

# Boost Free Lessons - Year 10 Maths

## Lesson 2: Algebraic Fractions

Name: \_\_\_\_\_ Grade: \_\_\_\_\_ Date: \_\_\_\_\_

### Worked Example 1

Simplify  $\frac{6x^2}{9x}$

1. Deal with the numbers first. The highest common factor of 6 and 9 is 3, so  $\frac{6}{9} = \frac{2}{3}$ .
2. Now the letters:  $x^2 \div x = x$ .
3. Put the two parts back together.

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

### Worked Example 2

Simplify  $\frac{x^2 + 5x}{x + 5}$

1. You can only cancel **factors**, never single terms, so factorise the numerator first.
2.  $x^2 + 5x = x(x + 5)$ .
3. The bracket  $(x + 5)$  now appears on the top and the bottom, so it cancels.
4. That leaves  $x$  on its own.

$$= x$$

**Remember:** Factorise fully before you cancel. Only factors can be cancelled, never individual terms. To divide by a fraction, multiply by its reciprocal.



**Question 1:** Simplify the following.

1.  $\frac{4x}{8}$

2.  $\frac{10a^2}{5a}$

3.  $\frac{12m^3}{4m}$

4.  $\frac{15xy}{20y}$

5.  $\frac{6a^2b}{9ab^2}$

6.  $\frac{14p^5}{7p^2}$

7.  $\frac{8x^2y^3}{12xy}$

8.  $\frac{5k}{25k^3}$



**Question 2:** Simplify the following.

1.  $\frac{2x + 6}{2}$

2.  $\frac{3x - 12}{3}$

3.  $\frac{x^2 + 3x}{x}$

4.  $\frac{x^2 - 4x}{x - 4}$

5.  $\frac{x}{3} \times \frac{9}{x^2}$

6.  $\frac{2a}{5} \times \frac{10}{a}$

7.  $\frac{x}{4} \div \frac{x}{8}$

8.  $\frac{3m}{7} \div \frac{m}{14}$



**Question 3:** Answer the following questions.

1. Simplify  $\frac{x^2 + 7x}{x + 7}$ .

2. Simplify  $\frac{4x + 8}{x + 2}$ .

3. Simplify  $\frac{6a^2b^3}{9a^3b}$ .

4. Simplify  $\frac{x}{2} + \frac{x}{5}$ .

5. Explain why  $\frac{x+3}{3}$  does not simplify to  $x$ .





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**Answers:** Algebraic Fractions**Question 1**

1.  $\frac{x}{2}$

2.  $2a$

3.  $3m^2$

4.  $\frac{3x}{4}$

5.  $\frac{2a}{3b}$

6.  $2p^3$

7.  $\frac{2xy^2}{3}$

8.  $\frac{1}{5k^2}$

**Question 2**

1.  $x + 3$

2.  $x - 4$

3.  $x + 3$

4.  $x$

5.  $\frac{3}{x}$

6.  $4$

7.  $2$

8.  $6$

**Question 3**

1.  $x$

2.  $4$

3.  $\frac{2b^2}{3a}$

4.  $\frac{7x}{10}$

5. You can only cancel factors of the **whole** numerator. Here 3 is a term, not a factor of  $x + 3$ .

