Expand & Simplify - Worksheet

Skill

Group A - Single brackets

Expand and simplify:

1) $3(x + 4) + 2(x + 5)$

2) $3(y + 5) + 2(y + 6)$

3) $3(a - 5) - 2(a - 6)$

4) $6(2k + 2m) + 6(5k - 4m)$

5) $7(3b + 4c) - 3(2b - 7c)$

6) $5(7s + 6t) - 3(5s - 2t)$

7) $5x(2x + 4) + 3x(x + 3)$

8) $5x(2x - 4) + 3x(x - 3)$

9) $10x(2x - 4) - 6x(x - 3)$

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

11) $-2(3x + 5) - 2(x - 1)$

12) $-3(2 - x) - x(5 - 2x)$

Group B - Two or more brackets

Expand and simplify:

1) $(x - 3)(x - 5)$

2) $(x - 4)^2$

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

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

5) $(x - 1)(x - 2)(x - 3)$

6) $(2x + 1)(x - 3)^2$

7) $(x - 4)^3$

8) $(2x - 3)^3$

9) $(2x + 3)^3$

Group C - Surds

Expand and simplify each pair of brackets containing surds:

1) $(2 + \sqrt{3})(3 + \sqrt{3})$

2) $(2 + \sqrt{4})(3 + \sqrt{4})$

3) $(2 - \sqrt{5})(3 + \sqrt{5})$

4) $(\sqrt{2} - \sqrt{5})(\sqrt{3} + \sqrt{5})$

5) $(\sqrt{2} - \sqrt{5})(\sqrt{2} + \sqrt{5})$

6) $(\sqrt{2} - \sqrt{5})(\sqrt{2} - \sqrt{5})$

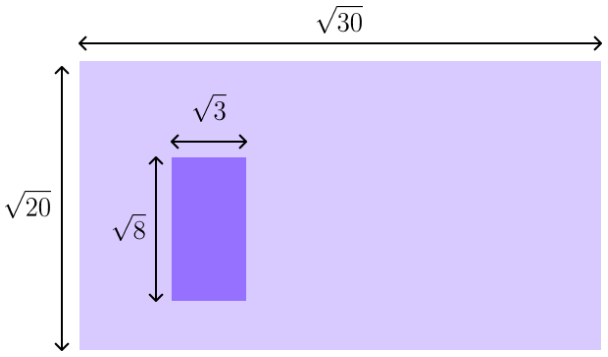
Expand & Simplify - Worksheet

Applied

1) The length of the rectangle is three times as long as the width. The width of the rectangle is given by $x - 4$. Write an expression for the perimeter of the rectangle in expanded form.

2) The front edge of the base of the cuboid is equal to $2x - 2$, the depth is $x + 6$ and the height is $x - 1$. Write an expression for the volume of the cuboid in expanded form.

3) A garden contains a small patio with length $\sqrt{8}$ m and width $\sqrt{3}$ m and is surrounded by a larger grassed area. The length of the entire garden is $\sqrt{30}$ m and the width is $\sqrt{20}$ m. Work out the area that the grass covers.



Expand & Simplify - Exam Questions

1) Expand and simplify:

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

.....

(1)

(b) $3(x - 2) + 2(x + 5)$

.....

(2)

(c) $(2y - 3)(y + 2)$

.....

(2)

(5 marks)

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2) Expand and simplify:

(a) $(5 - x)^2$

.....

(2)

(b) $5x(3x - 4) - 2x(2x - 3)$

.....

(3)

(5 marks)

Expand & Simplify - Exam Questions

3) Expand and simplify:

(a) $3(2x - 4y) + 4(x - 5y)$

.....

(2)

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

.....

(3)

(5 marks)

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4) **(a)** Expand $\sqrt{3}(4 - 2\sqrt{3})$

.....

(2)

(b) Expand and simplify:

$(\sqrt{3} - \sqrt{5})(\sqrt{3} + \sqrt{5})$

.....

(3)

(5 marks)

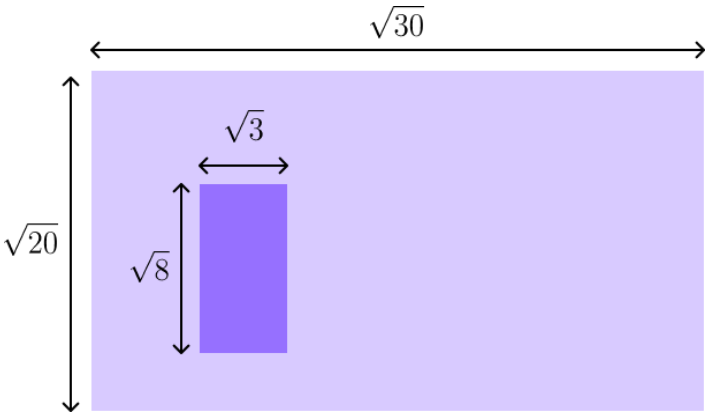
Expand & Simplify - Answers

	Question	Answer
	Skill Questions	
Group A	Expand and simplify: **1)** $3(x + 4) + 2(x + 5)$ **2)** $3(y + 5) + 2(y + 6)$ **3)** $3(a - 5) - 2(a - 6)$ **4)** $6(2k + 2m) + 6(5k - 4m)$ **5)** $7(3b + 4c) - 3(2b - 7c)$ **6)** $5(7s + 6t) - 3(5s - 2t)$ **7)** $5x(2x + 4) + 3x(x + 3)$ **8)** $5x(2x - 4) + 3x(x - 3)$ **9)** $10x(2x - 4) - 6x(x - 3)$ **10)** $-(2x + 1) - (x - 1)$ **11)** $-2(3x + 5) - 2(x - 1)$ **12)** $-3(2 - x) - x(5 - 2x)$	 **1)** $5x + 22$ **2)** $5y + 27$ **3)** $a - 3$ **4)** $42k - 12m$ **5)** $15b + 49c$ **6)** $20s + 36t$ **7)** $13x^2 + 29x$ **8)** $13x^2 - 29x$ **9)** $14x^2 - 22x$ **10)** $-3x$ **11)** $-8x - 8$ **12)** $-6 - 2x + 2x^2$
Group B	Expand and simplify: **1)** $(x - 3)(x - 5)$ **2)** $(x - 4)^2$ **3)** $(2x + 1)(x + 1)$ **4)** $(2x + 1)(x - 2)$ **5)** $(x - 1)(x - 2)(x - 3)$ **6)** $(2x + 1)(x - 3)^2$ **7)** $(x - 4)^2$ **8)** $(2x - 3)^3$ **9)** $(2x + 3)^3$	 **1)** $x^2 - 8x + 15$ **2)** $x^2 - 8x + 16$ **3)** $2x^2 + 3x + 1$ **4)** $2x^2 - 3x - 2$ **5)** $x^3 - 6x^2 + 11x - 6$ **6)** $2x^3 - 11x^2 + 12x + 9$ **7)** $x^3 - 12x^2 + 48x - 64$ **8)** $8x^3 - 36x^2 + 54x - 27$ **9)** $8x^3 + 36x^2 + 54x + 27$

Expand & Simplify - Answers

Group C	Expand & Simplify: **1)** $(2 + \sqrt{3})(3 + \sqrt{3})$ **2)** $(2 + \sqrt{4})(3 + \sqrt{4})$ **3)** $(2 - \sqrt{5})(3 + \sqrt{5})$ **4)** $(\sqrt{2} - \sqrt{5})(\sqrt{3} + \sqrt{5})$ **5)** $(\sqrt{2} - \sqrt{5})(\sqrt{2} + \sqrt{5})$ **6)** $(\sqrt{2} - \sqrt{5})(\sqrt{2} - \sqrt{5})$	**1)** $9 + 5\sqrt{3}$ **2)** 20 **3)** $1 - \sqrt{5}$ **4)** $\sqrt{6} + \sqrt{10} - \sqrt{15} - 5$ **5)** -3 **6)** $7 - 2\sqrt{10}$

Expand & Simplify - Answers

	Question	Answer
	Applied Questions	
1)	The length of the rectangle is three times as long as the width. The width of the rectangle is given by $x - 4$. Write an expression for the perimeter of the rectangle in expanded form.	$8x - 32$
2)	The front edge of the base of the cuboid is equal to $2x - 2$, the depth is $x + 6$ and the height is $x - 1$. Write an expression for the volume of the cuboid in expanded form. 	$2x^3 + 8x^2 - 22x + 12$
3)	A garden contains a small patio with length $\sqrt{8}$ m and width $\sqrt{3}$m and is surrounded by a larger grassed area. The length of the entire garden is $\sqrt{30}$ m and the width is $\sqrt{20}$ m. Work out the area that the grass covers. 	$10\sqrt{6} - 2\sqrt{6} = 8\sqrt{6}\,m^2$

Expand & Simplify - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Expand and simplify:		
(a)	$-2(y+3)$	**(a)** $-2y \pm 6$ $-2y-6$	**(1)** **(1)**
(b)	$3(x-2)+2(x+5)$	**(b)** $3x-6+2x+10$ $5x+4$	**(1)** **(1)**
(c)	$(2y-3)(y+2)$	**(c)** $2y^2-3y+4y-6$ $2y^2+y-6$	**(1)** **(1)**
2)	Expand and simplify:		
(a)	$(5-x)^2$	**(a)** $25-5x-5x+x^2$ $x^2-10x+25$	**(1)** **(1)**
(b)	$5x(3x-4)-2x(2x-3)$	**(b)** $15x^2-20x$ $-4x^2+6x$ or $-(4x^2-6x)$ $11x^2-14x$	**(1)** **(1)** **(1)**
3)	Expand and simplify:		
(a)	$3(2x-4y)+4(x-5y)$	**(a)** $6x-12y+4x-20y$ $10x-32y$	**(1)** **(1)**
(b)	$(x-2)^2(2x+1)$	**(b)** x^2-4x+4 $2x^3-8x^2+8x+x^2-4x+4$ $2x^3-7x^2+4x+4$	**(1)** **(1)** **(1)**
4) **(a)**	Expand: $\sqrt{3}(4-2\sqrt{3})$	**(a)** $2\times\sqrt{3}\times\sqrt{3}=2\times3=6$ $4\sqrt{3}-6$	**(1)** **(1)**
(b)	Expand and simplify: $(\sqrt{3}-\sqrt{5})(\sqrt{3}+\sqrt{5})$	**(b)** $\sqrt{9}+\sqrt{15}-\sqrt{15}-\sqrt{25}$ $\sqrt{9}=3$ **and** $\sqrt{25}=5$ -2	**(1)** **(1)** **(1)**