

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

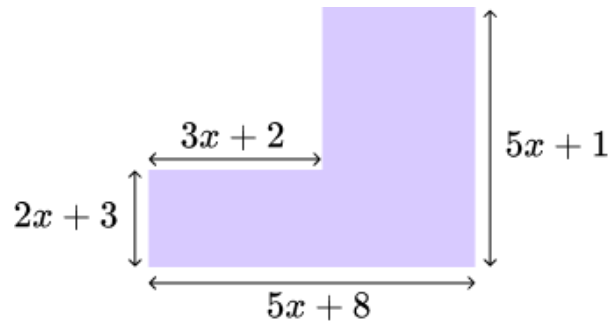
11) $(2x + 1)(x + 2)$

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

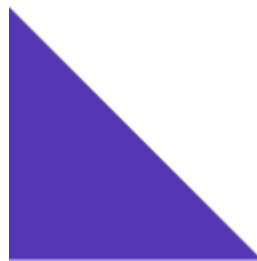
Algebraic Expressions - Worksheet

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)

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

.....

(3 marks)

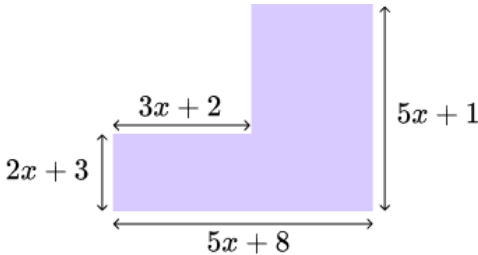

Algebraic Expressions - Answers

	Question	Answer
	Skill Questions	
Group A	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) $3xy(x - 2) - 4xy(x - 4)$	1) $5x + 11$ 2) $x - 11$ 3) $x - 11y$ 4) $4x + 20$ 5) $5x^2 - y^2$ 6) $5x^2 - 5y^2 - 6y$ 7) $10x^3 - 10y^3 - 12y^2$ 8) $4x + 20$ 9) $4x - 20$ 10) $8x^2 - 20xy$ 11) $7x^2 - 22xy$ 12) $10xy - x^2y$
Group B	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) $\frac{2x^2-10x+12}{4x^2-16}$	1) $2xy$ 2) $2xy$ 3) $\frac{3x+2y}{2}$ 4) $2x + 1$ 5) $\frac{x+5}{x+6}$ 6) $\frac{x-3}{2(x+2)}$

Algebraic Expressions - Answers

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

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