FRACTIONS

A DEFINING AND REPRESENTING FRACTIONS

A.1 WRITING FRACTIONS FROM WORDS

Ex 1: Write as a fraction:

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

Ex 2: Write as a fraction:

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

Ex 3: Write as a fraction:

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

Ex 4: Write as a fraction:

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

B EQUIVALENT FRACTIONS

B.1 SIMPLIFYING ALGEBRAIC FRACTIONS

Ex 5:

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

Ex 6:

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

Ex 7:

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

Ex 8:

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

Ex 9:

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

C SIMPLIFICATION

C.1 SIMPLIFYING ALGEBRAIC FRACTIONS

Ex 10: Simplify:

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

Ex 11: Simplify:

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

Ex 12: Simplify:

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

Ex 13: Simplify:

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

Ex 14: Simplify:

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

Ex 15: Simplify:

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

Ex 16: Simplify:

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

D CROSS MULTIPLICATION

D.1 SOLVING PROPORTIONS USING CROSS-MULTIPLICATION

Ex 17: Solve x for $\frac{12}{4} = \frac{x}{6}$:

$$x = \square$$

Ex 18: Solve x for $\frac{11}{10} = \frac{x}{5}$:

$$x = \square$$

Ex 19: Solve x for $\frac{12}{10} = \frac{18}{x}$:

$$x = \square$$

Ex 20: Solve x for $\frac{27}{x} = \frac{30}{10}$:

$$x = \square$$

D.2 SOLVING PROPORTIONS USING CROSS-MULTIPLICATION

Ex 21: Solve for x in the equation $\frac{x}{3} = \frac{x+1}{2}$.

$$x = \square$$

Ex 22: Solve for x in the equation $\frac{x}{2} = \frac{x-2}{3}$.

$$x = \square$$

Ex 23: Solve for x in the equation $\frac{2}{x+1} = \frac{1}{x}$.

$$x = \square$$

Ex 24: Solve for x in the equation $\frac{2x+1}{4} = \frac{x+2}{3}$.

$$x = \square$$

E ADDITION AND SUBTRACTION

E.1 ADDING AND SUBTRACTING ALGEBRAIC FRACTIONS

Ex 25: Calculate and simplify:

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

Ex 26: Calculate and simplify:

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

Ex 27: Calculate and simplify:

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

Ex 28: Calculate and simplify:

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

Ex 29: Calculate and simplify:

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

Ex 30: Calculate and simplify:

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

F MULTIPLYING A FRACTION BY A NUMBER

F.1 MULTIPLYING OF ALGEBRAIC FRACTIONS BY NUMBERS

Ex 31: Calculate and simplify:

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

Ex 32: Calculate and simplify:

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

Ex 33: Calculate and simplify:

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

Ex 34: Calculate and simplify:

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

Ex 35: Calculate and simplify:

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

Ex 36: Calculate and simplify:

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

G MULTIPLICATION OF FRACTIONS

G.1 MULTIPLYING OF ALGEBRAIC FRACTIONS

Ex 37: Calculate and simplify:

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

Ex 38: Calculate and simplify:

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

Ex 39: Calculate and simplify:

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

Ex 40: Calculate and simplify:

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

G.2 MULTIPLYING OF ALGEBRAIC FRACTIONS

Ex 41: Calculate and simplify:

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

Ex 42: Calculate and simplify:

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

Ex 43: Calculate and simplify:

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

Ex 44: Calculate and simplify:

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

H FRACTIONS AS THE RESULT OF DIVISION

H.1 DIVIDING ALGEBRAIC FRACTIONS

Ex 45: Calculate and simplify:

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

Ex 46: Calculate and simplify:

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

Ex 47: Calculate and simplify:

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

Ex 48: Calculate and simplify:

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

H.2 DIVIDING ALGEBRAIC FRACTIONS

Ex 49: Calculate and simplify:

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

Ex 50: Calculate and simplify:

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

Ex 51: Calculate and simplify:

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

Ex 52: Calculate and simplify:

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

Ex 53: Calculate and simplify:

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

Ex 54: Calculate and simplify:

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

I SIGN CONVENTIONS FOR FRACTIONS

I.1 SIMPLIFYING ALGEBRAIC FRACTIONS WITH RELATIVE NUMBERS

Ex 55: Simplify:

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

Ex 56: Simplify:

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

Ex 57: Simplify:

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

Ex 58: Simplify:

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

Ex 59: Simplify:

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

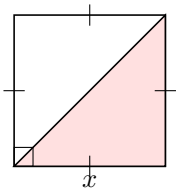
Ex 60: Simplify:

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

J FRACTION AS QUOTIENT

J.1 FORMULATING ALGEBRAIC EXPRESSIONS

Ex 61: Express the colored area in the following diagram:

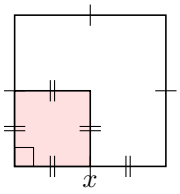


Area = $\square$

Ex 62: 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 63: Express the colored area in the following diagram:



Area = $\square$

Ex 64: A baker bakes 1000 cookies. He wants to put these cookies into x boxes, with the same number of cookies in each box. Express the number of cookies in each box.

Cookies per box = $\square$

K FRACTION AS A RATIO AND OPERATOR

K.1 APPLYING RATIOS TO ALGEBRAIC EXPRESSIONS

Ex 65: An item is priced at x dollars. If it is discounted by a ratio of $\frac{1}{4}$ of its price, write a simplified expression for the new price.

New Price = $\square$

Un article a un prix de x dollars. S'il est réduit d'un rapport de $\frac{1}{4}$ de son prix, écrire une expression simplifiée pour le nouveau prix.

Nouveau Prix = $\square$

Ex 66: Calculate and simplify: $\frac{2}{3}$ of $(x+9)$.

$\square$

Calculer et simplifier : $\frac{2}{3}$ de $(x+9)$.

$\square$

Ex 67: Calculate and simplify: one-half of x plus one-third of x.

$\square$

Calculer et simplifier : la moitié de x plus un tiers de x.

$\square$

Ex 68: A quantity x is increased by $\frac{2}{5}$ of its value. Write a simplified expression for the new quantity.

New Quantity = $\square$

Une quantité x est augmentée de $\frac{2}{5}$ de sa valeur. Écrire une expression simplifiée pour la nouvelle quantité.

Nouvelle Quantité = $\square$

L FRACTIONS AS DECIMAL NUMBERS

L.1 SIMPLIFYING EXPRESSIONS WITH FRACTIONAL AND DECIMAL COEFFICIENTS

Ex 69: Calculate and simplify:

$$0.5x - \frac{x}{2} = \square$$

Calculer et simplifier :

$$0,5x - \frac{x}{2} = \square$$

Ex 70: Calculate and simplify:

$$0.25y + \frac{3y}{4} = \square$$

Calculer et simplifier :

$$0,25y + \frac{3y}{4} = \square$$

Ex 71: Calculate and simplify:

$$a - 0.2a - \frac{2a}{5} = \square$$

Calculer et simplifier :

$$a - 0,2a - \frac{2a}{5} = \square$$

Ex 72: Calculate and simplify:

$$0.75 \times \frac{z}{3} = \square$$

Calculer et simplifier :

$$0,75 \times \frac{z}{3} = \square$$

Ex 73: Calculate and simplify:

$$0.25x + \frac{3x}{4} = \square$$

Calculer et simplifier :

$$0,25x + \frac{3x}{4} = \square$$

Ex 74: Calculate and simplify:

$$x - 0.2x - \frac{2x}{5} = \square$$

Calculer et simplifier :

$$x - 0,2x - \frac{2x}{5} = \square$$

Ex 75: Calculate and simplify:

$$0.75 \times \frac{x}{3} = \square$$

Calculer et simplifier :

$$0,75 \times \frac{x}{3} = \square$$

M ORDER OF OPERATIONS

M.1 CALCULATING ALGEBRAIC EXPRESSIONS

Ex 76: Calculate and simplify:

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

Calcule et simplifie :

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

Ex 77: Calculate and simplify:

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

Calcule et simplifie :

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

Ex 78: Calculate and simplify:

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

Calcule et simplifie :

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

Ex 79: Calculate and simplify:

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

Calcule et simplifie :

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

M.2 CALCULATING ALGEBRAIC EXPRESSIONS

Ex 80: Write as a single fraction:

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

Ex 81: Write as a single fraction:

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

Ex 82: Write as a single fraction:

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

Ex 83: Write as a single fraction:

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