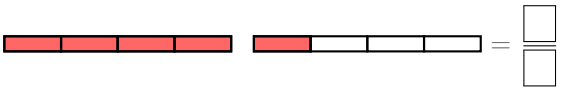
FRACTIONS

A DEFINING AND REPRESENTING FRACTIONS

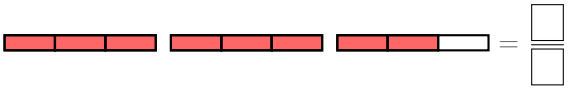
A.1 FINDING FRACTIONS

Ex 1: A bar represents 1. Find the fraction that represents the shaded part:

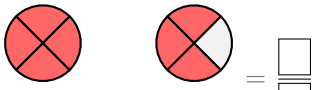


Ex 2: A bar represents 1. Find the fraction that represents the shaded part:

Ex 3: A bar represents 1. Find the fraction that represents the shaded part:



Ex 4: A circle represents 1. Find the fraction that represents the shaded part:



A.2 WRITING FRACTIONS FROM WORDS

Ex 5: Write as fraction:

one over four=

Ex 6: Write as fraction:

three over five =

Ex 7: Write as fraction:

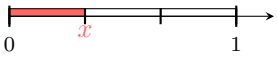
three quarters =

Ex 8: Write as fraction:

six over hundred =

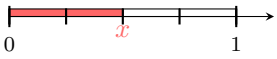
A.3 FINDING FRACTIONS WITH THE BAR MODEL

Ex 9: Find the value of x



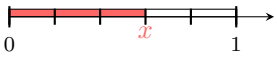
$x =$

Ex 10: Find the value of x



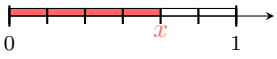
$x =$

Ex 11: Find the value of x



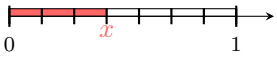
$x =$

Ex 12: Find the value of x



$x =$

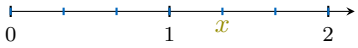
Ex 13: Find the value of x



$x =$

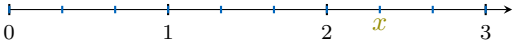
A.4 FINDING FRACTIONS GREATER THAN 1

Ex 14: Find the value of x



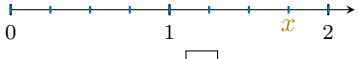
$x =$

Ex 15: Find the value of x



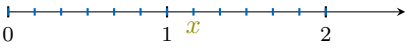
$x =$

Ex 16: Find the value of x



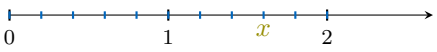
$x =$

Ex 17: Find the value of x



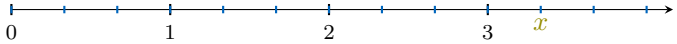
$x =$

Ex 18: Find the value of x



$x = \frac{\square}{\square}$

Ex 19: Find the value of x



$x = \frac{\square}{\square}$

B EQUIVALENT FRACTIONS

B.1 FINDING THE MISSING NUMERATOR

Ex 20:

$$\frac{2}{4} = \frac{\square}{2}$$

Ex 21:

$$\frac{9}{6} = \frac{\square}{2}$$

Ex 22:

$$\frac{5}{10} = \frac{\square}{2}$$

Ex 23:

$$\frac{16}{12} = \frac{\square}{3}$$

Ex 24:

$$\frac{4}{10} = \frac{\square}{5}$$

B.2 FINDING THE MISSING NUMERATOR

Ex 25:

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

Ex 26:

$$\frac{4}{3} = \frac{\square}{15}$$

Ex 27:

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

Ex 28:

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

Ex 29:

$$\frac{7}{8} = \frac{\square}{32}$$

B.3 FINDING THE MISSING DENOMINATOR

Ex 30:

$$\frac{4}{10} = \frac{2}{\square}$$

Ex 31:

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

Ex 32:

$$\frac{9}{6} = \frac{3}{\square}$$

Ex 33:

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

B.4 FINDING THE MISSING DENOMINATOR

Ex 34:

$$\frac{2}{5} = \frac{6}{\square}$$

Ex 35:

$$\frac{2}{3} = \frac{8}{\square}$$

Ex 36:

$$\frac{3}{5} = \frac{9}{\square}$$

Ex 37:

$$\frac{4}{7} = \frac{12}{\square}$$

Ex 38:

$$\frac{5}{9} = \frac{20}{\square}$$

C SIMPLIFICATION

C.1 SIMPLIFYING FRACTIONS

Ex 39: Simplify:

$$\frac{4}{6} = \frac{\square}{\square}$$

Ex 40: Simplify:

$$\frac{2}{4} = \frac{\square}{\square}$$

Ex 41: Simplify:

$$\frac{10}{8} = \frac{\square}{\square}$$

Ex 42: Simplify:

$$\frac{6}{9} = \frac{\square}{\square}$$

C.2 SIMPLIFYING FRACTIONS

Ex 43: Simplify:

$$\frac{24}{16} = \frac{\square}{\square}$$

Ex 44: Simplify:

$$\frac{12}{20} = \frac{\square}{\square}$$

Ex 45: Simplify:

$$\frac{30}{100} = \frac{\square}{\square}$$

Ex 46: Simplify:

$$\frac{25}{100} = \frac{\square}{\square}$$

D CROSS MULTIPLICATION

D.1 SOLVING PROPORTIONS USING CROSS-MULTIPLICATION

Ex 47:  Solve x for $\frac{12}{4} = \frac{x}{6}$:

$$x = \square$$

Ex 48:  Solve x for $\frac{11}{10} = \frac{x}{5}$:

$$x = \square$$

Ex 49:  Solve x for $\frac{12}{10} = \frac{18}{x}$:

$$x = \square$$

Ex 50:  Solve x for $\frac{27}{x} = \frac{30}{10}$:

$$x = \square$$

E ADDITION AND SUBTRACTION

E.1 ADDING FRACTIONS WITH COMMON DENOMINATORS

Ex 51:

$$\frac{1}{4} + \frac{2}{4} = \frac{\square}{\square}$$

Ex 52:

$$\frac{3}{5} + \frac{1}{5} = \frac{\square}{\square}$$

Ex 53:

$$\frac{2}{6} + \frac{3}{6} = \frac{\square}{\square}$$

Ex 54:

$$\frac{2}{3} + \frac{2}{3} = \frac{\square}{\square}$$

Ex 55:

$$\frac{4}{5} + \frac{2}{5} = \frac{\square}{\square}$$

E.2 SUBTRACTING FRACTIONS WITH COMMON DENOMINATORS

Ex 56:

$$\frac{3}{4} - \frac{2}{4} = \frac{\square}{\square}$$

Ex 57:

$$\frac{4}{5} - \frac{3}{5} = \frac{\square}{\square}$$

Ex 58:

$$\frac{3}{4} - \frac{1}{4} = \frac{\square}{\square}$$

Ex 59:

$$\frac{4}{3} - \frac{2}{3} = \frac{\square}{\square}$$

Ex 60:

$$\frac{7}{6} - \frac{2}{6} = \frac{\square}{\square}$$

E.3 ADDING FRACTIONS WITH LIKE DENOMINATORS

Ex 61:

$$\frac{2}{5}+\frac{3}{10}=\frac{\square}{\square}$$

Ex 62:

$$\frac{1}{4}+\frac{3}{8}=\frac{\square}{\square}$$

Ex 63:

$$\frac{2}{3}+\frac{1}{6}=\frac{\square}{\square}$$

Ex 64:

$$\frac{3}{5}+\frac{2}{15}=\frac{\square}{\square}$$

Ex 65:

$$\frac{3}{10}+\frac{2}{5}=\frac{\square}{\square}$$

Ex 66:

$$\frac{3}{8}+\frac{1}{2}=\frac{\square}{\square}$$

E.4 SUBTRACTING FRACTIONS WITH LIKE DENOMINATORS

Ex 67:

$$\frac{2}{5}-\frac{3}{10}=\frac{\square}{\square}$$

Ex 68:

$$\frac{7}{6}-\frac{1}{3}=\frac{\square}{\square}$$

Ex 69:

$$\frac{7}{8}-\frac{3}{4}=\frac{\square}{\square}$$

Ex 70:

$$\frac{5}{3}-\frac{5}{9}=\frac{\square}{\square}$$

Ex 71:

$$\frac{7}{2}-\frac{7}{4}=\frac{\square}{\square}$$

E.5 SOLVING REAL-WORLD PROBLEMS

Ex 72: Louis has a whole cake. He cuts it into 8 equal slices and eats 3 slices. What fraction of the whole cake remains?

$\frac{\square}{\square}$ of the cake

Ex 73: Today, Louis eats $\frac{1}{2}$ of a croissant. Then, Louis eats $\frac{1}{4}$ of another croissant. How much croissant did Louis eat in total?

$\frac{\square}{\square}$ of a croissant

Ex 74: At the beginning, there are $\frac{5}{6}$ of a cake. After eating, there are $\frac{2}{3}$ of the cake. What quantity of cake did Louis eat?

$\frac{\square}{\square}$ of the cake

Ex 75: At the beginning, there are $\frac{7}{8}$ of a pizza. After eating, there are $\frac{3}{4}$ of the pizza. What quantity of pizza did Louis eat?

$\frac{\square}{\square}$ of the pizza

Ex 76: Louis read $\frac{2}{5}$ of his book on Saturday and $\frac{3}{10}$ of his book on Sunday. How much of his book did Louis read in total?

$\frac{\square}{\square}$ of the book

E.6 ADDING FRACTIONS WITH UNLIKE DENOMINATORS

Ex 77: Calculate and simplify:

$$\frac{2}{3}+\frac{3}{5}=\frac{\square}{\square}$$

Ex 78: Calculate and simplify:

$$\frac{1}{2}+\frac{2}{3}=\frac{\square}{\square}$$

Ex 79: Calculate and simplify:

$$\frac{3}{2}+\frac{4}{5}=\frac{\square}{\square}$$

Ex 80: Calculate and simplify:

$$\frac{3}{4}+\frac{5}{6}=\frac{\square}{\square}$$

Ex 81: Calculate and simplify:

$$\frac{7}{8}+\frac{11}{6}=\frac{\square}{\square}$$

F MULTIPLYING A FRACTION BY A NUMBER

F.1 MULTIPLYING FRACTIONS BY WHOLE NUMBERS

Ex 82: Calculate and simplify:

$$3 \times \frac{2}{5} = \frac{\square}{\square}$$

Ex 83: Calculate and simplify:

$$2 \times \frac{3}{4} = \frac{\square}{\square}$$

Ex 84: Calculate and simplify:

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

Ex 85: Calculate and simplify:

$$6 \times \frac{2}{9} = \frac{\square}{\square}$$

F.2 SOLVING REAL-WORLD PROBLEMS

Ex 86: Su has a large, delicious cake in front of her. Each time she eats, she takes $\frac{1}{4}$ of the cake. She does this 3 times. What fraction of the cake does Su eat in total?

$\frac{\square}{\square}$ of the cake

Ex 87: A baker is making mini-muffins. Each batch requires $\frac{2}{7}$ of a cup of batter. The baker wants to make 3 batches of mini-muffins. How much batter does the baker need in total?

$\frac{\square}{\square}$ of a cup of batter

Ex 88: A track is $\frac{1}{4}$ of a kilometer long. If a runner runs around the track 5 times, how many kilometers did the runner run?

$\frac{\square}{\square}$ kilometers

Ex 89: A recipe for cookies calls for $\frac{2}{3}$ of a cup of sugar. If you want to make 4 batches of cookies, how many cups of sugar do you need?

$\frac{\square}{\square}$ cups of sugar

G MULTIPLICATION OF FRACTIONS

G.1 MULTIPLYING FRACTIONS

Ex 90: Calculate and simplify:

$$\frac{1}{2} \times \frac{2}{3} = \frac{\square}{\square}$$

Ex 91: Calculate and simplify:

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

Ex 92: Calculate and simplify:

$$\frac{3}{4} \times \frac{3}{5} = \frac{\square}{\square}$$

Ex 93: Calculate and simplify:

$$\frac{5}{6} \times \frac{2}{3} = \frac{\square}{\square}$$

G.2 MULTIPLYING FRACTIONS

Ex 94: Calculate and simplify:

$$\frac{4}{3} \times \frac{9}{5} = \frac{\square}{\square}$$

Ex 95: Calculate and simplify:

$$\frac{2}{5} \times \frac{5}{8} = \frac{\square}{\square}$$

Ex 96: Calculate and simplify:

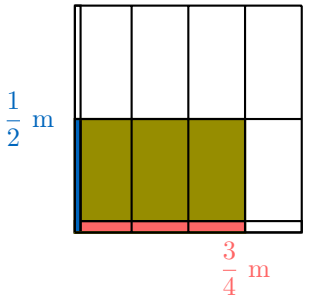
$$\frac{3}{7} \times \frac{14}{9} = \frac{\square}{\square}$$

Ex 97: Calculate and simplify:

$$\frac{8}{15} \times \frac{3}{4} = \frac{\square}{\square}$$

G.3 SOLVING REAL-WORLD PROBLEMS

Ex 98:



Calculate the area of the vegetable garden:

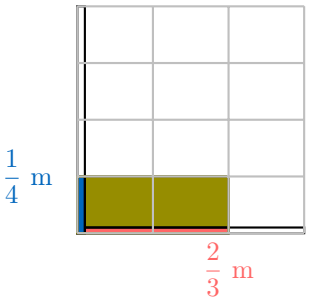
$\square\!\!\square\ m^2$

Ex 99: At Tariel High School, $\frac{4}{5}$ of the students are involved in extracurricular activities. Of these students, $\frac{2}{3}$ participate in fall activities. What fraction of the total student population at Tariel High School participates in fall activities?

$\square\!\!\square$ of the total students.

Ex 100: A rectangular piece of fabric is used to make a banner. The fabric is $\frac{2}{3}$ meters long and $\frac{1}{4}$ meters wide. What is the area of the banner?

$\square\!\!\square$ m^2.



Ex 101: A farmer has $\frac{2}{3}$ of a field planted with corn. Of that corn section, $\frac{1}{2}$ is irrigated. What fraction of the entire field is irrigated?

$\square\!\!\square$ of the field.

H DIVISION OF FRACTIONS

H.1 FINDING RECIPROCALS

Ex 102: The reciprocal of $\frac{5}{7}$ is $\square\!\!\square$.

Ex 103: The reciprocal of $\frac{3}{8}$ is $\square\!\!\square$.

Ex 104: The reciprocal of $\frac{7}{2}$ is $\square\!\!\square$.

Ex 105: The reciprocal of 4 is $\square\!\!\square$.

H.2 DIVIDING FRACTIONS

Ex 106: Calculate and simplify:

$$\frac{1}{2} \div \frac{3}{4} = \frac{\square}{\square}$$

Ex 107: Calculate and simplify:

$$\frac{2}{3} \div \frac{1}{2} = \frac{\square}{\square}$$

Ex 108: Calculate and simplify:

$$\frac{3}{5} \div \frac{2}{7} = \frac{\square}{\square}$$

Ex 109: Calculate and simplify:

$$\frac{4}{9} \div \frac{2}{3} = \frac{\square}{\square}$$

H.3 DIVIDING FRACTIONS

Ex 110: Simplify:

$$\frac{\frac{1}{2}}{\frac{3}{4}} = \frac{\square}{\square}$$

Ex 111: Simplify:

$$\frac{\frac{4}{9}}{\frac{2}{3}} = \frac{\square}{\square}$$

Ex 112: Simplify:

$$\frac{\frac{4}{3}}{\frac{5}{6}} = \frac{\square}{\square}$$

Ex 113: Simplify:

$$\frac{\frac{4}{10}}{\frac{7}{10}} = \frac{\square}{\square}$$

I SIGN CONVENTIONS FOR FRACTIONS

I.1 SIMPLIFYING WITH SIGNED NUMBERS

Ex 114: Simplify:

$$\frac{-15}{-30} = \square$$

Ex 115: Simplify:

$$\frac{-9}{12} = \square$$

Ex 116: Simplify:

$$\frac{-10}{-20} = \square$$

Ex 117: Simplify:

$$\frac{22}{-33} = \square$$

I.2 OPERATING WITH FRACTIONS WITH SIGNED NUMBERS

Ex 118: Calculate and simplify:

$$\frac{1}{2} - 1 = \square$$

Ex 119: Calculate and simplify:

$$\frac{3}{4} - \frac{1}{2} = \square$$

Ex 120: Calculate and simplify:

$$\frac{2}{3} - \frac{3}{4} = \square$$

Ex 121: Calculate and simplify:

$$\frac{-2}{3} - 2 = \square$$

Ex 122: Calculate and simplify:

$$\frac{-2}{3} - \frac{-4}{3} = \square$$

J FRACTIONS AS THE RESULT OF DIVISION

J.1 CONVERTING DIVISION TO FRACTIONS

Ex 123: Write as a fraction:

$$3 \div 2 = \frac{\square}{\square}$$

Ex 124: Write as a fraction:

$$2 \div 5 = \frac{\square}{\square}$$

Ex 125: Write as a fraction:

$$3 \div 4 = \frac{\square}{\square}$$

Ex 126: Write as a fraction:

$$5 \div 3 = \frac{\square}{\square}$$

J.2 CONVERTING FRACTIONS TO DIVISION EXPRESSIONS

Ex 127: Convert the fraction into a division expression:

$$\frac{2}{5} = \square \div \square$$

Ex 128: Convert the fraction into a division expression:

$$\frac{4}{7} = \square \div \square$$

Ex 129: Convert the fraction into a division expression:

$$\frac{3}{8} = \square \div \square$$

Ex 130: Convert the fraction into a division expression:

$$\frac{6}{9} = \square \div \square$$

J.3 CONVERTING FRACTIONS TO WHOLE NUMBERS

Ex 131: Convert the fraction into a whole number:

$$\frac{4}{2} = \square$$

Ex 132: Convert the fraction into a whole number:

$$\frac{9}{3} = \square$$

Ex 133: Convert the fraction into a whole number:

$$\frac{8}{4} = \square$$

Ex 134: Convert the fraction into a whole number:

$$\frac{5}{5} = \square$$

J.4 FINDING FRACTIONS IN WORD PROBLEMS

Ex 135: Four friends share 3 cakes equally. What fraction does each friend get?

$\frac{\square}{\square}$ of a cake

Ex 136: Five friends share 2 pizzas equally. What fraction does each friend get?

$\frac{\square}{\square}$ of a pizza

Ex 137: A couple shares 5 chocolate bars equally. What fraction of a chocolate bar does each person get?

$\frac{\square}{\square}$ of a chocolate bar

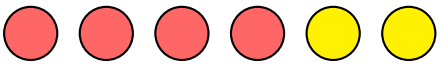
Ex 138: Six family members share 2 apple pies equally. What fraction of a pie does each family member get?

$\frac{\square}{\square}$ of a pie

K FRACTION AS A RATIO AND OPERATOR

K.1 IDENTIFYING FRACTIONS IN REAL-LIFE CONTEXTS

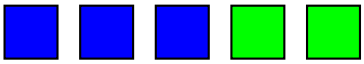
Ex 139:



What fraction of the circles are red ? (Simplify your answer.)

$\frac{\square}{\square}$ of the circles are red.

Ex 140:



What fraction of the squares are blue? (Simplify your answer.)

$\square/\square$ of the squares are blue.

Ex 141:

What fraction of the children are girls? (Simplify your answer.)

$\square/\square$ of the children are girls.

Ex 142:

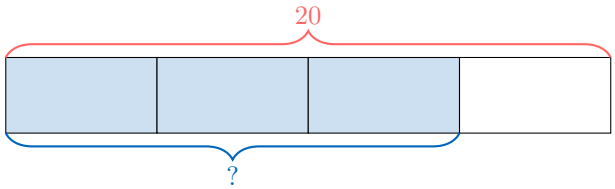
What fraction of the children raised their hand? (Simplify your answer.)

$\square/\square$ of the children raised their hand.

K.2 CALCULATING FRACTIONS OF A WHOLE

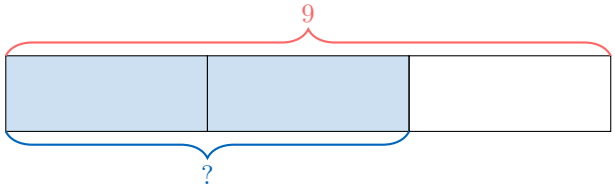
Ex 143:

$\frac{3}{4}$ of 20 = $\square$



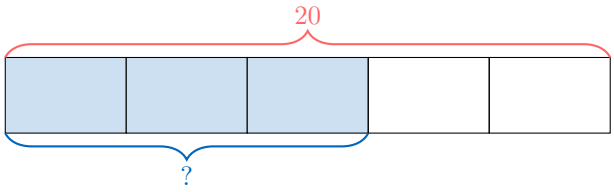
Ex 144:

$\frac{2}{3}$ of 9 = $\square$



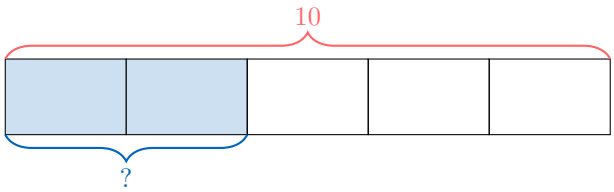
Ex 145:

$\frac{3}{5}$ of 20 = $\square$



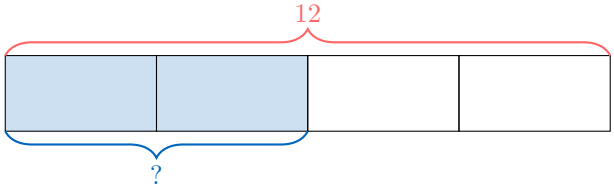
Ex 146:

$\frac{2}{5}$ of 10 = $\square$



Ex 147:

$\frac{2}{4}$ of 12 = $\square$



K.3 APPLYING FRACTIONS TO REAL-WORLD PROBLEMS

Ex 148: In a class of 9 students, $\frac{2}{3}$ of the students are girls. How many of the students are girls?

$\square$ girls

Ex 149: In a group of 16 fruits, $\frac{3}{4}$ of them are apples. How many of the fruits are apples?

$\square$ apples

Ex 150: In a collection of 15 books, $\frac{2}{5}$ of them are novels. How many of the books are novels?

$\square$ novels

Ex 151: For a refreshing drink recipe, the mixture consists of $\frac{1}{3}$ lemon and $\frac{2}{3}$ water for a total of 18 cl. How much lemon and water are used in the drink?

$\square$ cl of lemon
$\square$ cl of water

L FRACTIONS AS DECIMAL NUMBERS

L.1 CONVERTING FRACTIONS TO DECIMALS

Ex 152: Convert to a decimal number:

$$\frac{3}{4} = \square$$

Ex 153: Convert to a decimal number:

$$\frac{2}{5} = \square$$

Ex 154: Convert to a decimal number:

$$\frac{3}{20} = \square$$

Ex 155: Convert to a decimal number:

$$\frac{40}{50} = \square$$

L.2 CONVERTING DECIMALS TO FRACTIONS

Ex 156: Convert to a fraction:

$$1.3 = \frac{\square}{\square}$$

Ex 157: Convert 0.3 to a fraction:

$$0.3 = \frac{\square}{\square}$$

Ex 158: Convert 10.7 to a fraction:

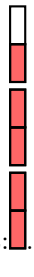
$$10.7 = \frac{\square}{\square}$$

Ex 159: Convert 0.99 to a fraction:

$$0.99 = \frac{\square}{\square}$$

M REPRESENTING FRACTIONS GREATER THAN ONE

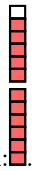
M.1 SOLVING REAL-WORLD PROBLEMS

Ex 160: I eat $\frac{5}{2}$ of a pain au chocolat:  .

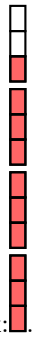
So I eat $\square$ whole pains au chocolat and $\frac{\square}{\square}$ of another pain au chocolat.

Ex 161: I eat $\frac{5}{4}$ of a pizza:   .

So I eat $\square$ whole pizza and $\frac{\square}{\square}$ of another pizza.

Ex 162: I have $\frac{11}{6}$ of a ribbon:  .

So I have $\square$ whole ribbon and $\frac{\square}{\square}$ of another ribbon.

Ex 163: I have $\frac{10}{3}$ of a wood plank:  .

So I have $\square$ whole wood planks and $\frac{\square}{\square}$ of another wood plank.

M.2 FINDING MIXED NUMBERS FROM BAR MODELS

Ex 164: Write the mixed number shown in the diagram:

$= \square \frac{\square}{\square}$

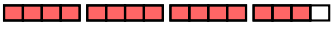
Ex 165: Write the mixed number shown in the diagram:

$= \square \frac{\square}{\square}$

Ex 166: Write the mixed number shown in the diagram:

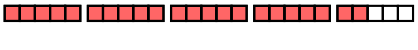
$= \square \frac{\square}{\square}$

Ex 167: Write the mixed number shown in the diagram:



$= \square \frac{\square}{\square}$

Ex 168: Write the mixed number shown in the diagram:



$= \square + \frac{\square}{\square}$

M.3 FINDING FRACTIONS FROM MIXED NUMBERS

Ex 169: Convert into improper fraction:

$$2\frac{1}{3} = \frac{\square}{\square}$$

Ex 170: Convert into an improper fraction:

$$3\frac{2}{5} = \frac{\square}{\square}$$

Ex 171: Convert into an improper fraction:

$$2\frac{3}{4} = \frac{\square}{\square}$$

Ex 172: Convert into an improper fraction:

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

M.4 FINDING MIXED NUMBERS FROM FRACTIONS

Ex 173: Convert into mixed number:

$$\frac{3}{2} = \square\,\frac{\square}{\square}$$

Ex 174: Convert into a mixed number:

$$\frac{7}{3} = \square\,\frac{\square}{\square}$$

Ex 175: Convert into a mixed number:

$$\frac{9}{2} = \square\,\frac{\square}{\square}$$

Ex 176: Convert into a mixed number:

$$\frac{13}{5} = \square\,\frac{\square}{\square}$$

N ORDER OF OPERATIONS

N.1 EVALUATING AND SIMPLIFYING EXPRESSIONS WITH FRACTIONS

Ex 177: Evaluate and simplify:

$$3 \times \frac{1}{2} + 1 = \square$$

Ex 178: Evaluate and simplify:

$$\frac{2 + \frac{1}{2}}{\frac{1}{4}} = \square$$

Ex 179: Evaluate and simplify:

$$\frac{3 + \frac{3}{4}}{\frac{1}{2}} = \square$$

Ex 180: Evaluate and simplify:

$$\frac{2 + \frac{1}{2}}{1 + \frac{2}{3}} = \square$$