

Year 8 Term 1 Math Homework

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

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6 Year 8 Term 1 Week 6 Homework

6.1 Topic 1 — Algebra (Chapter Review)

6.1.1 Adding and subtracting like terms

Exercise 6.1.1 Simplify each of these expressions by collecting like terms:

1. $3mn + 9m^2 + 6mn + 12n^2 =$ _____

2. $5x^2 - 4x - 3x^2 + 9x =$ _____

3. $4a^2 + 2^2 + 3^2 - a^2 =$ _____

4. $2xy + 4xy - 9xy + xy^2 =$ _____

5. $6x - (-5x^2) + (-3x^2) - (-4x) =$ _____

6.1.2 Index Laws [$a^m \times a^n = a^{m+n}$; $a^m \div a^n = a^{m-n}$; $(a^m)^n = a^{m \times n}$]

Exercise 6.1.2 Simplify these products using index laws:

1. $9xy^2 \times 4x^2y^2 =$ _____

2. $5x^5 \times 4y^3 \times 3xy =$ _____

3. $6ab \times 4ab^2 \times 3a^3b =$ _____

4. $9m^7 \times 2m^6 \times m^5 =$ _____

5. $4pq \times 5p^2q^3 \times 6p^4q^5 =$ _____

Exercise 6.1.3 Simplify these divisions using index laws:

1. $8a^6 \div 2a^4 \div a^2 =$ _____

2. $25y^{12} \div 5y^4 \div xy =$ _____

3. $3x^{12} \div 4x^8 =$ _____

4. $12x^8y^3 \div 6x^4y \div 2y =$ _____

5. $24pq^2 \times p^2q^3 \div p^3q^2 =$ _____

Exercise 6.1.4 Simplify these expression using index laws:

1. $(x^2)^3 =$ _____

2. $(3a^3)^4 =$ _____

3. $(4x^2y^3)^2 =$ _____

4. $(3x^5y^6)^3 =$ _____

5. $(m - 3)^2 =$ _____

6. $(a^2 + 2b^3)^2 =$ _____

6.1.3 Removing Grouping Symbols**Exercise 6.1.5 Rewrite the following expressions without grouping symbols:**

1. $5(x + 3) + 4x =$ _____

2. $9(6x + 2y^2) =$ _____

3. $4x(x + 2) - 6x =$ _____

4. $8a + 3(2a + 3) =$ _____

5. $3x(2x - 3y) + 5x(x - 2y) =$ _____

6. $9ab(4a^2b + 3ab^2 - 2ba^2) =$ _____

Exercise 6.1.6 Expand and simplify:

1. $12 - 2(3a + 8) + 6 =$ _____

2. $4(5x + 6) - 6(7x - 8) =$ _____

3. $3abc(4a^2bc + 3ab^2c - 2ba^2c) =$ _____

4. $3x(5x - 2y) - y(x + 6y) =$ _____

5. $5ab(2a + b^2) - 7b(a^2 - 3b) =$ _____

6. $(m + 2n)^3$ (Hints: $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$)

6.1.4 Highest Common Factors (HCF)**Exercise 6.1.7 Complete the following by finding the missing HCF:**

- $6x + 15 = \underline{\hspace{2cm}} (2x + 5)$
- $2a^2 - 4a = \underline{\hspace{2cm}} (a - 2)$
- $4m + 12 = \underline{\hspace{2cm}} (2m + 6)$
- $(a^2b - 2ab + 4ab^2) = \underline{\hspace{2cm}} (a - 2 + 4b)$

Exercise 6.1.8 Simplify the following expressions:

- $8p + 3q - 6p + 12q = \underline{\hspace{10cm}}$
- $6m^2n + 3mn^3 + 5m^2n = \underline{\hspace{10cm}}$
- $63a^5b^3 \div 3a^2b = \underline{\hspace{10cm}}$
- $ab - 3a^2 + 5ba - 2ab = \underline{\hspace{10cm}}$
- $(2p^6 \times 6p^7) \div 4p^5 = \underline{\hspace{10cm}}$

Exercise 6.1.9 Factorise the following expressions:

- $15 + 5a - 35a^2 = \underline{\hspace{10cm}}$
- $6xy + 3xy^2 + 12x^2y^3 = \underline{\hspace{10cm}}$
- $24mn + 4mp - 6mnp = \underline{\hspace{10cm}}$
- $3abc + 6ab + 12a^2b = \underline{\hspace{10cm}}$
- $a^2b^4 + a^2b - ab^2 = \underline{\hspace{10cm}}$

Exercise 6.1.10 Expand and simplify the following expressions:

- $4(x + 3y) + 5x - 12y = \underline{\hspace{10cm}}$
- $8y + 3(4y + 6) - 12 = \underline{\hspace{10cm}}$
- $6 + 2(3x - 4) = \underline{\hspace{10cm}}$
- $9(5 - 3y) + 10y = \underline{\hspace{10cm}}$
- $2(5 - 6x)^2 = \underline{\hspace{10cm}}$

6.1.5 Algebraic Fractions**Exercise 6.1.11 Simplify the following fractions:**

1. $\frac{5x}{3} - \frac{3x}{4} =$ _____

2. $\frac{2x}{3} + \frac{x}{6} =$ _____

3. $\frac{2m}{3} + \frac{3m}{5} =$ _____

4. $\frac{b}{4} + \frac{3b}{6} =$ _____

Exercise 6.1.12 Simplify the following products:

1. $\frac{x}{2} \times \frac{y}{3} =$ _____

2. $\frac{2x}{3} \times \frac{6}{4x} =$ _____

3. $\frac{3x}{5} \times \frac{10}{6x} =$ _____

4. $\frac{2a}{b} \times \frac{3b}{2a} =$ _____

Exercise 6.1.13 Simplify the following divisions:

1. $\frac{2x}{3} \div \frac{4}{x} =$ _____

2. $\frac{2a}{3} \div \frac{a}{5} =$ _____

3. $\frac{3}{5x} \div \frac{x}{2} =$ _____

4. $\frac{4y}{6} \div \frac{3}{2y} =$ _____

Exercise 6.1.14 Simplify the following:

1. $\frac{a-4}{3} + \frac{3+a}{4} =$ _____

2. $\frac{x+1}{3} + \frac{x-3}{5} =$ _____

3. $\frac{2x-1}{2} - \frac{3x+5}{3} =$ _____

4. $\frac{5a-2}{3} + \frac{5+4a}{8} =$ _____

6.1.6 Binomial Products**Exercise 6.1.15 Expand these binomial products:**

1. $(x + 2)(x + 5)$

2. $(2x + 9)(x - 3)$

3. $(2a + 3)(2a - 3)$

4. $(2x - 9)(3 - 4x)$

5. $(12x + 4)(3x - 5)$

6. $3(2x + 5)(2x - 4)$

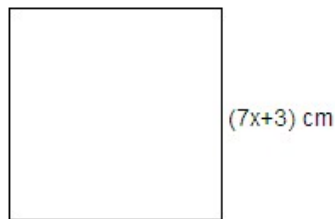
7. $4(3x - 4y)^2$

8. $(2x + 1)^2 - (2x - 1)^2$

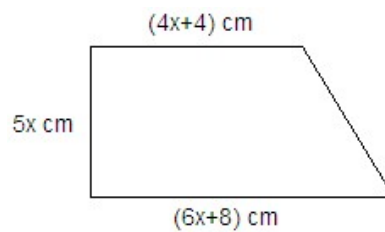
Exercise 6.1.16 Miscellaneous Exercises

1. Find the simple expression for the area of each figure shown below:

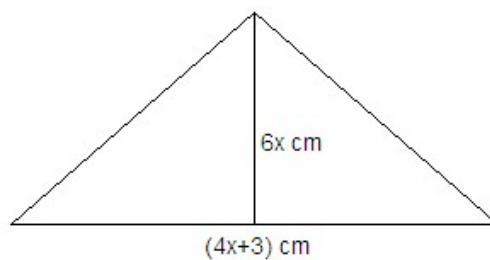
(a) Area = _____



(b) Area = _____



(c) Area = _____



2. A rectangle is four times as long as its broad. If it is $(x+2)$ cm long, find its perimeter and area in term of x .

3. A car travels at x km/h for 20 km, then increases speed by 6 km/h and travels for a further 10 km. How long did the car travel? (answer in terms of x)

4. An exam is taken by ' x ' girls and ' y ' boys. The boys score an average of ' m ' and the girls score an average of ' n '. Find the average for the whole exam.

5. Keith receives $\$(2a+3)$ pocket money. On each consecutive birthday this amount is doubled. How much will he be received four birthdays from now?

6. A group of 5 people have $\$p$ between them. A sixth person joins them and brings with him $\$60$. What is the average wealth of each person?

7. Simplify the following expressions:

(a) $\frac{15a^4b^6}{5a^2b^2} =$ _____

(b) $\frac{(5a^4)^2}{5a^4} =$ _____

(c) $(3a^3)^3 =$ _____

(d) $\frac{2x^2}{3b} \div \frac{2x^3}{b} =$ _____

8. Factorise the following expressions:

(a) $35x^2y^3 - 7xy^2 =$ _____

(b) $2a^2b^2 + 4a^2b - 8ab^2 =$ _____

(c) $4abc + 8a^2b + 16a^3c =$ _____

(d) $6xy + 3x^3y - 12x^2y^3 =$ _____

9. Expand and simplify the following expressions:

(a) $3p(2p - 4) - 3(4p - 3)$

(b) $(x + 1)^2 + (x + 2)^2 + (x + 3)^2$

(c) $(4x + 1)(2x - 1) - (x + 2)(x - 2)$

Exercise 6.1.17 Typical exam questions for Year 8:

1. Increase $5a$ by $6 =$ _____

2. Expand $4(5a - 7) =$ _____

3. Simplify $35a^2b \div 5a =$ _____

4. Simplify $5c^2 - 3c + 3c^2 - 6c =$ _____

5. Simplify $4x^2y \times 3xy^2 =$ _____

6. Simplify $(-4a^4)^3 =$ _____

7. Factorise $4a^2 - 4ab + b^2 =$ _____

8. Expand and simplify $(3x^2 - 5)^2 - (2x^2 + 4)^2$

9. If $a = -3$, $b = 5$ and $c = 12$, find the value of $2a^2 + 3b - c$

10. Expand and simplify $3(5x - 5) + 2(4x + 6) =$ _____

11. Simplify $\frac{4x}{3} - \frac{3x}{4} =$ _____

12. Given $T = \frac{D}{S}$, find if $D = 280$ km and $S = 60$ km/h.

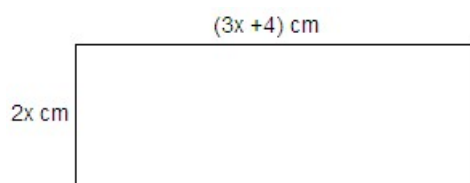
13. If x is an even number, find the sum of next five consecutive even numbers.

14. If $a = 0.25$, evaluate $2a^2$ _____

15. A car bought for $\$M$ was sold at a profit of 15%. What was the selling price?

16. Expand and simplify $(3x^2 - 5)^2 - (2x^2 + 4)^2$

17. Write an expression for the perimeter and area of the rectangle in terms of x .



18. $\frac{x}{4} + \frac{x-2}{3}$

19. $\frac{3x+2}{4} + \frac{4x-3}{3}$

20. $4x - 2 - \frac{2x-5}{2} + \frac{3x+2}{3}$
