RICH MATHEMATICAL TASK BOOKLET

NUMBER Decimals, Percentages

YEAR 7 - 8 ODD YEARS

Copy Masters

Task 1

What percentage of your one whole bottle is filled with water? Be ready to explain and justify how you know.

What percentage have you downloaded of that computer game? How much more would you need to download to complete it?

Record using a range of different representations including symbols and be ready to explain and justify how they are equivalent.

Task 1 (independent)

Practise your timetables with a buddy and make flash cards with the equation on one side and answer on the other side for any that you do not know automatically. Use your flash cards to practice the multiplication facts that you do not know.

1. Marie is playing a computer game. She attempted 100 times to hit a target and was able to successfully hit it 50% of the attempts. How many attempts was she unsuccessful in hitting the target?
2. Marie is playing a computer game. She attempted 100 times to hit a target and was able to successfully hit it 25% of the attempts. How many attempts was she unsuccessful in hitting the target?
3. Marie is playing a computer game. She attempted 100 times to hit a target and was able to successfully hit it 75% of the attempts. How many attempts was she unsuccessful in hitting the target?
4. Marie is playing a computer game. She attempted 100 times to hit a target and was able to successfully hit it 80% of the attempts. How many attempts was she unsuccessful in hitting the target?
5. In Marie's class of 30 students only 20% play the same computer game as Marie. How many students play the game?
6. In Marie's double class of 55 students only 30% play the same computer game as Marie. How many students play the game?
7. If there are 20 girls in a class of 30 students. What percentage are boys? If there are 18 girls in a class of 33 students. What percentage are boys?

Task 2

You and your friends are running on the athletics track in the park. This tape represents the track you run on.

If I put the 0-digit card down at the start of it that indicates so far you have run 0 metres and the 1-digit card indicates that you have not reached 1 metre yet.

As a percentage of the metre how far have you run exactly?

How far have you run now?

Record using a range of different representations including symbols and be ready to explain and justify how they are equivalent.

Task 2 (independent)

Use your flash cards with a buddy and for any multiplication facts that you do not know automatically, write them out and say out loud quietly to yourself at least 4 times.

What are their equivalent fractional numbers?

- 75% = =
- $\frac{1}{4}$ = =
- .7 = =
- $\frac{3}{4}$ = =
- 23% = =
- .45 = =
- Two-thirds = =
- $\frac{1}{5}$ = =
- 70% = =
- Three-fifths = =
- 130% = =
- .10 = =
- .01 = =
- .07 = =
- .13 = =

Task 3

Mike and Jonah were competing to see who could push toy cars further across the floor. Mike measured the distance each car went, and he said that Jonah won because although both their cars reached 3.45 metres and neither of them reached 3.46 metres Jonah's car went further.

Can you record at least 12 different distances for his car which shows Jonah's car went further.

Be ready to explain and justify your answers using number lines, diagrams, drawings, fractions, and decimals.

Task 3 (independent)

Use your flash cards for 3 x 3, 6 x 6, 4 x 4, 8 x 8. Make new flash cards for 6 x 3 and 4 x 8 and practice these while also noting the relationship between the square numbers and the new facts.

What numbers can you record between:

1. .1 and .2
2. 50% and 51%
3. 5% and 6%
4. .4 and .5
5. .51 and .56
6. .11 and .12
7. .541 and .542
8. 1.3 and 1.4
9. 478.51 and 478.52

Task 4

There are 4 finalists in a skateboarding competition. Here are their scores for their 2 runs and trick stage. This competition scores each stage out of 10.

Contestant	1	2	3	4
Run 1	8.903	7.796	7.897	8.03
Run 2	7.0001	9.9911	8.98	8.004
Tricks	8.987	7.5	8.0	8.039

Who came first? Second? Third?

How many points would the second finalist have needed to come first?

How many points would the third finalist have needed to come first?

Task 4 (independent)

Put these decimal numbers in order from largest to smallest:

1. .9, 1.00000, .900000, .99, .009
2. .90146, .9015, .9000000, .99
3. .4405, .4, .321, .99999, .4.9
4. .50000, .45100, .510, .52, .5200009
5. 1.2, 1.209, 1.21, 1.20099
6. .89, .8, .9, .089, .09

Write an explanation to explain the rules you were using to order each row.

Task 5

Solve these equations using two different ways

.625 + .78

1.324 + 1.0769

.469 + 8

19.2 + 8091

1 - .05

.1 - .05

9.99 - .001

Task 5 (independent)

Put these numbers in order from smallest to largest:

- $\frac{1}{2}$, .49999, 49%
- $\frac{1}{3}, \frac{1}{2}$, 93%, .510, .003, 51%
- .2409, .2, 25%, $\frac{1}{4}$, .2000001, $\frac{3}{4}$
- $1\frac{1}{2}$, 1.9, 1.09, 125%, 100%
- $\frac{1}{5}$, 21%, .201
- 3%, $\frac{1}{3}$, .03, .3909
- $\frac{1}{2}$, .49999, 49%
- .20009, $\frac{2}{3}$, .9, 99%, $\frac{9}{10}$,
- $1\frac{1}{2}$, 1.49999, 160%, 1.9, 150%
- .1, $\frac{1}{2}$, .00001, $\frac{1}{100}$, 200%

Write an explanation about the rules you used to order them.

Task 6

Alani is going to a family reunion in Tuvalu. She has some money saved up. In Tuvalu they use Australian dollars but their own coins. The exchange rate is $1 New Zealand for $.9301 Australian.

How much Australian money will she get in exchange for NZ$10? NZ$100? NZ$550?

In Samoa the exchange rate is $1 New Zealand for 1.5204 tala.

How much will she get in exchange for NZ$10? NZ$100? NZ$550?

Task 6 (independent)

Look at your flash cards for or write them out if you don't have them.

3 x 4 =

3 x 8 =

6 x 4 =

6 x 8 =

Discuss with a partner the patterns that you notice between each one. Use the patterns to help remember the times-table facts.

Solve the following:

.5 + .05 =

.5 + .505 =

.5 + .5555

.3 + .03 =

.3 + .0303 =

.03 + .3033=

.7 + .07 =

.7 + 0.707 =

1 x .5 =

1 x .05 =

1 x .005 =

1 x .000505

Task 7

Estimate where you think the decimal point goes and then compute to check that you have put it in the right place.

2.4 x 200 = 480

0.218 x 1 = 2180

0.24 x 0.63 = 1512

0.108 x 0.19 = 002052

0.99 x 0.999 = 098901

What did you notice?

Task 7 (independent)

Solve these equations to the nearest whole number. Estimate the nearest whole number and then check whether your estimate was close.

- 2.9 + .9 + .199
- .0009 + 1.0009
- .5 + .034 + 3.33
- 6 - .0009
- .8 - .008
- 34.267 - .9
- 5 x .9
- .08 x 1
- 2.8 x 10
- .89 x 2

Task 8

The Huia train service travels 121km from Hamilton to Auckland. It takes 1.5 hours to complete the journey. What is the average rate in kilometres per hour?

Now use the same strategy you used to solve this equation. Estimate first and then do the calculation.

35.6 ÷ 1.92

Be ready to explain and justify your reasoning.

Task 8 (independent)

Look at your flash cards for or write them out if you don't have them.

2 x 7 =

4 x 7 =

8 x 7 =

3 x 9 =

6 x 9 =

Discuss with a partner the patterns that you notice between each one. Use the patterns to help remember the times-table facts.

Write these as decimals:

- 1 and $\frac{5}{10}$
- 12 and $\frac{7}{10}$
- 23 and $\frac{3}{10}$
- 4 and $\frac{83}{100}$
- 1 and $\frac{10}{100}$
- 2 and $\frac{3}{100}$
- 9 and $\frac{831}{1000}$
- 5 and $\frac{83}{1000}$
- 4 and $\frac{1}{1000}$

What is the tenths digit in these?

- 9.92
- 0.02
- 7.816
- 0.30198
- 1.33333
- 1.00009

Which 2 has the biggest value in 0.022? Represent your reasoning to explain your ideas.

How many thousandths are there altogether in 0.022?

Task 9

The local bakery cool stores a large quantity of dough for when it is needed. They If they use 28 cups of flour and the ratio of cups of flour to water is 7:4. How much water do they use?

What if they use 80 cups of flour? The ratio of cups of flour to cups of water they use is 10:8. How much water should they use?

What if they use 78 cups of flour? The ratio of cups of flour to cups of water they use is 10:3. How much water should they use?

Task 9 (independent)

As you solve these, think about their place on the place value chart.

- 32.8 x 6
- 73 x 9
- 1.00001 x 10
- 745 + .9
- 1.43 + 1.6
- 4. 0009 + 1.9991
- 6.5 – 1.9
- 12. 32 – 0.31
- 33.1 - .99

Identify, record, and explain the pattern you notice in the shifts in place value?

Task 10

Tom's Mum is saving for a new phone which will cost $1650. She earns $3500 each month. She spends her money on the bills, food and extras in the ratio of 6:4:5. Of the money she spends on extras, she has to spend 80% and she puts 20% in her savings for the phone. How long will it take her to save for her new phone?

Task 10 (independent)

1. On a farm the ratio of cows to sheep is 6:8. What is the fraction of cows to sheep?
2. On a farm the ratio of cows to sheep is 10:30. What is the fraction of cows to sheep?
3. On a farm the ratio of cows to sheep is 2:3. What is the fraction of cows to sheep?
4. On a farm the ratio of cows to sheep is 5:6. What is the fraction of cows to sheep?
5. On a farm the ratio of cows to sheep is 20:50. What is the fraction of cows to sheep?

What pattern can you see? Can you make a conjecture about what you discovered? Record your reasoning.

Task 11 (optional task)

Replace the letter with a number

m x .20 = 28

j x .5 = 25

346 = p x 10 + y x 100

2.333 = 64 ÷ a

b = .77 ÷ 100

Write five more to share with the group.

Task 11 (independent)

Where does the decimal point go? Before you compute an answer put in the decimal and write an explanation of why you put it where it is.

0.33 x 6.3

33 x 0.63

3.3 x 63

0.33 x 0.63

Now check your answers with computation. If there are differences record your reasoning.

Task 12 (optional task)

Replace the letter with a number

$8 \div .1 = p$

$8.4 \div .1 = y$

$.45 \div .1 = h$

$j = 8.2 \div .2$

$t = 8.45 \div 2.2$

$8.04 \div 2.2 = w$

Can you write some using multiplication to share with the group?