15

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

$$4n\left(n^2 - 15 - 3n + 5n\right)$$

$$4n\left(n^2 - 15 + 2n\right)$$

$$4n^3 - 60n + 8n^2$$

$$4n^3 + 8n^2 - 60n$$

(2)

P 5 9 0 2 2 A 0 1 8 2 8

Algebra Page 1

12 (a) Expand and simplify $n(n-4)(3n+5)$

$$n(3n^2 - 20 - 12n + 5n)$$

$$n(3n^2 - 20 - 7n)$$

$$3n^3 - 20n - 7n^2$$

$$3n^3 - 7n^2 - 20n$$

....

(2)

P 6 8 7 2 7 A 0 1 5 3 2

12

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

$2x(x^2 + 15 - 5x - 3x)$

$2x(x^2 + 15 - 8x)$

$2x^3 + 30x - 16x^2$

$2x^3 - 16x^2 + 30x$

P 6 6 2 9 7 A 0 1 4 2 8

13 (a) Expand and simplify $\quad 5x(x + 2)(3x - 4)$

$5x \left(3x^2 - 8 + 6x - 4x \right)$

$5x \left(3x^2 - 8 + 2x \right)$

$15x^3 - 40x + 10x^2$

$15x^3 + 10x^2 - 40x$

12

(c) Expand and simplify $5x(3x + 4)(2x - 1)$

$$5x(6x^2 - 4 + 8x - 3x)$$

$$5x(6x^2 - 4 + 5x)$$

$$30x^3 - 20x + 25x^2$$

$$30x^3 + 25x^2 - 20x$$

(3)

14 (a) Show that $3y(2y + 5)(y + 7)$ can be written in the form $ay^3 + by^2 + cy$ where a, b and c are integers.

$$3y(2y + 5)(y + 7)$$

$$3y(2y^2 + 35 + 5y + 14y)$$

$$3y(2y^2 + 35 + 19y)$$

$$6y^3 + 105y + 57y^2$$

$$6y^3 + 57y^2 + 105y$$

(3)

15 Write $3x(2x-1)(5x+4)$ in the form $ax^3 + bx^2 + cx$ where a, b and c are integers.

$$3x(10x^2 - 4 - 5x + 8x)$$

$$3x(10x^2 - 4 + 3x)$$

$$30x^3 - 12x + 9x^2$$

(Total for Question 15 is 3 marks)

(c) Expand and simplify $4x(x - 5)(2x + 3)$
Show your working clearly.

$$4x \quad (x - 5)(2x + 3)$$

$$4x (2x^2 - 15 - 10x + 3x)$$

$$4x (2x^2 - 15 - 7x)$$

$$8x^3 - 60x - 28x^2$$

$$8x^3 - 28x^2 - 60x$$

....

(3)

(Total for Question 12 is 7 marks)

P 6 5 9 1 9 R A 0 1 5 2 8

Algebra Page 8

21 (a) Show that $x(x - 1)(x + 1) = x^3 - x$

$$x(x - 1)(x + 1)$$

(1)

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

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

$$x^3 - x$$

13 Expand and simplify $4x(3x + 1)(2x - 3)$

Show your working clearly.

$$4x \quad (3x + 1)(2x - 3)$$

$$4x \quad (6x^2 - 3 + 2x - 9x)$$

$$4x \quad (6x^2 - 3 - 7x)$$

$$24x^3 - 12x - 28x^2$$

$$24x^3 - 28x^2 - 12x$$

....

(Total for Question 13 is 3 marks)

16 (a) Expand and simplify $(x + 4)(x - 2)(x + 1)$

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

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

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

$$x^3 -2x -1x^2 +4x^2 -8 -4x$$

$$x^3 + 3x^2 -6x -8$$

....

(3)

P 6 6 2 9 8 A 0 1 8 2 8

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

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

$$(2x-1)(x^2 - 15 + 3x - 5x)$$

$$(2x-1)(x^2 - 15 - 2x)$$

$$2x^3 - 30x - 4x^2 - 1x^2 + 15 + 2x$$

(3)

$$2x^3 - 5x^2 - 28x + 15$$

P 5 4 6 9 4 A 0 1 4 2 4

18 (a) Expand and simplify $(x + 2)(2x + 3)(x - 7)$

Show your working clearly.

$(x+2)(2x+3)(x-7)$

$(x+2)(2x^2 - 21 + 3x - 14x)$

$(x+2)(2x^2 - 21 - 11x)$

$2x^3 - 21x - 11x^2 + 4x^2 - 42 - 22x$

$2x^3 - 7x^2 - 43x - 42$

(3)

16 (a) Expand and simplify $(3x - 1)(x + 2)(3x + 1)$

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

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

$(3x - 1)(3x^2 + 2 + 7x)$

$9x^3 + 6x + 21x^2 - 3x^2 - 2 - 7x$

$9x^3 + 18x^2 - x - 2$

....

(3)

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

Show your working clearly.

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

$$(5-x)(2x^2 + 12 + 3x + 8x)$$

$$(5-x)(2x^2 + 12 + 11x)$$

$$10x^2 + 60 + 55x - 2x^3 - 12x - 11x^2$$

$$-2x^3 - x^2 + 43x + 60$$

(3)

17 (a) Expand and simplify $(x + 6)(3x - 2)(x + 6)$

$(x+6)(\ 3x-2)(x+6)$

$(x+6)\ (3x^2 -12 - 2x + 18x)$

$(x+6)(\ 3x^2 -12 + 16x)$

$3x^3 -12x +16x^2 +18x^2 -72 +96x$

$3x^3 + 34x^2 + 84x - 72$

....

(3)

14 (a) Expand and simplify $(3x + 1)(2 - x)(4 + x)$

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

$(3x+1)(\ 8 - x^2 - 4x + 2x)$

$(3x+1)(\ 8 - x^2 - 2x)$

$24x - 3x^3 - 6x^2 + 8 - x^2 - 2x$

$-3x^2 - 7x^2 + 22x + 8$

14

14 Expand and simplify $(4x + 1)(x - 3)(5x + 6)$

$$(4x+1)(x-3)(5x+6)$$

$$(4x+1)(5x^2 -18 -15x +6x)$$

$$(4x+1)(5x^2 -18 -9x)$$

$$20x^3 - 72x - 36x^2 + 5x^2 - 18 - 9x$$

$$20x^3 - 31x^2 - 81x - 18$$

(Total for Question 14 is 3 marks)

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

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

$(2x + 3)(x^2 - 20 - 5x + 4x)$

$(2x + 3)(x^2 - 20 - 1x)$

$2x^3 - 40x - 2x^2 + 3x^2 - 60 - 3x$

$2x^3 + x^2 - 43x - 60$

....

(Total for Question 16 is 3 marks)

P 7 3 4 6 9 A 0 1 5 2 4

13 Expand and simplify $3x(2x - 5)^2$

Show clear algebraic working.

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

$3x (4x^2 + 25 - 10x - 10x)$

$3x (4x^2 + 25 - 20x)$

$12x^3 + 75x - 60x^2$

$12x^3 - 60x^2 + 75x$

(Total for Question 13 is 3 marks)