

Algebraic Expressions - Worksheet

Skill

Group A - Collecting like terms including brackets

Simplify:

1) $3x + 5 + 2x + 6$

2) $3x - 5 - 2x - 6$

3) $3x - 5y - 2x - 6y$

4) $6x + 12 - 2x + 8$

5) $3x^2 + 5y^2 + 2x^2 - 6y^2$

6) $3x^2 - 5y^2 + 2x^2 - 6y$

7) $6x^3 - 10y^3 + 4x^3 - 12y^2$

8) $6(x + 2) - 2(x - 4)$

9) $6(x - 2) - 2(x + 4)$

10) $6x(x - 2y) + 2x(x - 4y)$

11) $3x(x - 2y) + 4x(x - 4y)$

12) $3xy(x - 2) - 4xy(x - 4)$

Group B - Simplifying algebraic fractions

Simplify each algebraic fraction fully:

1) $\frac{20x^3y}{10x^2}$

2) $\frac{20x^3y^2}{10x^2y}$

3) $\frac{9x^2 + 6xy}{6x}$

4) $\frac{12x^2y + 6xy}{6xy}$

5) $\frac{x^2 - x - 30}{x^2 - 36}$

6) $\frac{2x^2 - 10x + 12}{4x^2 - 16}$

Group C - Expanding single and double brackets

Expand and simplify:

1) $3(x + 4)$

2) $3(x + 5)$

3) $6(x + 5)$

4) $-6(x + 5)$

5) $-6(x - 5)$

6) $6x(x - 5)$

7) $(x + 3)(x + 4)$

8) $(x + 3)(x + 5)$

9) $(x + 3)(x - 5)$

10) $(2x + 1)(x + 1)$

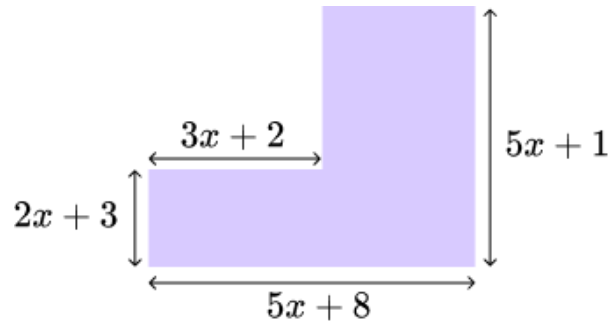
11) $(2x + 1)(x + 2)$

12) $(2x + 1)(x - 2)$

Algebraic Expressions - Worksheet

Applied

- 1) Below is a hexagon.



- a) Write an expression for the area of the hexagon.
b) Write an expression for the perimeter of the hexagon.
- 2) The base of the triangle is equal to $2x - 2$ and the height is $x + 6$.
Write an expression for the area of the triangle.



- 3) Henry is x years old.
Sam is two years older than Henry.
Aisha is 3 times as old as Sam.
Write an expression for the sum of their ages.

Algebraic Expressions - Exam Questions

1. (a) Simplify $4f - 2e + 3f + 5e$

.....
(2)

- (b) Expand $4x(2x - 7)$

.....
(2)
(4 marks)

-
2. (a) Simplify $\frac{15x^3y^2}{5xy^3}$

.....
(2)

- (b) Expand and simplify $(2x - 5)(x + 3)$

.....
(2)
(4 marks)

-
3. (a) Expand and simplify $5(3x + 2y) - 4(x - 5y)$

.....
(2)

- (b) Expand and simplify $(x - 3)^2(2x + 4)$

.....
(3)
(5 marks)

Algebraic Expressions - Exam Questions

4. Expand and simplify $\frac{2x^2 + 2x - 12}{4x^2 - 16}$

.....
(3 marks)

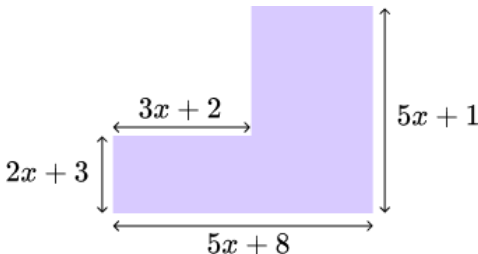

Algebraic Expressions - Answers

	Question	Answer
	Skill Questions	
Group A	<p>Simplify:</p> <p>1) $3x + 5 + 2x + 6$</p> <p>2) $3x - 5 - 2x - 6$</p> <p>3) $3x - 5y - 2x - 6y$</p> <p>4) $6x + 12 - 2x + 8$</p> <p>5) $3x^2 + 5y^2 + 2x^2 - 6y^2$</p> <p>6) $3x^2 - 5y^2 + 2x^2 - 6y$</p> <p>7) $6x^3 - 10y^3 + 4x^3 - 12y^2$</p> <p>8) $6(x + 2) - 2(x - 4)$</p> <p>9) $6(x - 2) - 2(x + 4)$</p> <p>10) $6x(x - 2y) + 2x(x - 4y)$</p> <p>11) $3x(x - 2y) + 4x(x - 4y)$</p> <p>12) $3xy(x - 2) - 4xy(x - 4)$</p>	<p>1) $5x + 11$</p> <p>2) $x - 11$</p> <p>3) $x - 11y$</p> <p>4) $4x + 20$</p> <p>5) $5x^2 - y^2$</p> <p>6) $5x^2 - 5y^2 - 6y$</p> <p>7) $10x^3 - 10y^3 - 12y^2$</p> <p>8) $4x + 20$</p> <p>9) $4x - 20$</p> <p>10) $8x^2 - 20xy$</p> <p>11) $7x^2 - 22xy$</p> <p>12) $10xy - x^2y$</p>
Group B	<p>Simplify each algebraic fraction fully:</p> <p>1) $\frac{20x^3y}{10x^2}$</p> <p>2) $\frac{20x^3y^2}{10x^2y}$</p> <p>3) $\frac{9x^2+6xy}{6x}$</p> <p>4) $\frac{12x^2y+6xy}{6xy}$</p> <p>5) $\frac{x^2-x-30}{x^2-36}$</p> <p>6) $\frac{2x^2-10x+12}{4x^2-16}$</p>	<p>1) $2xy$</p> <p>2) $2xy$</p> <p>3) $\frac{3x+2y}{2}$</p> <p>4) $2x + 1$</p> <p>5) $\frac{x+5}{x+6}$</p> <p>6) $\frac{x-3}{2(x+2)}$</p>

Algebraic Expressions - Answers

Group C	Expand and simplify:	
	1) $3(x + 4)$	1) $3x + 12$
	2) $3(x + 5)$	2) $3x + 15$
	3) $6(x + 5)$	3) $6x + 30$
	4) $-6(x + 5)$	4) $-6x - 30$
	5) $-6(x - 5)$	5) $-6x + 30$
	6) $6x(x - 5)$	6) $6x^2 - 30x$
	7) $(x + 3)(x + 4)$	7) $x^2 + 7x + 12$
	8) $(x + 3)(x + 5)$	8) $x^2 + 8x + 15$
	9) $(x + 3)(x - 5)$	9) $x^2 - 2x - 15$
	10) $(2x + 1)(x + 1)$	10) $2x^2 + 3x + 1$
	11) $(2x + 1)(x + 2)$	11) $2x^2 + 5x + 2$
	12) $(2x + 1)(x - 2)$	12) $2x^2 - 3x - 2$

Algebraic Expressions - Answers

	Question	Answer
	Applied Questions	
1)	<p>Below is a hexagon.</p>  <p>a) Write an expression for the area of the hexagon.</p> <p>b) Write an expression for the perimeter of the hexagon.</p>	<p>a) $16x^2 + 45x + 12$</p> <p>b) $20x + 18$</p>
2)	<p>The base of the triangle is equal to $2x - 2$ and the height is $x + 6$.</p>  <p>Write an expression for the area of the triangle.</p>	$x^2 + 5x - 6$
3)	<p>Henry is x years old. Sam is two years older than Henry. Aisha is 3 times as old as Sam. Write an expression for the sum of their ages.</p>	<p>Henry is x years old</p> <p>Sam is $x + 2$ years old</p> <p>Aisha is $3(x + 2) = 3x + 6$</p> <p>Total</p> $= x + x + 2 + 3x + 6$ $= 5x + 8$

Algebraic Expressions - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	Simplify $4f - 2e + 3f + 5e$	(a) $7f$ or $3e$ $7f + 3e$	(1) (1)
(b)	Expand $4x(2x - 7)$	(b) $8x^2 \pm 28x$ $8x^2 - 28x$	(1) (1)
2) (a)	Simplify $\frac{15x^3y^2}{5xy^3}$	(a) $3x^2$ seen $\frac{3x^2}{y}$	(1) (1)
(b)	Expand and simplify $(2x - 5)(x + 3)$	(b) $2x^2 - 5x + 6x - 15$ $2x^2 + x - 15$	(1) (1)
3) (a)	Expand and simplify $5(3x + 2y) - 4(x - 5y)$	(a) $15x + 10y - 4x + 20y$ $11x + 30y$	(1) (1)
(b)	Expand and simplify $(x - 3)^2(2x + 4)$	(b) $(x^2 - 6x + 9)(x + 2)$ $2x^3 + 4x^2 - 12x^2 - 24x + 18x + 36$ $2x^3 - 8x^2 - 6x + 36$	(1) (1) (1)
4)	Expand and simplify $\frac{2x^2+2x-12}{4x^2-16}$	$\frac{2(x^2+x-6)}{4(x^2-4)}$ $= \frac{2(x+3)(x-2)}{4(x+2)(x-2)}$ oe $= \frac{x+3}{2(x+2)}$	(1) (1) (1)

Do you have KS4 students who need additional support in maths?

Our specialist tutors will help them develop the skills they need to succeed at GCSE in weekly one to one online revision lessons. Trusted by secondary schools across the UK.

Visit thirdspacelearning.com to find out more.