

2. Expressions Answers

Expanding and Factorising (Single Brackets)

Things to remember:

- Expand brackets means to multiply what is outside the bracket with everything inside the bracket.
- Factorising is the opposite of expanding – put the HCF outside the brackets to factorise fully.

Questions:

1. (a) Expand $5(m + 2)$

$$\underline{5m + 10} \quad (1)$$

(b) Factorise $y^2 + 3y$

$$\underline{y(y + 3)} \quad (1)$$

(c) Simplify $a^5 \times a^4$

$$\underline{a^9} \quad (1)$$

(Total for Question is 3 marks)

2. (a) Expand $2m(m + 3)$

$$\underline{2m^2 + 6m} \quad (1)$$

(b) Factorise fully $3xy^2 - 6xy$

$$\underline{3xy(y - 2)} \quad (2)$$

(Total for Question is 3 marks)

3. (a) Expand $3(x + 4)$

$$\underline{3x + 12} \quad (1)$$

(b) Expand $x(x^2 + 2)$

$$\underline{x^3 + 2x} \quad (2)$$

(c) Factorise $x^2 - 6x$

$$\underline{x(x - 6)} \quad (1)$$

(Total for Question is 4 marks)

4. (a) Expand and simplify $5(x + 7) + 3(x - 2)$

$$5x + 35 + 3x - 6$$

$$8x + 29$$

(2)

- (b) Factorise completely $3a^2b + 6ab^2$

$$3ab(a + 2b)$$

(2)

(Total for Question is 4 marks)

5. (a) Expand $3(2y - 5)$

$$6y - 15$$

(1)

- (b) Factorise completely $8x^2 + 4xy$

$$4x(2x + y)$$

(2)

(Total for Question is 3 marks)

6. (a) Factorise $3x + 6$

$$3(x + 2)$$

(1)

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

$$5y - 10 + 2y - 6$$

$$7y - 16$$

(2)

(Total for Question is 3 marks)

7. (a) Factorise $4x + 10y$

$$2(2x + 5y)$$

(1)

- (b) Factorise $x^2 + 7x$

$$x(x + 7)$$

(1)

(Total for Question is 2 marks)

Expand and Factorise Quadratics

Things to remember:

- Use FOIL (first, outside, inside, last) or the grid method (for multiplication) to expand brackets.
- For any quadratic $ax^2 + bx + c = 0$, find a pair of numbers with a sum of b and a product of ac to factorise.

Questions:

1. Expand and simplify $(m + 7)(m + 3)$

$$m^2 + 7m + 3m + 21$$

$$\dots\dots\dots m^2 + 10m + 21 \dots\dots\dots$$

(Total for question = 2 marks)

2. (a) Factorise $6 + 9x$

$$\dots\dots\dots 3(2 + 3x) \dots\dots\dots$$

(1)

- (b) Factorise $y^2 - 16$

$$\dots\dots\dots (y + 4)(y - 4) \dots\dots\dots$$

(1)

- (c) Factorise $2p^2 - p - 10$

$\swarrow -20 \searrow$

| | | |
|------|--------|-------|
| | $2p$ | -5 |
| p | $2p^2$ | $-5p$ |
| $+2$ | $+4p$ | -10 |

$$\dots\dots\dots (2p - 5)(p + 2) \dots\dots\dots$$

(2)

(Total for Question is 4 marks)

3. Solve, by factorising, the equation $8x^2 - 30x - 27 = 0$

$\swarrow -216 \searrow$

| | | |
|------|--------|--------|
| | $2x$ | -9 |
| $4x$ | $8x^2$ | $-36x$ |
| $+3$ | $+6x$ | -27 |

$$\dots\dots\dots (4x + 3)(2x - 9) \dots\dots\dots$$

(Total for Question is 3 marks)

4. Factorise $x^2 + 3x - 4$

$$\frac{(x+4)(x-1)}{\dots\dots\dots}$$

(Total for question is 2 marks)

5. Write $x^2 + 2x - 8$ in the form $(x + m)^2 + n$ where m and n are integers.

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

$$\frac{(x+1)^2 - 9}{\dots\dots\dots}$$

(Total for question is 2 marks)

6. (a) Expand $4(3x + 5)$

$$\frac{12x + 20}{\dots\dots\dots}$$

(1)

(b) Expand and simplify $2(x - 4) + 3(x + 5)$

$$2x - 8 + 3x + 15$$

$$\frac{5x + 7}{\dots\dots\dots}$$

(2)

(c) Expand and simplify $(x + 4)(x + 6)$

$$x^2 + 4x + 6x + 24$$

$$\frac{x^2 + 10x + 24}{\dots\dots\dots}$$

(2)

(Total for Question is 5 marks)

7. (a) Factorise $x^2 + 5x + 4$

$$\frac{(x+4)(x+1)}{\dots\dots\dots}$$

(2)

(b) Expand and simplify $(3x - 1)(2x + 5)$

$$6x^2 - 2x + 15x - 5$$

$$\frac{6x^2 + 13x - 5}{\dots\dots\dots}$$

(2)

(Total for Question is 4 marks)

8. (a) Expand $3(2 + t)$

$6 + 3t$
.....
(1)

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

$6x^2 + 15x$
.....
(2)

(c) Expand and simplify $(m + 3)(m + 10)$

$m^2 + 3m + 10m + 30$

$m^2 + 13m + 30$
.....
(2)

(Total for Question is 5 marks)

9. (a) Factorise $x^2 + 7x$

$x(x + 7)$
.....
(1)

(b) Factorise $y^2 - 10y + 16$

$(y - 8)(y - 2)$
.....
(2)

*(c) (i) Factorise $2t^2 + 5t + 2$

| | | |
|-------|--------|--------|
| | t | $+ 2$ |
| $2t$ | $2t^2$ | $+ 4t$ |
| $+ 1$ | $+ t$ | $+ 2$ |

$(2t + 1)(t + 2)$
.....
(2)

(ii) t is a positive whole number.
The expression $2t^2 + 5t + 2$ can never have a value that is a prime number.
Explain why.

Prime numbers only have 2 factors.

$2t^2 + 5t + 2$ has at least 4 (1, itself and

the two factors above)

(3)
(Total for Question is 6 marks)

Expanding 3 Brackets

1. Expand and simplify $(x + 2)(x + 3)(x + 6)$

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

$$(x^2 + 5x + 6)(x + 6)$$

$$x^3 + 6x^2 + 5x^2 + 30x + 6x + 36$$

$$x^3 + 11x^2 + 36x + 36$$

(4)

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2. Expand and simplify $(y + 1)(y - 2)(y + 3)$

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

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

$$y^3 + 3y^2 - y^2 - 3y - 2y - 6$$

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

(4)

3. Expand and simplify $(x - 5)(x - 2)(x - 1)$

$$(x^2 - 2x - 5x + 10)(x - 1)$$

$$(x^2 - 7x + 10)(x - 1)$$

$$x^3 - x^2 - 7x^2 + 7x + 10x - 10$$

$$\underline{x^3 - 8x^2 + 17x - 10}$$

(4)

4. Expand and simplify $(2y + 3)(y + 1)(3y - 1)$

$$(2y^2 + 2y + 3y + 3)(3y - 1)$$

$$(2y^2 + 5y + 3)(3y - 1)$$

$$6y^3 - 2y^2 + 15y^2 - 5y + 9y - 3$$

$$\underline{6y^3 + 13y^2 + 4y - 3}$$

(4)

5. Expand and simplify $(5x + 1)(2x - 1)(2x - 3)$

$$(10x^2 - 5x + 2x - 1)(2x - 3)$$

$$(10x^2 - 3x - 1)(2x - 3)$$

$$20x^3 - 30x^2 - 6x^2 + 9x - 2x + 3$$

$$20x^3 - 36x^2 + 7x + 3$$

(4)

6. Expand and simplify $(y + 3)(y + 1)^2$

$$(y + 3)(y + 1)(y + 1)$$

$$(y^2 + y + 3y + 3)(y + 1)$$

$$(y^2 + 4y + 3)(y + 1)$$

$$y^3 + y^2 + 4y^2 + 4y + 3y + 3$$

$$y^3 + 5y^2 + 7y + 3$$

(4)