SUPER 12s

SUPER 12s CAN BE USED AS AN INDIVIDUALISED MASTERY LEARNING PROGRAM.

2 ALGEBRA
2.5 ALGEBRAIC FRACTIONS
2.5 LEVEL 6

NAME : _____

Skill description: Simplifying algebraic fractions that contain common numerical factors (including negatives) and multiple common variables raised to powers.

Essential Revision

1. Write as an improper fraction.

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

2. Write using fractions.

$$(5x + y) \div (a - b)$$

3. Simplify.

$$\frac{500x}{450xy}$$

4. Simplify.

$$\frac{y^4}{y^3}$$

5. Simplify.

$$\frac{a^4\, b}{a^2\, b^5}$$

6. Simplify.

$$\frac{24\, a^6\, b^2}{30\, a^4\, b^5}$$

7. Write using fractions.

$$a \div (b + 1)$$

8. Write using fractions.

$$9a \div b$$

9. Simplify.

$$\frac{450x^2}{50xy^3}$$

10. Simplify.

$$\frac{d^2}{d^6}$$

11. Simplify.

$$\frac{f\ g^5}{f^3\ g}$$

12. Simplify.

$$\frac{4\ a^7\ b^4}{12\ a^4\ b^5}$$

Solutions can be found at the end of the booklet.

score $\frac{\quad}{12}$

STRATEGIES TO SOLVE THE PROBLEMS

Example 1

Simplify the following algebraic fraction.

$$\frac{-2\,x^3\,y^2 \times x\,y^3}{-4\,x^4 \times x^2\,y^4}$$

In this example the numerator and denominator have a common numerical factor and variables (x and y).

Step 1

Simplify the coefficients by dividing the numerator and denominator by the highest common factor (2). As both values are negative, these will cancel each other out also, leaving positive values.

$$\frac{-2\,x^3\,y^2 \times x\,y^3}{-4\,x^4 \times x^2\,y^4}$$

$$\frac{x^3\,y^2 \times x\,y^3}{2\,x^4 \times x^2\,y^4}$$

Step 2

Understanding index notation, we can simplify the x and y variables by multiplying the terms in the numerator and denominator.

$$\frac{x^3\,y^2 \times x\,y^3}{2\,x^4 \times x^2\,y^4}$$

$$\frac{x^4\,y^5}{2\,x^6\,y^4}$$

Step 3

By understanding index notation, we can simplify the x and y variables.

$$\frac{x^4\,y^5}{2\,x^6\,y^4}$$

$$\frac{x^{4-6}\,y^{5-4}}{2}$$

$$\frac{x^{-2}y^{1}}{2}$$

$$\frac{y}{2x^2}$$

Example 2

Simplify the following algebraic fraction.

$$\frac{-25\,x^2\,y^3 \times 2\,x^3\,y}{15\,x^5\,y^2 \times x\,y}$$

In this example the numerator and denominator have a common numerical factor and variables (x and y).

Step 1

Simplify the coefficients by multiplying the values in the numerator, then dividing the numerator and denominator by the highest common factor (5).

$$\frac{-25\,x^2\,y^3 \times 2\,x^3\,y}{15\,x^5\,y^2 \times x\,y}$$

$$\frac{-50\,x^2\,y^3 \times\ x^3\,y}{15\,x^5\,y^2 \times x\,y}$$

$$\frac{-10\,x^2\,y^3 \times\ x^3\,y}{3\,x^5\,y^2 \times x\,y}$$

Step 2

We can simplify the x and y variables by multiplying the terms in the numerator and denominator.

$$\frac{-10\,x^2\,y^3 \times\, x^3\,y}{3\,x^5\,y^2 \times x\,y}$$

$$\downarrow$$

$$\frac{-10\,x^5\,y^4}{3\,x^6\,y^3}$$

Step 3

By understanding index notation, we can simplify the x and y variables.

$$\frac{-10\,x^{5-6}\,y^{4-3}}{3}$$

$$\downarrow$$

$$\frac{-10\,x^{-1}\,y^{1}}{3}$$

$$\downarrow$$

$$\frac{-10y}{3x}$$

QUESTIONS

Simplify.

1.

$$\frac{-5\,x^2\,y^5 \times x^2\,y}{20\,x\,y^2}$$

2.

$$\frac{6\,x^4\,y}{12\,x^7\,y^4 \times\ x^3\,y}$$

3.

$$\frac{-40\,a^4\,b^3 \times a\,b}{-30\,a^7\,b^5 \times a^2\,b^3}$$

4.

$$\frac{25\,f^5\,g^2}{-10\,f^2\,g \times 2\,f^2\,g}$$

5.

$$\frac{-24\,m^6\,n^3 \times m\,n}{18\,m^3\,n^8 \times m^2\,n^2}$$

6.

$$\frac{-2\,x^7\,y^6 \times 4\,z^4}{-14\,x\,y^7\,z^3}$$

7.

$$\frac{4\,c^5\,d^3\,e^2}{6\,d^4\,e^7 \times 3\,d^2\,e}$$

8.

$$\frac{12\,w^3\,x^3\,y^2 \times 2\,w\,x^3}{-18\,w^2\,x\,y^3 \times w^2\,y}$$

9.

$$\frac{-8\,x^2\,z^4 \times x^3\,y^2}{-12\,y^3\,z^8 \times z^2}$$

10.

$$\frac{-18\,x^4\,y^2}{3\,x^5\,y^7\,z \times x^5\,z^2}$$

11.

$$\frac{21\,a^4\,c^3 \times -3}{77\,b^5\,c^2 \times a^2\,b^5}$$

12.

$$\frac{-6\,f^5\,g^2\,h^5 \times 2\,f\,g\,h}{14\,f^2\,g^7\,h^3 \times f^4\,g\,h^2}$$

SOLUTIONS CAN BE FOUND AT THE END OF THE BOOKLET.

score $\frac{\quad}{12}$

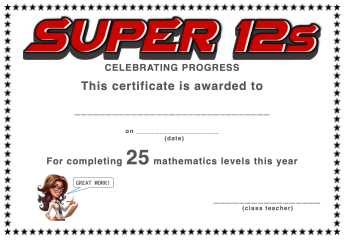
MASTERY TEST

Teacher's signature

I'VE COMPLETED

_____

LEVELS THIS YEAR



Solutions to Essential Revision

1. $\frac{14}{3}$	2. $\frac{5x+y}{a-b}$
3. $\frac{10}{9y}$	4. y
5. $\frac{a^2}{b^4}$	6. $\frac{4a^2}{5b^3}$
7. $\frac{a}{b+1}$	8. $\frac{9a}{b}$
9. $\frac{9x}{y^3}$	10. $\frac{1}{d^4}$
11. $\frac{g^4}{f^2}$	12. $\frac{a^3}{3b}$

Solutions to Questions

1. $\frac{-x^3y^4}{4}$	2. $\frac{1}{2x^6y^4}$
3. $\frac{4}{3a^4b^4}$	4. $\frac{5f}{-4}$
5. $\frac{-4m^2}{3n^6}$	6. $\frac{4x^6z}{7y}$
7. $\frac{2c^5}{9d^3e^6}$	8. $\frac{4x^5}{-3y^2}$
9. $\frac{2x^5}{3yz^6}$	10. $\frac{-6}{x^6y^5z^3}$
11. $\frac{-9a^2c}{11b^{10}}$	12. $\frac{-6h}{7g^5}$