ALGEBRAIC FRACTIONS

A DEFINITIONS

A.1 WRITING FRACTIONS FROM WORDS

Ex 1: Write as fraction:

$$x \text{ over } 2 = \square$$

Ex 2: Write as a fraction:

$$x \text{ square over } 6 = \square$$

Ex 3: Write as a fraction:

$$3 \text{ over } x = \square$$

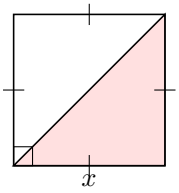
Ex 4: Write as a fraction:

$$x + 1 \text{ over } 2 = \square$$

B FRACTION AS QUOTIENT

B.1 FORMULATING ALGEBRAIC EXPRESSIONS

Ex 5: Express the colored area in the following diagram:

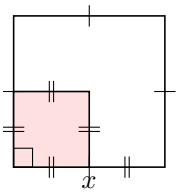


Area = $\square$

Ex 6: You have x marbles and want to share them equally among four friends. Express the number of marbles each friend receives.

Marbles per friend = $\square$

Ex 7: Express the colored area in the following diagram:



Area = $\square$

Ex 8: Un boulanger cuit 1000 biscuits. Il veut mettre ces biscuits dans x boîtes, avec le même nombre de biscuits dans chaque boîte. Exprime le nombre de biscuits dans chaque boîte.

Biscuits par boîte = $\square$

C EQUIVALENT FRACTIONS

C.1 SIMPLIFYING ALGEBRAIC FRACTIONS

Ex 9:

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

Ex 10:

$$\frac{10x^2}{4} = \frac{5x^2}{\square}$$

Ex 11:

$$\frac{9x^3}{30x} = \frac{3x^2}{\square}$$

Ex 12:

$$\frac{3x^2}{2x} = \frac{3x}{\square}$$

Ex 13:

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

D SIMPLIFICATION

D.1 SIMPLIFYING ALGEBRAIC FRACTIONS

Ex 14: Simplify:

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

Ex 15: Simplify:

$$\frac{x^2}{3x} = \square$$

Ex 16: Simplify:

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

Ex 17: Simplify:

$$\frac{8x^4}{12x} = \square$$

Ex 18: Simplify:

$$\frac{15x^2}{25x} = \square$$

Ex 19: Simplify:

$$\frac{14x^5}{21x^2} = \square$$

Ex 20: Simplify:

$$\frac{4x^3}{16x} = \square$$

E CROSS MULTIPLICATION

E.1 SOLVING PROPORTIONS USING CROSS-MULTIPLICATION

Ex 21: Solve x for $\frac{12}{4} = \frac{x}{6}$ (you can use a calculator).

$x =$ ☐

Ex 22: Solve x for $\frac{11}{10} = \frac{x}{5}$ (you can use a calculator).

$x =$ ☐

Ex 23: Solve x for $\frac{12}{10} = \frac{18}{x}$ (you can use a calculator).

$x =$ ☐

Ex 24: Solve x for $\frac{27}{x} = \frac{30}{10}$ (you can use a calculator).

$x =$ ☐

E.2 SOLVING PROPORTIONS USING CROSS-MULTIPLICATION

Ex 25: Solve for x in the equation $\frac{x}{3} = \frac{x+1}{2}$.

$x =$ ☐

Ex 26: Solve for x in the equation $\frac{x}{2} = \frac{x-2}{3}$.

$x =$ ☐

Ex 27: Solve for x in the equation $\frac{2}{x+1} = \frac{1}{x}$.

$x =$ ☐

Ex 28: Solve x for $\frac{2x+1}{4} = \frac{x+2}{3}$.

$x =$ ☐

F ADDITION AND SUBTRACTION

F.1 ADDING AND SUBTRACTING ALGEBRAIC FRACTIONS

Ex 29: Calculate and simplify::

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

Ex 30: Calculate and simplify:

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

Ex 31: Calculate and simplify:

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

Ex 32: Calculate and simplify:

$$\frac{5x}{3} - \frac{x}{6} = \square$$

Ex 33: Calculate and simplify:

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

Ex 34: Calculate and simplify:

$$\frac{7x^3}{4} - \frac{2x^3}{3} = \square$$

G MULTIPLICATION OF A FRACTION BY A NUMBER

G.1 MULTIPLYING OF ALGEBRAIC FRACTIONS BY NUMBERS

Ex 35: Calculate and simplify:

$$x \times \frac{x}{2} = \square$$

Ex 36: Calculate and simplify:

$$3x \times \frac{2x}{9} = \square$$

Ex 37: Calculate and simplify:

$$2x \times \frac{x^3}{6} = \square$$

Ex 38: Calculate and simplify:

$$4x^2 \times \frac{x}{8} = \square$$

Ex 39: Calculate and simplify:

$$\frac{5}{x} \times x^2 = \square$$

Ex 40: Calculate and simplify:

$$\frac{x^4}{3} \times 6 = \square$$

H MULTIPLICATION OF FRACTIONS

H.1 MULTIPLYING OF ALGEBRAIC FRACTIONS

Ex 41: Calculate and simplify:

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

Ex 42: Calculate and simplify:

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

Ex 43: Calculate and simplify:

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

Ex 44: Calculate and simplify:

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

H.2 MULTIPLYING OF ALGEBRAIC FRACTIONS

Ex 45: Calculate and simplify:

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

Ex 46: Calculate and simplify:

$$\frac{x}{2} \times \frac{x^2}{3} = \square$$

Ex 47: Calculate and simplify:

$$\frac{2}{x} \times \frac{x^2}{3} = \square$$

Ex 48: Calculate and simplify:

$$\left(\frac{x}{2}\right)^2 = \square$$

I DIVISION OF FRACTIONS

I.1 DIVIDING ALGEBRAIC FRACTIONS

Ex 49: Calculate and simplify:

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

Ex 50: Calculate and simplify:

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

Ex 51: Calculate and simplify:

$$\frac{3}{x} \div \frac{6}{x} = \square$$

Ex 52: Calculate and simplify:

$$\frac{4x}{5} \div x = \square$$

Ex 53: Calculate and simplify:

$$\frac{x^2}{2} \div \frac{x}{4} = \square$$

I.2 DIVIDING ALGEBRAIC FRACTIONS

Ex 54: Calculate and simplify:

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

Ex 55: Calculate and simplify:

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

Ex 56: Calculate and simplify:

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

Ex 57: Calculate and simplify:

$$\frac{\frac{4x^2}{5}}{2} = \square$$

Ex 58: Calculate and simplify:

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

Ex 59: Calculate and simplify:

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

J SIGN RULES

J.1 SIMPLIFYING ALGEBRAIC FRACTIONS WITH RELATIVE NUMBERS

Ex 60: Simplify:

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

Ex 61: Simplify:

$$\frac{-6x}{12} = \square$$

Ex 62: Simplify:

$$\frac{-12x^4}{-2x^2} = \square$$

Ex 63: Simplify:

$$\frac{3x^3}{-9x} = \square$$

Ex 64: Simplify:

$$\frac{-21x^3}{-7x} = \square$$

Ex 65: Simplify:

$$\frac{-4x^4}{8x^2} = \square$$

K ORDER OF OPERATIONS

K.1 CALCULATING ALGEBRAIC EXPRESSIONS

Ex 66: Calculate and simplify:

$$\frac{x+7x}{3\times 4} = \square$$

Ex 67: Calculate and simplify:

$$x \times \frac{3x+x}{4+2} = \boxed{}$$

Ex 68: Calculate and simplify:

$$\frac{2x^3}{2x-x} = \boxed{}$$

Ex 69: Calculate and simplify:

$$4x \times \frac{6x-2x}{2\times 8} = \boxed{}$$

K.2 CALCULATING ALGEBRAIC EXPRESSIONS

Ex 70: Write as a single fraction:

$$2 - \frac{x+1}{3} = \boxed{}$$

Ex 71: Write as a single fraction:

$$3x - \frac{2-x}{4} = \boxed{}$$

Ex 72: Write as a single fraction:

$$\frac{x}{2} - \frac{x+1}{3} = \boxed{}$$

Ex 73: Write as a single fraction:

$$\frac{x+1}{3} - \frac{x+4}{2} = \boxed{}$$