

Year 8 Term 1 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

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5 Year 8 Term 1 Week 5 Homework

5.1 Topic 1 — Algebra

5.1.1 Factorising: The Highest Common Factor

To factorise an algebraic expression:

- write the HCF of the terms outside grouping symbols
- divide each term in the expression by the HCF to find the terms inside the grouping symbols.
- $ab + ac = a(b + c)$ $ab - ac = a(b - c)$

Example 5.1.1 Factorise the following:

- $6x + 18$
 $= (6 \times x) + (6 \times 3) = 6(x + 3)$
- $2c^2 - 6c$
 $= (2c \times c) + (2c \times 3)$
 $= 2c(c + 3)$
- $12u^2 + 8uv$
 $= (4u \times u) + (4u \times v)$
 $= 4u(u + v)$

Exercise 5.1.1 Factorise the following algebraic expressions:

- $-15a^2 + 35ab =$ _____
- $2u + 2v - 12 =$ _____
- $6x - 9y + 24z =$ _____
- $18x^2y - 24xyz =$ _____
- $a^2b + ab^2 + 2ab =$ _____
- $-12q^2p + 9qp^2 =$ _____
- $12wxy - 20x^2 + 8xy^2 =$ _____
- $35ab^2 - 40a^2b^2 + 15b =$ _____

Example 5.1.2 Factorise by taking out the binomial common factor or HCF

$$1. 2a(b - c) + (b - c) = (2a + 1)(b - c)$$

$$2. a^4b^3 - 4a^6b^2 = a^4b^2(b - 4a^2)$$

Exercise 5.1.2 Factorise by taking out the binomial common factor

$$1. a(b + c) + 3(b + c) = \underline{\hspace{10cm}}$$

$$2. a(a + 4) + (a + 4) = \underline{\hspace{10cm}}$$

$$3. 2x(y - 2) - 2(y - 2) = \underline{\hspace{10cm}}$$

$$4. 2c(c + d) - (c + d) = \underline{\hspace{10cm}}$$

$$5. (a - 3) - a(a - 3) = \underline{\hspace{10cm}}$$

$$6. u(v + 12) + 2v(v + 12) = \underline{\hspace{10cm}}$$

$$7. 5m(n - 5) - 5n(n - 5) = \underline{\hspace{10cm}}$$

$$8. (k + m) - n(k + m) = \underline{\hspace{10cm}}$$

Exercise 5.1.3 Factorise by taking out HCF

$$1. a^4 - a^5 = \underline{\hspace{10cm}}$$

$$2. b^6 + 2b^3 = \underline{\hspace{10cm}}$$

$$3. 4x^6 - 8x^4 = \underline{\hspace{10cm}}$$

$$4. 8m^4 - 14m^3n = \underline{\hspace{10cm}}$$

$$5. 5u^8 + 3u^6 = \underline{\hspace{10cm}}$$

$$6. 2x^2y - 6xy^4 + 8x^2y^2 = \underline{\hspace{10cm}}$$

$$7. 12a^6b^4 + 8a^4b^2 - 16a^3b^5 = \underline{\hspace{10cm}}$$

$$8. 3x^2y^3z^4 + x^3y^4z^5 - 9x^6y^5z^4 = \underline{\hspace{10cm}}$$

5.1.2 Adding and Subtracting Algebraic Fractions

To add or subtract algebraic fractions:

1. Express the fractions with a common denominator
2. Add or subtract the numerators and simplify if possible.

Example 5.1.3 Simplify the following

$$1. \frac{5x}{12} - \frac{7x}{12} = \frac{2x}{12} = -\frac{x}{6}$$

$$2. \frac{2a}{3} + \frac{a}{4} = \frac{8a}{12} + \frac{3a}{12} = \frac{11a}{12}$$

$$\begin{aligned} 3. \frac{17p}{20} - \frac{p}{4} &= \frac{17p}{20} - \frac{5p}{20} \\ &= \frac{12p}{20} \\ &= \frac{3p}{5} \end{aligned}$$

Exercise 5.1.4 Simplify the following algebraic fractions:

$$1. \frac{13t}{15} - \frac{8t}{15} = \underline{\hspace{10cm}}$$

$$2. \frac{11m}{12} - \frac{3m}{12} = \underline{\hspace{10cm}}$$

$$3. \frac{3w}{4} + \frac{4w}{5}$$

$\underline{\hspace{10cm}}$

$\underline{\hspace{10cm}}$

$$4. \frac{4x}{3} - \frac{11x}{15}$$

$\underline{\hspace{10cm}}$

$\underline{\hspace{10cm}}$

$$5. \frac{5y}{12} - \frac{7y}{24}$$

$\underline{\hspace{10cm}}$

$\underline{\hspace{10cm}}$

Exercise 5.1.5 Further Applications

1. $\frac{a+2}{2} + \frac{a+3}{4}$

2. $\frac{m-2}{3} + \frac{m+2}{4}$

3. $\frac{x+3}{5} + \frac{x-1}{7}$

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

5. $\frac{5y-2}{4} + \frac{2y-3}{7}$

6. $\frac{n-2}{6} + \frac{n+3}{3}$

7. $\frac{b+3}{8} - \frac{b-3}{3}$

8. $\frac{2s-3}{3t} + \frac{3s+1}{t}$

5.1.3 Multiplying Algebra Fractions

To multiply algebraic fractions:

1. Cancel any common factors between the numerators and denominators
2. Multiply the numerators and multiply denominators.

Example 5.1.4 Simplify:

$$1. \frac{a}{4} \times \frac{b}{7} = \frac{ab}{28}$$

$$2. \frac{4x}{15} \times \frac{3y}{8} = \frac{xy}{10}$$

$$3. \frac{3a^2}{4b^2} \times \frac{2b}{9a} = \frac{a}{6b}$$

Exercise 5.1.6 Simplify the following algebraic fractions:

$$1. \frac{ab}{4} \times \frac{2a}{b} = \underline{\hspace{10cm}}$$

$$2. \frac{4x}{5} \times \frac{15y}{8} = \underline{\hspace{10cm}}$$

$$3. \frac{2}{d} \times \frac{3}{8d} = \underline{\hspace{10cm}}$$

$$4. \frac{7w}{3x} \times \frac{4w}{5y} = \underline{\hspace{10cm}}$$

$$5. \frac{y}{4} \times \frac{k}{6} = \underline{\hspace{10cm}}$$

$$6. \frac{a}{b} \times \frac{c}{ad} = \underline{\hspace{10cm}}$$

$$7. \frac{3e}{4f} \times \frac{5g}{6h} = \underline{\hspace{10cm}}$$

$$8. \frac{3a}{4b} \times \frac{3ab}{4cd} = \underline{\hspace{10cm}}$$
