Adding and Subtracting Fractions
Part 1: The same sized slice

We are learning to add simple fractions

Exercise 1

What to do

Each of these fraction problems can be shown with fraction symbols. Use fraction symbols to write a sentence for each addition

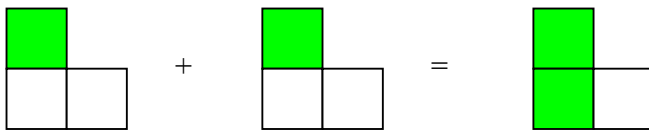1)   Tony eats one third of a cake, Anne also eats one third of a cake. How much do they eat between them?

2)   Jim has finished one quarter of a jigsaw, and Alison has finished two quarters. How much have they finished in total?
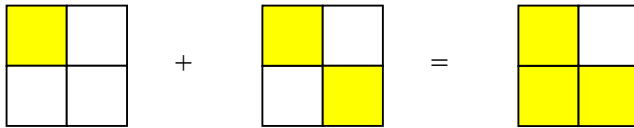
3)   Ross and Emile both have two fifths of a muesli bar left. How much of a muesli bar do they have between them?
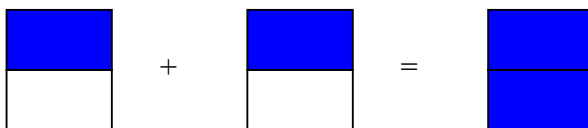
4)

5)

6)

7) The number problem for the first question is $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$. Look at the number problems for all the others and see if you can work out a way to add fractions. Write down your explanation as if you were explaining how to add fractions to a friend who has not done this exercise.

8) Use your strategy to answer these fraction additions

(a) $\frac{3}{5} + \frac{1}{5}$　　(b) $\frac{3}{8} + \frac{1}{8}$　　(c) $\frac{5}{13} + \frac{4}{13}$

(d) $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$　　(e) $\frac{3}{8} + \frac{1}{8} + \frac{3}{8}$　　(f) $\frac{8}{19} + \frac{3}{19} + \frac{2}{19}$

9) Copy and complete this sentence
In a fraction, the bottom number (the denominator) tells us _____, while the top number (the numerator) tells us _____. This is why when we add fractions we only add the top numbers, as we want to know how many pieces we have in total and already know how many pieces are in the whole thing.

Exercise 2: Parts in a whole

1) Copy and complete this sentence
Question 6 in exercise 1 shows that _____ halves make one whole

2)

(a) Use fractions to write the problem shown here
(b) How many thirds make one whole?

3) (a) How many quarters make one whole?
(b) How many sixths make one whole?
(c) How many tenths make one whole?
(d) Write four fraction problems that make one whole

4) Which of the following fractions make one whole?

(a) $\frac{9}{9}$　　(b) $\frac{12}{12}$　　(c) $\frac{x}{x}$

Exercise 3

Add these fractions

1) $\frac{3}{7} + \frac{1}{7}$　　(2) $\frac{2}{9} + \frac{3}{9}$　　(3) $\frac{1}{4} + \frac{2}{4}$　　(4) $\frac{1}{10} + \frac{7}{10}$

Something to think about

These next fraction problems have answers that are bigger than one whole. What do you think a fraction bigger than one looks like?

Write a fraction that you think is bigger than one whole, and share this with a friend to see if they have the same idea as you

5) $\dfrac{6}{7}+\dfrac{2}{7}$ (6) $\dfrac{4}{7}+\dfrac{5}{7}$ (7) $\dfrac{2}{3}+\dfrac{2}{3}$ (8) $\dfrac{5}{6}+\dfrac{3}{6}$

9) $\dfrac{9}{4}+\dfrac{1}{4}$ (10) $\dfrac{12}{11}+\dfrac{6}{11}$ (11) $\dfrac{15}{8}+\dfrac{9}{8}$ (12) $\dfrac{7}{3}+\dfrac{2}{3}$

13) $\dfrac{11}{9}+\dfrac{4}{9}$ (14) $\dfrac{17}{15}+\dfrac{22}{15}$ (15) $\dfrac{16}{13}+\dfrac{5}{13}$ (16) $\dfrac{17}{4}+\dfrac{1}{4}$

17)   Make up five fraction problems of your own, and answer them

Investigation

Consider this problem:

Jane has five eighths of a Hawaiian pizza and eats four of the eighths. How much of a pizza is left?

1)   Draw pictures to show this problem
2)   Show the problem with numbers
3)   Make up three other fraction stories of your own that involve subtraction, and then show them as drawing and with numbers
4)   Write a strategy for subtracting simple fractions like this

Exercise 4

Subtract these fractions.

1) $\dfrac{7}{11}-\dfrac{3}{11}$ (2) $\dfrac{6}{10}-\dfrac{5}{10}$ (3) $\dfrac{3}{8}-\dfrac{2}{8}$ (4) $\dfrac{3}{4}-\dfrac{1}{4}$

5) $\dfrac{9}{5}-\dfrac{6}{5}$ (6) $\dfrac{10}{8}-\dfrac{3}{8}$ (7) $\dfrac{11}{9}-\dfrac{4}{9}$ (8) $\dfrac{10}{7}-\dfrac{6}{7}$

9) $\dfrac{14}{5}-\dfrac{6}{5}$ (10) $\dfrac{17}{3}-\dfrac{10}{3}$ (11) $\dfrac{17}{11}-\dfrac{6}{11}$ (12) $\dfrac{14}{6}-\dfrac{2}{6}$

13)   Create five problems of your own, and answer them.

Exercise 5

If you know about converting improper fractions to mixed numbers, check that this has been done for all the answers for exercises 1 to 4.

If you also know about simplifying fractions, also check that all of your answers have been simplified

Adding and subtracting fractions: the same sized slice
Answers

Exercise 1

1) $\dfrac{1}{3}+\dfrac{1}{3}=\dfrac{2}{3}$ (2) $\dfrac{1}{4}+\dfrac{2}{4}=\dfrac{3}{4}$ (3) $\dfrac{2}{5}+\dfrac{2}{5}=\dfrac{4}{5}$ (4) $\dfrac{1}{3}+\dfrac{1}{3}=\dfrac{2}{3}$

5) $\dfrac{1}{6}+\dfrac{2}{6}+\dfrac{2}{6}=\dfrac{5}{6}$ (6) $\dfrac{1}{2}+\dfrac{1}{2}=\dfrac{2}{2}$

7) When we add these fractions what we do is add the top numbers and don't touch the bottom number. For example $\dfrac{4}{17}+\dfrac{7}{17}=\dfrac{4+7}{17}$

$$=\dfrac{11}{17}$$

8) (a) $\dfrac{4}{5}$ (b) $\dfrac{4}{8}$ (c) $\dfrac{9}{13}$ (d) $\dfrac{3}{4}$ (e) $\dfrac{7}{8}$ (f) $\dfrac{13}{19}$

9) In a fraction, the bottom number (the denominator) tells us **how many pieces are in a whole** while the top number (the numerator) tells us **how many pieces we have**. This is why when we add fractions we only add the top numbers, as we want to know how many pieces we have in total and already know how many pieces are in the whole thing.

Exercise 2

1) Question 6 in exercise 1 shows that two halves make one whole

2) (a) $\dfrac{1}{3}+\dfrac{1}{3}+\dfrac{1}{3}=\dfrac{3}{3}$

    (b) three thirds make one whole

3) (a) four quarters make one whole
    (b) six sixths make one whole
    (c) ten tenths make one whole
    (d) Various, but all should have numerators (top numbers) that are the same as their denominators (bottom numbers)

4) All three fractions equal one, as they have the same number on the top and the bottom
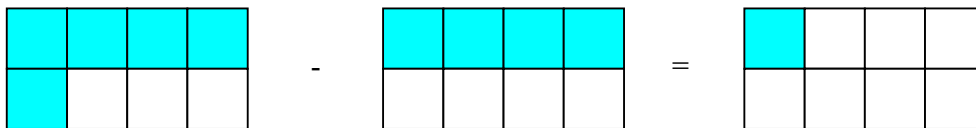
Exercise 3

1) $\dfrac{4}{7}$ (2) $\dfrac{5}{9}$ (3) $\dfrac{3}{4}$ (4) $\dfrac{8}{10}$

If a fraction smaller than one has the numerator (top number) smaller than the denominator (denominator), and a fraction equal to one has the numerator equal to the denominator, then a fraction bigger than one must have the numerator bigger than the denominator

5) $\dfrac{8}{7}$ (6) $\dfrac{9}{7}$ (7) $\dfrac{4}{3}$ (8) $\dfrac{8}{6}$

9) $\dfrac{10}{4}$ (10) $\dfrac{18}{11}$ (11) $\dfrac{24}{8}$ (12) $\dfrac{9}{3}$

13) $\dfrac{15}{9}$ (14) $\dfrac{39}{15}$ (15) $\dfrac{21}{13}$ (16) $\dfrac{18}{4}$

17) Own problems

Investigation

1) I have problems drawing circles and cutting them up, so my pizza is a slab pizza

2) $\dfrac{5}{8} - \dfrac{4}{8} = \dfrac{1}{8}$

3) Own similar problems

4) When we know we are working with the same size of slice, then all we have to do is

subtract the numerators (top numbers). For example $\dfrac{5}{6} - \dfrac{4}{6} = \dfrac{5-4}{6}$

$$= \dfrac{1}{6}$$

Exercise 4

1) $\dfrac{4}{11}$　　(2) $\dfrac{1}{10}$　　(3) $\dfrac{1}{8}$　　(4) $\dfrac{2}{4}$

5) $\dfrac{3}{5}$　　(6) $\dfrac{7}{8}$　　(7) $\dfrac{7}{9}$　　(8) $\dfrac{4}{7}$

9) $\dfrac{8}{5}$　　(10) $\dfrac{7}{3}$　　(11) $\dfrac{11}{11}$　　(12) $\dfrac{12}{6}$

13) Five problems of your own.

Exercise 5

From exercise 1
6) 1
8) (b) ½

From exercise 2
$\dfrac{3}{3} = 1$
All of the others equal one as well

From exercise 3
4) ½　(5) $1\dfrac{1}{7}$　(6) $1\dfrac{2}{7}$　(7) $1\dfrac{1}{3}$　(8) $1\dfrac{2}{6} = 1\dfrac{1}{3}$　(9) $2\dfrac{2}{4} = 2\dfrac{1}{2}$

10) $1\dfrac{7}{11}$　(11) 3　(12) 3　(13) $1\dfrac{6}{9} = 1\dfrac{2}{3}$　(14) $2\dfrac{9}{15} = 2\dfrac{3}{5}$

15) $1\dfrac{8}{13}$　(16) $4\dfrac{2}{4} = 4\dfrac{1}{2}$

From exercise 4
4) ½　(9) $1\dfrac{3}{5}$　(10) $2\dfrac{1}{3}$　(11) 1　(12) 2