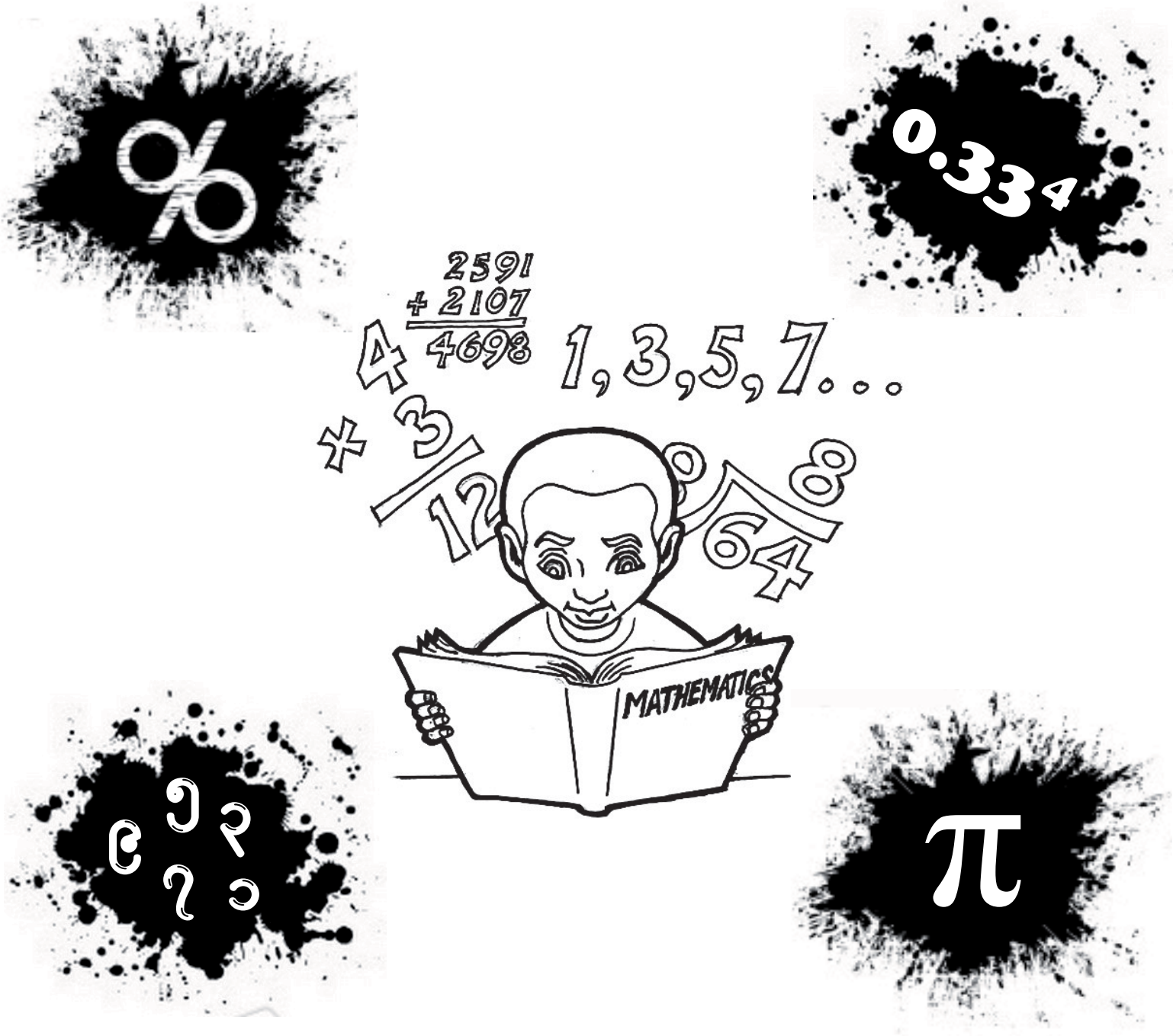
Maths Module 1: Numbers

Teacher's Guide



The Curriculum Project

Maths Module 1: Numbers

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1. Whole Numbers

1.1 Introduction

Think

Give the students time to write some uses of maths. Then get them to call out their ideas and make a list on the board.
Possible suggestions:
shopping, measuring things (for building, etc.), cooking, counting (money, etc.)

Go through the question about Dave as a class, give the students time to think and ask them what the mistake was.
Answer:
Dave made a mistake because 100 - 23 is 77 not 57. He should have asked for more change.

1.2 Place Value

Think

Give the students some time to answer the question. Ask them the value of the numbers and ask a student to write the number in words on the board.
Answers:
The value of the 8 is 8 x 10 = 80, the value of the 4 is 4 x 10,000 = 40,000.
In words the number is fourty seven thousand two hundred and eighty six.

Practice - *Answers*

i. a) *two hundred and four* ***b)*** *one thousand and twenty three*
c) *nine thousand five hundred and fifty two* ***d)*** *ten thousand two hundred and fifty six*
e) *eighty one thousand five hundred and five* ***f)*** *three hundred and seventy thousand*

ii. a) *705* ***b)*** *2652* ***c)*** *22,500* ***d)*** *1,257,000*

iii. *There are many different answers to the last question. Ask a few students to come to the board and write their answer. Make corrections if necessary.*

Possible answer: 26,703, 36,072, 72,063, 76,203

1.3 Rounding

Practice - *Answers*

a) *48,000. Round down because the number in the hundreds column is less than 5.*

b) *9800* ***c)*** *57,000* ***d)*** *47,000,000*

1.4 Addition and Subtraction

Practice - *Answers*

i. ***Across:*** ***1.*** *421* ***4.*** *1411* ***6.*** *5616* ***7.*** *759*
Down: ***1.*** *4615* ***2.*** *2146* ***3.*** *1164* ***5.*** *1699*

ii. *Rangoon to Taungyi to Mandalay = 905 km.*
The difference is 905 - 695 = 210 km.

iii. *7500 m*

iv. ***a)*** *600* ***b)*** *15,920* ***c)*** *39,700* ***d)*** *73,404*

Extra Activity - This is an activity for 2 people.

The ancient Egyptian people used the symbols | for 1, ₃ for 10 and 9 for 100.

|	||	|||	||| |	||| ||	||| |||	||| ||| |	||| ||| ||	||| ||| |||		₃ ₃	₃ ₃ ₃ ₃ ₃		999
1	2	3	4	5	6	7	8	9	10	20	50	100	300

From the table we can see that 9 ₃ ₃ ₃ ₃ ₃ \|\|\|\|\|\| is 156 and 999 ₃ ₃ 9 \|\|\| \| is 427.

This activity demonstrates the symbols that Egyptian people used before Roman numerals. Copy the table onto the board and explain to the students what each symbol represents. Go through the example for 156 and 427 below the table to make sure the students understand.

After explaining about Egyptian numbers ask the students to do the following exercises:

a) Write 382 and 748 in Egyptian numbers.

b) Write 5 numbers between 10 and 1000 using Egyptian symbols. Ask them to swap with their partner and work out the numbers they have written.

c) Work in pairs to solve these calculations. Tell the students they can only write using Egyptian symbols.

₃ ₃ ₃ \|\|\| + ₃ ₃ \|\|

₃ ₃ ₃ \|\|\| + ₃ ₃ \|\|\|
₃ ₃ ₃ \|\|\| \|\|\|

999 ₃ ₃ ₃ \|\|\| + 999 ₃ ₃ ₃ \|\|\|
99 ₃ ₃ ₃ \|\|\| ₃ ₃ ₃ \|\|\|
₃ \|\| ₃ ₃

1.5 Multiplication and Division

Think

Ask the students to look at this exercise in pairs. If they write the numbers in different orders, then they should see that the answer is always the same for multiplication but not for division.

Ask them what this means before explaining that multiplication is commutative and division is not.

Think

Explain the question to the class and ask them to answer it individually.

Answers:

If we multiply by 100, then we add two zeros. If we multiply by 1000 we add three zeros.

Practice - *Answers*

i. a) *329* ***b)*** *550* ***c)*** *117* ***d)*** *168* ***e)*** *700* ***f)*** *536* ***g)*** *168*

For this exercise ask students which method they chose and get some of them to demonstrate their calculation on the board. Ask the class if they think the solutions given are correct.

ii. a) *420 minutes* ***b)*** *336 baht* ***c)*** *312 baht*

Practice - *Answers*

a) *8875* ***b)*** *15,246* ***c)*** *36,518* ***d)*** *7712* ***e)*** *35,028* ***f)*** *37,814*

Think

Explain the question to the class and ask them to solve it individually.
Answer:
We use the splitting method by writing 6 = 2 x 3. So, 816 ÷ 6 = 816 ÷ 2 ÷ 3 = 408 ÷ 3 = 136.

Practice - *Answers*

a) *56 ÷ 2 ÷ 2 = 14* ***b)*** *90 ÷ 3 ÷ 5 = 6* ***c)*** *112 ÷ 2 ÷ 8 = 7* ***d)*** *720 ÷ 2 ÷ 2 ÷ 6 = 30*

Practice - *Answers*

a) *12* ***b)*** *230* ***c)*** *268* ***d)*** *256* ***e)*** *254 remainder 10* ***f)*** *249 remainder 9*

Activity - This is an activity for 1 person.

Ask the students to multiply 123456789 by 3 using long multiplication. Then ask them to multiply the result by 9. Then ask them to multiply 123456789 by 5 and then the result by 9.
Without calculating see if the students can notice the pattern and say what the result will be if they multiply by 4 and then by 9 and also by 7 and then by 9.

Answer - (123456789 x 3) x 9 = 3333333303, (123456789 x 5) x 9 = 5555555505. From this the students should be able to deduce that (123456789 x 4) x 9 = 4444444404 and (123456789 x 7) x 9 = 7777777707.

1.6 Order of Operations

Think

Let students look at the calculations in pairs and try different ways to solve them.
Answers:
6 + 4 x 7 - 13 = 6 + 28 -13 = 21. (Do the multiplication first.)

37 - 35 ÷ 5 = 37 - 5 = 32. (Do the division first.)

8 x 4 + 15 ÷ 3 = 32 + 5 = 37. (Do the multiplication and division first, then add the numbers.)

Write the sentence on the board and ask a student to come and complete the gaps.
Answer:
If we have more than one operation, we do the multiplication and division first. Then we do the addition and subtraction.

Practice - *Answers*

a) *26* ***b)*** *26* ***c)*** *11* ***d)*** *8* ***e)*** *8* ***f)*** *21* ***g)*** *30*

Practice - *Answers*

i. a) +, - ***b)*** ÷, ÷, x ***c)*** -, +, + ***d)*** x, -, +, ÷

ii. a) *12 ÷ (3 x 2) = 2* ***b)*** *4 x (5 + 7) = 48* ***c)*** *8 + (6 ÷ 3) + 2 = 12* ***d)*** *(27 - 5) x (9 - 5) = 88*

iii. a) *2* ***b)*** *1* ***c)*** *18* ***d)*** *125* ***e)*** *24* ***f)*** *8* ***g)*** *1000* ***h)*** *1*

iv. a) *(3 x 2) + (3 x 3) + (3 x 1) = 18* ***b)*** *(5 x 2) + (4 x 1) + (6 x 2) + (10 x 1) = 36*

v. c) *(82 - 32) + (27 - 12) = 65*

Think

Give the students some time to come up with different answers. Ask them how many they found.
Answers include:
(3 x 5) - 2 x (7 + 1) = -1, (3 x 5 - 2) x (7 + 1) = 104 and 3 x (5 - 2) x 7 + 1 = 64.

Now ask all the students to write some calculations similar to the example and then swap with their partner to make different answers using brackets.

Activity - This is an activity for 2 or 4 people. You will need: paper and scissors.

Ask the groups to make cards numbered 0-9. Tell them to fold their cards so they can't see the numbers.
Explain the activity and go through the example as a class to make sure everybody understands.
In teams of 1 or 2 let the students play the activity 10 times. The team with the lowest score at the end wins.

2. Factors and Multiples

2.1 Introduction

Think

Explain the question to the class and ask them to answer it individually.
Answers:
The factors of 12 are 1, 2, 3, 4, 6 and 12. The factors of 18 are 1, 2, 3, 6, 9 and 18.

Practice - *Answers*

a) *2 x 6* ***b)*** *2 x 12* ***c)*** *3 x 9* ***d)*** *2 x 18* ***e)*** *8 x 8* ***f)*** *2 x 40* ***g)*** *2 x 48* ***h)*** *12 x 12*

There is more than one answer to these questions. See how many the students can find.

Practice - *Answers*

i. a) *15 is a multiple of 1, 3, 5, and 15*
b) *27 is a multiple of 1, 3, 9 and 27*
c) *40 is a multiple of 1, 4, 5, 8, 10, 20 and 40*
d) *40 is a multiple of 1, 4, 5, 8, 10, 20 and 40*

ii. a) *21, 24, 27, 30, 33, 36, 39* ***b)*** *28, 35, 42, 49, 56* ***c)*** *26, 39, 52, 65*

2.2 Prime Numbers

Think

Let the students discuss the statement in pairs and then ask them what their answer is. Ask them to explain their answer.
Answer:
The statement is true. All even numbers greater than 2 have at least three factors - 1, 2 and the number itself.

Practice - *Answers*

a) *2, 3, 5, 7, 11* ***b)*** *23, 29* ***c)*** *31, 37, 41, 43, 47*

Activity - This is an activity for 1 person.

Ask the students to write a 10 x 10 number grid in their exercise books and follow the instructions.
When they have finished tell them to write out all the numbers that are circled or not crossed out.
Ask them what the numbers are. *Answer - All the prime numbers less than 100.*

2.3 Indices

Practice - *Answers*

i. a) 3^3 ***b)*** 2^3 ***c)*** 5^4 ***d)*** 7^5 ***e)*** 13^4 ***f)*** $2^2 \times 3^2$ ***g)*** $3^3 \times 5^2$ ***h)*** $3 \times 11^2 \times 2^2$

i) $5^2 \times 13^3$

ii. a) 27 ***b)*** 32 ***c)*** 25 ***d)*** 81 ***e)*** 49 ***f)*** 24 ***g)*** 72 ***h)*** 225 ***i)*** 378

2.4 Prime Factors

Practice - *Answers*

a) 3 and 5 ***b)*** 3 ***c)*** 2 and 5 ***d)*** 2

Extra Activity - This is an activity for 2 people.

The first player thinks of a number between 1 and 100. The second player asks questions to try and guess the number. For example: 'Is it a prime number?', 'Is it an odd/even number?' 'Is it a multiple of 3?' 'Is it a factor of 10?' 'Is it divisible by 5?' Player 1 can only answer 'yes' or 'no'. After player 2 has asked a few questions and tried to guess the number, the players swap and play again. Let the students play a few times.

This activity would be easier if the students have a 10 x 10 numbered square. They can use it to cross out numbers when they are guessing.

Think

Explain the question to the class and ask them to solve it individually. When they have solved it, ask for some demonstrations on the board using different products.
Possible answers:
720 = 72 x 10 = 24 x 30 = 18 x 40.
The final product of prime factors should be the same as the example!

2.5 Highest Common Factor (H.C.F.)

Practice - *Answers*

a) *3* ***b)*** *12* ***c)*** *7* ***d)*** *15* ***e)*** *13* ***f)*** *4*

2.6 Lowest Common Multiple (L.C.M.)

Practice - *Answers*

a) *15* ***b)*** *24* ***c)*** *15* ***d)*** *48* ***e)*** *60* ***f)*** *72*

Activity - This is an activity for 4 people. You will need: paper.

Split the class into groups of 4 and ask the groups to make 20 pieces of numbered paper. Tell them to fold the paper so they cannot see the number. Split each group in half to make two teams, A and B. Start with Team A picking two numbers and showing them to Team B. Team B has to find the L.C.M. of the two numbers. If they are right they get one point. Team B then picks the numbers and Team A has to find the L.C.M. The first team to get 10 points wins.

Extra Activity - This is an activity for the class. You will need: paper.

Before the class make cards numbered -10 to 100, fold them and put them in a bag. In class write the 3 x 3 grid on the board. Tell students to work in pairs and copy the grid into their books. Take numbers from the bag and call them out. The students have to put the number in the right catagory. The first pair to get 3 in a row wins. Play again using the same grid or by making new grids.

This activity can be made more difficult by using bigger grids.

Prime Number	*Multiple of 7*	*Divisible by 5*
Factor of 24	*Prime number squared*	*Factor of 40*
Multiple of 3	*Divisible by 3*	*Negative number*

3. Negative Numbers

3.1 Introduction

Think

Ask the students to work in pairs. At the end of the exercise make sure they understand that the value of a negative number *decreases* as the number *increases*.

Answers:

a) *-2 > -4* ***b)*** *-3 < -1* ***c)*** *-4 < 1* ***d)*** *-4 < -2 < 0*

e) *5 > 1 > -3* ***f)*** *-3 > -9 > -12*

3.2 Temperatures

Practice - *Answers*

The temperatures are: 10°C, 5°C, 0°C, -2°C, -4°C.

a) *Plymouth* ***b)*** *3 (The answer is <u>not</u> -3)* ***c)*** *4* ***d)*** *Yes* ***e)*** *Aberdeen*

3.3 Addition and Subtraction

Practice - *Answers*

i. a) *-3* ***b)*** *1* ***c)*** *-12* ***d)*** *-6* ***e)*** *-3* ***f)*** *24* ***g)*** *12* ***h)*** *-14* ***i)*** *-8*

ii. a) *2* ***b)*** *-1* ***c)*** *7* ***d)*** *9* ***e)*** *1* ***f)*** *-10*

iii.

5	-4	2	-1	-3	-8	0	5
1	-2	1	-4	-11	-8	5	
-1	-1	-3	-15	-19	-3		
-2	-4	-18	-34	-22			
-6	-22	-42	-56				
-28	-64	-98					
-92	-162						
-254							

3.4 Multiplication and Division

Practice - *Answers*

a) *-24* ***b)*** *-14* ***c)*** *-16* ***d)*** *24* ***e)*** *131* ***f)*** *112* ***g)*** *-3* ***h)*** *-5* ***i)*** *-4*

j) *7* ***k)*** *8* ***l)*** *12*

4. Decimals

4.1 Introduction

Think

Explain to the students the value of the number in the tenths column. Ask them to give the value of the number in the hundreths and in the thousandths column and write them as decimals. Finally, ask them to say the number in words.

Answers:
There are 7 hundreths and 5 thousandths, as decimals these are 0.07 and 0.005.
In words the number is eight point four seven five.

Practice - *Answers*

ii. a) *eight tenths* ***b)*** *eight thousandths* ***c)*** *five thousandths* ***d)*** *five hundreths*
Make sure the students understand how to say decimal numbers correctly.

iii. a) *15.34* ***b)*** *11.07* ***c)*** *27.0035* ***d)*** *0.506*

4.2 Addition of Decimals

Practice - *Answers*

i. a) *10.8* ***b)*** *0.039* ***c)*** *3.98* ***d)*** *0.2673* ***e)*** *4.698* ***f)*** *0.3552* ***g)*** *27.374*

ii. *22.6 cm*

Activity - This is an activity for 2 people.

Ask the students to copy the grid into their exercise books. Explain the exercise and give an example. Give them 2 minutes to cross out pairs of numbers that have a sum between 5 and 7. Tell them to swap books with their partner and add up the total of their remaining numbers. The person with the lowest total wins. Find who got the lowest total in the class and play again.

4.3 Subtraction of Decimals

Practice - *Answers*

i. a) *7.8* ***b)*** *16.87* ***c)*** *6.939* ***d)*** *2.94* ***e)*** *2.4* ***f)*** *0.7294* ***g)*** *7.81*

ii. *5.9 cm*

4.4 Changing Units - Length

Think

Ask the students to look at the pictures in pairs and decide which unit is used for each example. Check they have the right answers.

Answers:

a) *Mae Sot to Bangkok is measured in km,* ***b)*** *the length of a football pitch is measured in m,*

c) *the length of a mosquito is measured in mm,* ***d)*** *the width of a classroom is measured in m.*

Ask the students to guess the distance to the moon. Tell them the answer will come later in the module.

Practice - *Answers*

a) *200 cm* ***b)*** *30 mm* ***c)*** *150 cm* ***d)*** *9200 mm* ***e)*** *2,000,000 mm*

a) *30 cm* ***b)*** *1.5 m* ***c)*** *0.12 m* ***d)*** *0.125 mm* ***e)*** *2.85 km*

4.5 Changing Units - Mass

Think

Answers:
a) *Your friend is measured in kg,* ***b)*** *a jar of coffee is measured in g*

c) *a truck is measured in tonnes,* ***d)*** *100 elephants are measured in tonnes.*

Practice - *Answers*

i. a) *12,000 kg* ***b)*** *13,000 g* ***c)*** *0.0003 mg* ***d)*** *700,000 g* ***e)*** *720,000 mg*

ii. a) *0.015 t* ***b)*** *15 g* ***c)*** *5.02 kg* ***d)*** *0.19 t* ***e)*** *0.086 kg*

4.6 Adding and Subtracting Quantities

Practice - *Answers*

i. a) *5.86 m* ***b)*** *0.273 m* ***c)*** *1046 g* ***d)*** *0.087052 kg* ***e)*** *448.2 cm* ***f)*** *19.85 g*

ii. a) *2.85 kg* ***b)*** *34 km*

4.7 Multiplying Decimals by Whole Numbers

Think

Ask the students to think about how they would answer this question using the information.
Answer:
If we multiply 0.2 by 10 then 0.3 x 2 = 0.6. We divide the answer by 10 to get 0.06.

Practice - *Answers*

a) *3251.6* ***b)*** *0.504* ***c)*** *12.87* ***d)*** *322.32* ***e)*** *34 954.7* ***f)*** *5.922*

g) *131.56* ***h)*** *3438.08* ***i)*** *84.41 m*

4.8 Dividing Decimals by Whole Numbers

Practice - *Answers*

i. a) *0.224* ***b)*** *3.8* ***c)*** *0.1092* ***d)*** *0.0057* ***e)*** *0.45* ***f)*** *0.036* ***g)*** *3.12* ***h)*** *0.01034*

ii. *3.248 cm*

4.9 Multiplying Decimals

Think

Ask the students to think about how they would answer this question using the information.
Answer:
If we multiply 0.2 by 10 then 0.3 x 2 = 0.6. We divide the answer by 10 to get 0.06.

Practice - *Answers*

a) *0.008* ***b)*** *0.0003* ***c)*** *0.0006* ***d)*** *0.0007* ***e)*** *0.00056* ***f)*** *4.8* ***g)*** *0.0016* ***h)*** *0.0036*

The number of decimal places in the answer is the sum of the decimal places in the numbers being multiplied.

Practice - *Answers*

a) *0.1502* ***b)*** *1.12* ***c)*** *0.0008* ***d)*** *0.0025* ***e)*** *12.4* ***f)*** *0.36924* ***g)*** *0.11152*

h) *19.8*

4.10 Division by Decimals

Practice - *Answers*

a) *12* ***b)*** *60* ***c)*** *120* ***d)*** *12* ***e)*** *52 000* ***f)*** *0.012* ***g)*** *3.1* ***h)*** *1.2*

4.11 Decimal Places

Think

Explain the question to the class and ask them to solve it individually. (Remind students that they studied rounding at the beginning of the module.)

Answer:

We round to 1 d.p. by looking at the number in the hundreths column and to 2 d.p. by looking at the number in the thousandths column.

Practice - *Answers*

i. a) *14* ***b)*** *110* ***c)*** *152* ***d)*** *1*

ii. a) *1.27* ***b)*** *0.042* ***c)*** *3.99* ***d)*** *8.03*

iii. a) *0.22* ***b)*** *3.80* ***c)*** *0.11* ***d)*** *0.01* ***e)*** *0.45* ***f)*** *0.04* ***g)*** *3.12*

h) *0.01* ***i)*** *3.25 cm*

5. Fractions

5.1 Introduction

Think

This exercise is given to help the students understand the parts to whole concept of fractions. Let them try to write the fraction of the square that is shaded.

Answer:

Three parts out of four are shaded, as a fraction this is $\frac{3}{4}$.

Make sure the students understand the difference between numerator and denominator.

Practice - *Answers*

i.a) $\frac{1}{60}$ *b)* $\frac{7}{60}$ *c)* $\frac{35}{60}$ *d)* $\frac{55}{60}$

ii. $\frac{5}{7}$

iii. $\frac{9}{44}$

iv. *Here is a possible answer:*

Maths	*English*	*Social Studies*	*Total*
5	*6*	*8*	*19*

So, $\frac{5}{19}$ *like maths the most.* $\frac{6}{19}$ *like English the most and* $\frac{8}{19}$ *like Social Studies the most.*

v. *One square represents* $\frac{1}{15}$ *of the garden.* $\frac{5}{15}$ *of the garden has been planted.*

5.2 Improper Fractions and Mixed Numbers

Think

This exercise is given to show the equivalence of improper fractions and mixed numbers. Give the students some time to think of the answer.

Answer:

That the two fractions are equal.

Activity - This is an activity for 2 people.

Give each student 2 minutes to write some examples of improper fractions and mixed numbers in their exercise books. Tell them to swap books with someone and classify the fractions they are given.

Practice - *Answers*

i. a) $2\frac{1}{5}$ *b)* $1\frac{5}{7}$ *c)* $3\frac{3}{8}$ *d)* $9\frac{3}{9}$ *e)* $15\frac{1}{6}$ *f)* $13\frac{4}{9}$

ii. a) $\frac{11}{4}$ *b)* $\frac{25}{6}$ *c)* $\frac{56}{15}$ *d)* $\frac{89}{12}$ *e)* $\frac{43}{9}$ *f)* $\frac{73}{7}$

5.3 Equivalent Fractions

Think

Let the students look at the exercise, shade the shapes and then write the fractions. They should see that the two fractions have the same value.

Think

Explain the question to the students and ask them to write out the set of equivalent fractions.
Answer:

$\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{8}{20}$.....

Practice - *Answers*

a) $\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12} = \frac{5}{15} =$ ..... *b)* $\frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12} =$ ..... *c)* $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15} =$ .....

Activity - This is an activity for 2 people. You will need: paper and scissors.

In pairs ask the students to write numbers 1-9 on squares of paper. Tell them to copy the diagram into their exercise book and place the numbers on it to make equivalent fractions. Give them 5 minutes to make as many sets of equivalent fractions as they can. The pair with the most sets in the class wins.

Practice - *Answers*

a) $\frac{1}{6} = \frac{3}{18}$ **b)** $\frac{3}{7} = \frac{2}{14}$ **c)** $\frac{3}{8} = \frac{18}{48}$

d) $\frac{5}{6} = \frac{30}{36}$ **e)** $\frac{4}{9} = \frac{24}{54}$ **f)** $\frac{5}{7} = \frac{40}{56}$

g) $\frac{8}{9} = \frac{40}{45}$ **h)** $\frac{7}{12} = \frac{84}{144}$ **i)** $\frac{7}{8} = \frac{49}{56}$

5.4 Simplifying Fractions

Practice - *Answers*

i. a) $\frac{3}{5}$ ***b)*** $\frac{2}{3}$ ***c)*** $\frac{7}{11}$ ***d)*** $\frac{11}{12}$ ***e)*** $\frac{1}{3}$ ***f)*** $\frac{7}{11}$

ii. a) $\frac{6}{250}$ ***b)*** $\frac{60}{24} = 2\frac{1}{2}$

5.5 Ordering Fractions

Think

Give students time to use the wall to decide which fraction is bigger. Ask them how they used the wall.
Answers:

$\frac{1}{2}$ *is bigger than* $\frac{1}{3}$. $\frac{1}{4}$ *is bigger than* $\frac{1}{2}$.

We learn from the wall that $\frac{3}{4}$ *is greater than* $\frac{2}{3}$ *by counting the 'bricks'.*

Extra Activity - This is an activity for the class. You will need: paper, paperclips and string.

Before the class make cards with fractions, one for each student and some extra. In class tie a piece of string across the classroom. Give each student a fraction card. Attach the extra fraction cards to the string in ascending order. Ask students to come and attach their fraction to the string in the right place. When all the students have attached their card ask them if the cards are in the right order. If a student can see a mistake ask them to come and correct it by moving the card. Continue until everyone agrees that the fractions are in the right order.

This activity can be used for different topics: Ordering decimals, ordering quantities, ordering mixed fractions, decimals and percentages, ordering whole numbers and ordering positive and negative numbers.

Practice - *Answers*

i. **a)** $\frac{1}{4} > \frac{1}{7}$ **b)** $\frac{1}{2} < \frac{7}{10}$ **c)** $\frac{5}{6} > \frac{3}{8}$ **d)** $\frac{3}{7} < \frac{32}{56}$

ii. **a)** $\frac{5}{6}$ **b)** $\frac{9}{11}$ **c)** $\frac{5}{6}$ **d)** $\frac{7}{9}$

iii. **a)** $\frac{17}{28}, \frac{3}{4}, \frac{11}{14}, \frac{5}{7}$ **b)** $\frac{7}{12}, \frac{2}{3}, \frac{17}{24}, \frac{3}{4}$ **c)** $\frac{4}{10}, \frac{5}{8}, \frac{13}{20}, \frac{3}{4}$

5.6 Changing Fractions to Decimals

Think

Give students time to try and work out how to write 0.2, 0.75 and 0.05 as fractions. Ask a student to demonstrate on the board. Correct them if necessary.

Answers:

$0.2 = \frac{2}{10} = \frac{1}{5}, 0.75 = \frac{75}{100} = \frac{3}{4}, 0.05 = \frac{5}{100} = \frac{1}{20}$

Practice - *Answers*

i. a) *0.4* ***b)*** *0.25* ***c)*** *2.16* ***d)*** *0.3125* ***e)*** *1.875*

ii. a) $0.4 < 0.5$ ***b)*** $0.8 > 0.75$ ***c)*** $0.8 > 0.88$ ***d)*** $0.15 > 0.08$

iii. a) $\frac{3}{10}$ ***b)*** $\frac{21}{50}$ ***c)*** $2\frac{39}{50}$ ***d)*** $7\frac{3}{25}$ ***e)*** $\frac{13}{40}$

iv. a) *0.25, 0.26, 0.3, 0.31, .05* ***b)*** *0.8, 085, 0.91, 0.95* ***c)*** *1.35, 1.4, 1.7, 1.75, 1.8*

Extra Activity - This is an activity for the whole class. You will need six pieces of fruit. (You can use cake, sweets or anything else but each item needs to be the same.)

Put 3 pieces of fruit on one table, 2 on a second table and 1 on a third table. Ask 10 students to leave the classroom. Ask them to come back 1 at a time and sit at the table where they think they will get the most fruit. Before the students come back in, discuss these questions with the rest of the class:

Where do you think the students will sit? Is it better to be first or last?
How much fruit will each student get? Where is the best place in the queue?

When all 10 students are back in the room, ask all the students to:

a) Write down how much fruit each student gets as a fraction and as a decimal.

b) Write down the largest amount of fruit any one student gets.

You can make this activity more difficult by using more fruit, more tables or more students.

v.

a) 4.101 m, 4.009 m, 4.0059 m

b) 1.25 kg, 0.55 kg, 0.525 kg, $\frac{1}{8}$ kg

c) 9.99 tonnes, 9.904 tonnes, $9\frac{9}{10}$ tonnes, 9.804 tonnes,

d) 2.02 litres, 2.0 litres, $\frac{1}{5}$ litres, 0.022 litres

5.7 Fractions as Recurring Decimals

Think

Let the students work in pairs to calculate the answers to 12 decimal places. Ask them what they notice about the answers.

Answers:

$\frac{2}{3} = 0.666666666666$ $\frac{2}{7} = 0.285714285714$

The students should notice that the numbers after the decimal places repeat themselves.

Practice - *Answers*

a) $0.\dot{4}$ ***b)*** $0.\dot{1}\dot{8}$ ***c)*** $0.\dot{7}$ ***d)*** $1.\dot{1}4285\dot{7}$

5.8 Adding and Subtracting Fractions

Think

Ask the students to shade the diagram and write the fraction of the garden that is planted. Ask them to simplify the answer.

Answer:

$\frac{3}{5}$

After this ask the students if they can calculate this fraction using addition. Ask a student to demonstrate on the board if they know how to do it.

Answer:

$\frac{2}{15} + \frac{3}{15} + \frac{4}{15} = \frac{9}{15} = \frac{3}{5}$

Practice - *Answers*

i. a) $\frac{4}{5}$ ***b)*** $\frac{7}{8}$ ***c)*** $\frac{3}{4}$ ***d)*** $\frac{99}{99} = 1$

ii. **a)** $\frac{17}{30}$ **b)** $\frac{25}{42}$ **c)** $\frac{29}{30}$ **d)** $\frac{82}{99}$ **e)** $\frac{13}{16}$ **f)** $\frac{5}{12}$ **g)** $\frac{11}{12}$ **h)** $\frac{1}{2}$

iii. **a)** $\frac{2}{3}$ **b)** $\frac{1}{2}$ **c)** $\frac{1}{16}$ **d)** $\frac{18}{55}$ **e)** $\frac{3}{26}$ **f)** 0

iv. **a)** $\frac{3}{4}$ **b)** $\frac{1}{2}$ **c)** $\frac{1}{16}$ **d)** $1\frac{7}{16}$

v. **a)** $1\frac{1}{2}$ **b)** $2\frac{2}{5}$ **c)** $4\frac{1}{2}$ **d)** $\frac{4}{5}$ **e)** $5\frac{3}{4}$ **f)** $1\frac{2}{9}$ **g)** $6\frac{5}{21}$

vi. a) *There are two mistakes:*

$\frac{2}{5} = \frac{8}{20}$ *not* $\frac{4}{20}$ *and Tin Tin added the numerators and denominators of the fractions.*

b) *There is* $\frac{1}{3}$ *of the day remaining (subtract the three fractions given from 1).*

c) *The perimeter is 24 m.*

d) *The weight of her harvest was* $14\frac{3}{4}$ *kg which is 14.75 kg as a decimal.*

5.9 Multiplying Fractions

Practice - *Answers*

i. *For the first part, ask some students to come and draw their diagrams on the board.*

ii. a) *6* ***b)*** *6* ***c)*** *24* ***d)*** *12 metres* ***e)*** *50 baht* ***f)*** *1 day* ***g)*** *15 km* ***h)*** *21 hours*

Practice - *Answers*

i. a) $\frac{3}{8}$ ***b)*** $\frac{10}{21}$ ***c)*** $\frac{7}{16}$ ***d)*** $\frac{3}{20}$ ***e)*** $\frac{3}{35}$

ii. a) $\frac{7}{8} \times \frac{4}{21} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ ***b)*** $\frac{4}{7}$ ***c)*** $1\frac{1}{11}$ ***d)*** $\frac{5}{48}$ ***e)*** $\frac{4}{11}$ ***f)*** $\frac{2}{9}$

g) $\frac{3}{4} \times \frac{8}{9} \times 1 = 1 \times \frac{2}{3} \times 1 = \frac{2}{3}$ ***h)*** $\frac{1}{7}$ ***i)*** $\frac{1}{11}$

iii. a) $\frac{14}{25}$ ***b)*** $\frac{1}{2}$ ***c)*** 8 ***d)*** $16\frac{1}{3}$ ***e)*** 7

5.10 Dividing by Fractions

Practice - *Answers*

a) *10* ***b)*** *14* ***c)*** *35* ***d)*** *99* ***e)*** *63* ***f)*** $\frac{3}{4}$ ***g)*** $\frac{1}{12}$ ***h)*** $\frac{3}{2}$ ***i)*** $\frac{3}{8}$

Practice - *Answers*

i. a) $7\frac{1}{2}$ ***b)*** $6\frac{2}{3}$ ***c)*** $\frac{5}{6}$ ***d)*** $5\frac{1}{3}$

ii. *If we let* $a = \frac{1}{3}$ *and* $b = \frac{1}{4}$ *then:*

$a + b = \frac{3}{4}$, $c = \frac{1}{4}$ *and* $d = \frac{3}{4}$

This is the correct solution because a, b, c and d are all proper fractions. If we swap the values of a and b, then d is an improper fraction.

Activity - This is an activity for 2 people.

Working in pairs ask the students to write down the four steps needed to solve the problem. If they are struggling tell them to use the example above to help them. Ask some students to read out their steps. Ask one pair with the correct answer to write their steps on the board. Now ask the class to solve the problem using these steps.

Answer

Step 1 : Write the mixed numbers as improper fractions. Step 2 : Invert the third fraction.

Step 3: Cancel the common factors. Step 4 : Find the answer. The answer to the problem is: $\frac{3}{8}$

6. Percentages

6.1 Introduction

Think

Ask the students if they can calculate how many women work in the factory.
Answer:
If 60 out of every 100 workers are women and there are 200 workers, then there are 120 women.

6.2 Percentages, Fractions and Decimals

Think

Using what has been learnt so far the students should be able to write percentages as fractions and decimals. Give them some time to try it and then ask students to demonstrate on the board.
Answers:

i. a) $10\% = \frac{1}{10} = 0.1$ **b)** $20\% = \frac{20}{100} = \frac{1}{5} = 0.1$ **c)** $50\% = \frac{50}{100} = \frac{1}{2} = 0.5$ **d)** $70\% = \frac{70}{100} = \frac{7}{10} = 0.7$

ii. *25 % of students chose bananas, 12.5 % chose apples and 75 % did not choose Jackfruit.*

Think

See if the students can reverse the method in the example to change percentages to fractions.
Answers:

$30\% = 0.3 = \frac{3}{10}$ $62.5\% = 0.625 = \frac{625}{1000} = \frac{5}{8}$

Extra Activity - This is an activity for 4 people. You will need: small pieces of paper that are all the same size.

Give each group some paper and ask them to make 12 sets of 4 cards. Each set has one card with a percentage (e.g. 50 %), a card with the decimal equivalent (0.5), a card with a fraction (50/100) and a card with the simplified fraction (1/2). When the cards are finished the dealer mixes them up and gives each player 7 cards and puts the rest in the middle. Player 1 asks another player for a card. If they can make a matching pair (e.g. 50 % = 0.5) they put it on the table and the next person plays. If they can't make a match they pick up one card from the pile. If they can now make a match they put it down and the next person plays. The game ends when one player has no cards left. The winner is the player with the most matched pairs.

Practice - *Answers*

i. **a)** $\frac{3}{10}$ **b)** $\frac{85}{100}$ **c)** $\frac{17}{40}$ **d)** $\frac{21}{40}$

ii. **a)** 0.44 **b)** 0.68 **c)** 1.7 **d)** 0.165 **e)** 0.284 **f)** 2.3575

iii.

	Fraction	Decimal	Hundredths	Percentage
a)	$\frac{1}{10}$	0.1	$\frac{10}{100}$	10 %
b)	$\frac{9}{10}$	0.9	$\frac{90}{100}$	90 %
c)	$\frac{8}{10}$	0.8	$\frac{80}{100}$	80%
d)	$\frac{6}{10}$	0.6	$\frac{60}{100}$	60%
e)	$\frac{3}{10}$	0.3	$\frac{30}{100}$	30%
f)	$\frac{1}{2}$	0.5	$\frac{50}{100}$	50%
g)	$\frac{1}{4}$	0.25	$\frac{25}{100}$	25%
h)	$\frac{3}{4}$	0.75	$\frac{75}{100}$	75%
i)	$\frac{1}{5}$	0.2	$\frac{20}{100}$	20 %

6.3 Percentages and Quantities

Practice - *Answers*

a) *25 %* ***b)*** *75 %* ***c)*** *15 %* ***d)*** *30 %* ***e)*** *60 %* ***f)*** $6\frac{2}{3}\%$ ***g)*** *50 %* ***h)*** *33.75 %*

i) *70 %* ***j)*** *56.25 %*

Practice - *Answers*

a) *48* ***b)*** *252* ***c)*** *920 g* ***d)*** *2.52 m* ***e)*** *340 m* ***f)*** *2.94 mm* ***g)*** *48 baht*

h) *65 % do not sell food, so 78 shops do not sell food* ***i)*** *93,000*

6.4 Percentage Increase and Decrease

Practice - *Answers*

i. a) *140* ***b)*** *544* ***c)*** *2768* ***d)*** *319*

ii. a) *70* ***b)*** *210* ***c)*** *2448* ***d)*** *93*

iii. a) *9,100,000,000 (9100 million)*

b)

Type of clothing	*Original price*	*Discount*	*New price*
Jeans	*900 baht*	*35 %*	*585 baht*
T-Shirt	*240 baht*	*25 %*	*180 baht*
Sandals	*180 baht*	*10 %*	*162 baht*
Jacket	*1300 baht*	*50 %*	*650 baht*
Shoes	*550 baht*	*20 %*	*440 baht*
Shirt	*400 baht*	*15 %*	*340 baht*

6.5 Finding Percentage Increases and Decreases

Think

See if the students can apply the method for percentage decrease to calculate the increased number of refugees.

Answer:

Increase = 80,000 - 10,000 = 70,000

$70{,}000 = \frac{70{,}000}{10{,}000}$ *of 10,000.* $\frac{70{,}000}{10{,}000} = \frac{7}{1} = 7$*.The pecentage increase is 7 x 100 = 700 %.*

Practice - *Answers*

i. *Find the percentage price increases*

a) *25 %*

b) *25 %*

c) *10 %*

ii. *Find the percentage price decreases*

a) *20 %*

b) *20 %*

c) *80 %*

iii.

Type of clothing	*Original price*	*Discount*	*New price*
Longyi	*200 baht*	*40 %*	*120 baht*
Earrings	*50 baht*	*60 %*	*20 baht*
Socks	*20 baht*	*40 %*	*12 baht*
Skirt	*350 baht*	*30 %*	*245 baht*
Underpants	*35 baht*	*60 %*	*14 baht*

6.6 Compound Percentage Problems

Practice - *Answers*

i. *20,650 baht*

The following two problems deal with compound percentage increases

ii. *10,500,000 people*

iii. *9,240,000 barrels*

7. Ratio

7.1 Introduction

Think

Ask the students to use the example to find the ratios asked for. The method is the same. Ask a student to come to the board and demonstrate.

Answers:

a) *Number of granddaughters : Total number of grandchildren = 8 : 18 = 4 : 9*

b) *Number of granddaughters : Number of grandsons = 8 : 10 = 4 : 5*

7.2 Simplifying Ratios

Practice - *Answers*

i. a) *4 : 5* ***b)*** *2 : 3* ***c)*** *1 : 3* ***d)*** *3 cm : 50 cm* ***e)*** *2 : 3 : 5*

f) *12 : 1 : 2* ***g)*** *1 : 8 : 7* ***h)*** *15 : 1* ***i)*** *4 : 9* ***j)*** *35 :24* ***k)*** *4 : 3 : 2*

ii. a) *The ratio of distances is 2 : 5. The ratio of times is 8 : 5.*

b) *22 : 9 : 28 (multiply each amount by 4 to get whole numbers).*

c) *3.6 : 3 : 4.8 = 36 : 30 : 48 = 6 : 5 : 8*

Extra Activity - This is a small group or class activity.You will need: At least one tape measure.

Start by making a list on the board of body parts that can be measured. If you only have one tape measure ask for a volunteer to come to the front and measure the body parts on the list. Write down the measurements on the board. Ask the students to make body ratios such as length of thumb : length of leg, length of nose : height, circumference of head : length of foot, etc.
(If you have more than one tape measure, then split the class into groups. One person from each group can be measured.)

7.3 Finding Quantities

Practice - *Answers*

i. a) *2 : 5 = 4 : 10* ***b)*** *4 : 6 = 12 : 18* ***c)*** *9 : 6 = 6 : 4* ***d)*** *5 2/5 : 9 = 3 : 5*

e) *9 : 5 = 7 1/5 : 4* ***f)*** *7 1/2 : 3 = 5 : 2* ***g)*** *3 : 3/5 = 5 : 1* ***h)*** *3 3/4 : 6 = 5 : 8*

ii.

a) *The second distance is 5 1/3 km*

b) *The second distance would be 12 km*

c) *Shine has 20 baht*

d) *The width is 10 2/3 cm*

7.4 Sharing Quantities

Think

We know the answer to the example is correct because 36 + 24 = 60 baht, which was the original amount. See if the students can work this out. Then ask them to calculate the ratio 2 : 4.

Answer:

One share is 10 baht. Hser Moo gets 2 shares, which is 20 baht and Hsa Say gets 4 shares, which is 40 baht.

Practice - *Answers*

a) *First share = 48 baht, second share = 32 baht*

b) *First share = 12 baht, second share = 20 baht*

c) *First share = 20 baht, second share = 25 baht*

d) *FIrst share = 8 baht, second share = 10 baht, third share = 8 baht*

7.5 Map Scales

Activity - This is an activity for 2 people. You will need: rulers.

Working in pairs ask students to think what distance is represented by 5 cm on the map. When you are sure they understand ask them to measure the distances on the map with a ruler and then calculate the real distances using the scale. (If there are no rulers you can give them the map distances.)

Answers:

a) *Map distance = 10 cm. Real distance = 10 km* ***c)*** *Map distance = 4.3 cm. Real distance = 4.3 km*

b) *Map distance = 7 cm. Real distance = 7 km* ***d)*** *Map distance = 6.5 cm. Real distance = 6.5 km*

8. Indices

8.1 Postive Indices

Think

Give the students some time to complete the statement. Ask for a demonstration on the board.

Answer:

a) $2^5 \div 2^3 = \frac{2^5}{2^3} = \frac{2 \times 2 \times 2 \times 2 \times 2}{2 \times 2 \times 2} = 2^2$

b) *subtracting,* $2^{5-3} = 2^2$

Practice - *Answers*

a) 3^7 ***b)*** 7^8 ***c)*** 5^8 ***d)*** 12^9 ***e)*** 4^2 ***f)*** 10^5

g) $2^0 = 1$ ***h)*** 6^5 ***i)*** 15^4 ***j)*** 2^9 ***k)*** $4^1 = 4$ ***l)*** 3^8

8.2 Negative Indices

Practice - *Answers*

i. a) $\frac{1}{2^4}$ ***b)*** $\frac{1}{7^3}$ ***c)*** 7^3 ***d)*** 5^5

ii. a) 5^{-2} ***b)*** 6^{-3} ***c)*** 10^{-3} ***d)*** a^{-2}

ii.a) $\frac{1}{2^3}=\frac{1}{8}$ ***b)*** $\frac{1}{3^3}=\frac{1}{27}$ ***c)*** $\frac{1}{49}$ ***d)*** $\frac{1}{64}$ ***e)*** $\frac{1}{5^3}=\frac{1}{125}$ ***f)*** $\frac{1}{4^3}=\frac{1}{64}$

8.3 Standard Form

Practice - *Answers*

i. a) 2.5×10^3 ***b)*** 6.3×10^2 ***c)*** 3.907×10^4 ***d)*** 2.6×10^5 ***e)*** 4.06×10^6 ***f)*** 8×10^{10}

g) 7.9 x 10-1 ***h)*** 4.8 x 10-3 ***i)*** 8.05 x 10-2 ***j)*** 8.808 x 10-2 ***k)*** 6.84 x 10-1 ***l)*** 7.3 x 10-11

ii. a) 3780 ***b)*** 0.00126 ***c)*** 5,300,000 ***d)*** 0.00000376 ***e)*** 4,250,000,000,000
f) 0.0000000443

8.4 Significant Figures

Think

The students should be able to use the method from section 4.6 to give Nathan Tun's height in the given units.

Answers:

To the nearest 10 mm = 1680 mm

To the nearest cm = 168 cm

In metres = 1.68 m

To the nearest km = 0.00168 km

Practice - *Answers*

a) 3 ***b)*** 6 ***c)*** 8 ***d)*** 0 ***e)*** 0

Practice - *Answers*

i. a) *60,000* ***b)*** *500* ***c)*** *600,000* ***d)*** *30* ***e)*** *4000* ***f)*** *4,000,000*

ii. a) *4700* ***b)*** *59,000* ***c)*** *10,000* ***d)*** *73,000* ***e)*** *440* ***f)*** *54,000*

iii. a) *0.00846* ***b)*** *5.84* ***c)*** *46.8* ***d)*** *7.51* ***e)*** *370* ***f)*** *0.00785*

8.6 Square Roots

Practice - *Answers*

a) *3* ***b)*** *5* ***c)*** *8* ***d)*** *1* ***e)*** *70* ***f)*** *0.8* ***g)*** *0.2*

Practice - *Answers*

a) $576 = 2^2 \times 2^2 \times 2^2 \times 3^2 = (2 \times 2 \times 2 \times 3)^2 = 24^2$. *So,* $\sqrt{576} = 24$

b) *36* ***c)*** *42*

Practice - *Answers*

a) $16 < 17 < 25$ *so* $\sqrt{17} = 4$ *to 1 significant figure*

b) $9 < 10 < 16$ *so* $\sqrt{10} = 3$ *to 1 significant figure*

c) $36 < 39 < 49$ *so* $\sqrt{39} = 6$ *to 1 significant figure*

d) $64 < 79 < 81$ *so* $\sqrt{79} = 8$ *to 1 significant figure*

e) $81 < 90 < 100$ *so* $\sqrt{90} = 9$ *to 1 significant figure*

8.7 Surds

Practice - *Answers*

i. **a)** $\frac{\sqrt{7}}{7}$ **b)** $\frac{\sqrt{17}}{17}$ **c)** 4 **d)** $\frac{3\sqrt{5}-5}{4}$ **e)** $-\frac{2\sqrt{7}+7}{3}$ **f)** $-2\sqrt{3}+3$

ii. Perimeter = 12 units, Area = 4 units^2

iii. $\sqrt{11}$

9. Estimation

9.1 Using Significant Figures to Estimate

Practice - *Answers*

a) *100* ***b)*** *0.35* ***c)*** *10* ***d)*** *0.3*

Activity - This is an activity for one person.

Give the students time to match the calculations and estimates. Write the exercise on the board and ask students to come and draw a line between one calculation and the correct estimate. When they have finished, ask students to make their own exercise. Tell them to swap exercises with another student and solve their exercise.

9.2 Upper and Lower Bounds

Practice - *Answers*

i.
a) *To the nearest 10: 25, 35; 175, 185; 3015, 3025; 5, 15*
b) *To 1 decimal place: 2.85, 2.5; 13.55, 13.65; 0.25, 0.35; 157.45, 157.55*

ii.

Stadium	Attendance to the nearest thousand	Lower bound	Upper bound
Manchester United	71,000	70,500	71,500
Arsenal	42,000	41,500	42,500
West Ham	23,000	22,500	23,500
Liverpool	13,000	12,500	13,500
Morecambe	1,000	500	1,500

Practice - *Answers*

i.

a) *r - 1.75, 1.65, R - 31.05, 30.95*

b) *29.2*

ii.

a) *15.0 cm*

b) *14.6 cm*

iii.

a) *55.25 cm^2, 41.25 cm^2*

b) *57.0025 cm^2, 55.5025 cm^2*

c) *27.625 cm^2, 20.625 cm^2*

Glossary of Keywords

The glossary in the Students' book is a list of all mathematical words that appear in the module. They are given in the order that they appear.
The following short activities are added to this guide to help students remember mathematical vocabulary. They can be used in several ways: to test prior knowledge of a topic, as warm-up activities at the beginning of a lesson or to review what has been learnt at the end of a topic.

Activity 1 - Discuss questions in pairs.

Students are given questions to discuss that relate to a topic.

Example questions -
What is an improper fraction?
How do I change from milligrams to tonnes?
How do I find the perimeter of a square?
What is the commutative law?
What is the order of operations?

Activity 2 - True or false.

Students work in pairs to decide if statements about a topic are true or false.

Example for fractions -
The denominator is the top number in a fraction.
The numerator is less than the denominator in an improper fraction.
Equivalent fractions have the same numerator.
$\frac{2}{4}$ is 50 % expressed as a fraction in its' lowest terms.

Activity 3 - Give an explanation.

Students work in pairs to prepare a short explanation to questions. Ask some students to give their explanation to the class.

Examples -
Explain how to change from a mixed number to an improper fraction.
Explain how to calculate: $(2 + 3) \times (7 - 4^2)^3$
Explain the mistake in this statement:
Explain what a negative number is.

Activity 4 - Brainstorming

Write a topic on the board and ask students what they know about the topic. Write their answers on the board.

Activity 5 - What's the topic?

Write words linked to a topic on the board and ask students if they can guess the topic.

Assessment

This is assessment covers most of the topics in this module and should give you an idea of how much the students have understood. It is recommended that you give it as a class test, with some time for review and revision beforehand.

Part 1 - Answers

Each question in part 1 is worth 1 mark.

a) *reciprocal* ***b)*** *rationalise* ***c)*** *kilometres* ***d)*** *brackets* ***e)*** *operations*

f) *factor* ***g)*** *multiple* ***h)*** *perimeter* ***i)*** *denominator* ***j)*** *equivalent*

k) *simplify* ***l)*** *recurring* ***m)*** *standard form* ***n)*** *numerator* ***o)*** *approximately*

Total for part 1: 15 marks

Part 2 - Answers

The total mark for the question is given on the right hand side of the page.

1. ***a)*** *two hundred and one* ***b)*** *one thousand and twenty one*
c) *one hundred and twelve thousand three hundred and fifty four* **3 marks**

2. ***a)*** *7602* ***b)*** *32,057* ***c)*** *111,000* **3 marks**

3. ***a)*** *3947* ***b)*** *13,257* ***c)*** *210* ***d)*** *713* ***e)*** *4195* **6 marks**

4. ***a)*** *465,234* ***b)*** *5,053,014* ***c)*** *107 r 17* ***d)*** *469 r 1* **4 marks**

5. ***a)*** *9* ***b)*** *23* ***c)*** *45* ***d)*** *14* **4 marks**

6. ***a)*** *20, 25, 30, 35, 40, 45* ***b)*** *55, 66, 77, 88, 99* **2 marks**

7. *41 and 101* **2 marks**

8. ***a)*** *2 x 2 x 2 x 3* ***b)*** *2 x 2 x 2 x 17* ***c)*** *2 x 2 x 2 x 2 x 3 x 11* **3 marks**

9. ***a)*** *8* ***b)*** *12* ***c)*** *4* **3 marks**

10. ***a)*** *48* ***b)*** *144* ***c)*** *850* **3 marks**

11. ***a)*** *7* ***b)*** *17* ***c)*** *9* ***d)*** *-12* **4 marks**

12. ***a)*** *positive* ***b)*** *negative*
c) *There are two answers: negative, postive or positive, negative* **4 marks**

13. *Top row: 9, 1.8, 8.1; Middle row: 5.4, 6.3, 7.2; Bottom row: 4.5, 10.8, 3.6* **4 marks**

14. *6.426 cm* **2 marks**

15. ***a)*** *748 cm* ***b)*** *1880 mg* ***c)*** *448.2 cm* **4 marks**

16. a) 0.17712 **b)** 0.02592 **c)** 22.96 **d)** 13.72 **e)** 32.768 ***5 marks***

17. a) $\frac{3}{10}$ **b)** $\frac{1}{2}$ **c)** $\frac{1}{5}$ ***3 marks***

18. a) $5\frac{1}{8}$ **b)** $13\frac{2}{5}$ ***2 marks***

19. a) $\frac{20}{7}$ **b)** $\frac{43}{9}$ ***2 marks***

20. a) $\frac{19}{20}$ **b)** $\frac{19}{56}$ **c)** $\frac{3}{4}$ **d)** $2\frac{1}{3}$ ***4 marks***

21. a) $\frac{9}{20}$ **b)** $\frac{113}{200}$ **c)** $\frac{37}{400}$ ***3 marks***

22. a) *40 baht* **b)** *3.33 m* ***2 marks***

23. a) *225* **b)** *420* ***2 marks***

24. a) *210* **b)** *652.5* ***2 marks***

25. *Other ratios include: 8 : 12 : 20, 2 : 3 : 5, 4 : 6 : 10 and 48 : 72 : 120. The simplest form is 2 : 3 : 5.* ***4 marks***

26. *18 cm* ***1 marks***

27. a) 5^{10} **b)** 7^{4} **c)** 6^{0} ***3 marks***

28. a) 2.5×10^{4} **b)** 7.65×10^{2} **c)** 9×10^{9} ***3 marks***

29. a) *0.0676* **b)** *22.9* **c)** *542* ***3 marks***

30. a) $\frac{3\sqrt{5}}{5}$ **b)** $\frac{\sqrt{11}}{11}$ **c)** $-\frac{7+\sqrt{11}}{38}$ ***4 marks***

31. a) *4.25, 4.75* **b)** *7.25, 7.75* **c)** *16.25, 16.75* ***3 marks***

Total for part 2: 98 marks

Total : 113 marks