &\frac{1}{4} \div 3 \\ &= \frac{1}{4} \times \frac{1}{3} \\ &= \frac{1}{12} \end{aligned}$$

3.3

$$\begin{aligned} &\frac{2}{3} \times \frac{3}{4} \\ &= \frac{1}{2} \\ \\ &\therefore \frac{1}{2} \times 250 \\ &= 125 \text{ ml} \end{aligned}$$



MEMORANDUM: DAY 4:

1.

QUESTION 1

Simplify the following:

1.1	$\frac{2}{3} \times \frac{2}{3}$ $= \frac{4}{9}$	1.2	$\frac{2}{3} \times \frac{2}{3} \times \frac{2}{3}$ $= \frac{8}{27}$	1.3	$\left(\frac{3}{5}\right)^2$ $= \frac{9}{25}$
1.4	$\left(-\frac{1}{4}\right)^3$ $= -\frac{1}{64}$	1.5	$\sqrt{\frac{49}{100}}$ $= \frac{7}{10}$	1.6	$\sqrt{\frac{50}{72}}$ $= \sqrt{\frac{25}{36}}$ $= \frac{5}{6}$
1.7	$-\sqrt{\frac{25}{81}} + \frac{5}{9}$ $= -\frac{5}{9} + \frac{5}{9}$ $= 0$	1.8	$\sqrt{1\frac{11}{25}}$ $= \sqrt{\frac{36}{25}}$ $= \frac{6}{5}$	1.9	$\sqrt[3]{\frac{27}{64}}$ $= \frac{3}{4}$
1.10	$\sqrt[3]{\frac{125}{1000}}$ $= \frac{5}{10}$ $= \frac{1}{2}$	1.11	$\sqrt[3]{-\frac{2}{16}}$ $= \sqrt[3]{-\frac{1}{8}}$ $= -\frac{1}{2}$	1.12	$\left(\sqrt{\frac{4}{9}}\right)^2$ $= \left(\frac{2}{3}\right)^2$ $= \frac{4}{9}$
1.13	$\left(\sqrt[3]{\frac{1}{8}}\right)^3$ $= \left(\frac{1}{2}\right)^3$ $= \frac{1}{8}$	1.14	$\frac{\sqrt[3]{216}}{6}$ $= \frac{6}{6}$ $= 1$	1.15	$\frac{-\frac{3}{4} + \sqrt{\left(\frac{3}{2}\right)^2} \div 4}{2}$ $= \frac{-\frac{3}{4} + \sqrt{\frac{9}{4} \times \frac{1}{4}}}{2}$ $= \frac{-\frac{3}{4} + \sqrt{\frac{9}{16}}}{2}$ $= \frac{-\frac{3}{4} + \frac{3}{4}}{2}$ $= \frac{0}{2}$ $= 0$

Simplify first if numbers are not perfect squares.

Write as an improper

QUESTION 2

Choose from the symbols $>$; $<$ **or** $=$ to make the following statements true:

2.1

$$\sqrt{\frac{1}{81}} < \frac{1}{8}$$

Calculations:

$$\sqrt{\frac{1}{81}} = \frac{1}{9}$$

2.2

$$\sqrt{\frac{16}{25}} = \sqrt[3]{\frac{64}{125}}$$

Calculations:

$$\sqrt{\frac{16}{25}} = \frac{4}{5}$$

$$\sqrt[3]{\frac{64}{125}} = \frac{4}{5}$$

2.3

$$\sqrt{1\frac{1}{3} + \frac{4}{9}} > \sqrt{\frac{16}{36}}$$

Calculations:

$\begin{aligned} &\sqrt{1\frac{1}{3} + \frac{4}{9}} \\ &= \sqrt{\frac{4}{3} + \frac{4}{9}} \\ &= \sqrt{\frac{12}{9} + \frac{4}{9}} \\ &= \sqrt{\frac{16}{9}} \\ &= \frac{4}{3} \end{aligned}$	$\begin{aligned} &\sqrt{\frac{16}{36}} \\ &= \frac{4}{6} \\ &= \frac{2}{3} \end{aligned}$
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QUESTION 3

3.1

area of square:

$$side \times side = \frac{49}{81} m^2$$

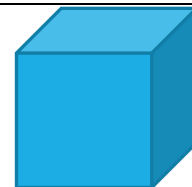
$$\therefore \text{length of the sides of the square} = \sqrt{\frac{49}{81}} = \frac{7}{9} m$$

3.2

(i) sides of a cube is $\frac{5}{6} m$.

volume of the cube = $side \times side \times side$

$$\begin{aligned} &= \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \\ &= \frac{125}{216} m^3 \end{aligned}$$



(ii) Volume of the new cube = $\frac{125}{216} - \frac{61}{216} = \frac{64}{216}$

$$\therefore \text{length of the sides of the new cube} = \sqrt[3]{\frac{64}{216}} = \frac{4}{6} = \frac{2}{3} m$$