NAME: _____

TEACHER: _____

St. Catherine's School

Year 9 Mathematics
9B & C Pathway

PRODUCTS and FACTORS
FRIDAY 21st July 2006
Period 2

Time allowed: *55 minutes*

INSTRUCTIONS

- There are 4 questions in this paper.
- Complete all 4 questions
- Marks for each part of a question are indicated
- All necessary working should be shown
- Show your working and answer clearly in the spaces provided
- Approved scientific calculators may be used

QUESTIONS	QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4	TOTAL
MARKS	/12	/12	/19	/5	/48

Question 1 /12

a) Simplify each of the following by collecting like terms PAS 4.3

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

(ii) $8x^2 + 7x - 3x^2$ 1

(iii) $5pq^2 - p^2q - 2pq^2 - p^2q + pq$ PAS 5.3.1 1

b) Expand and simplify the following where possible PAS 4.3

(i) $3(2m+4)$ 1

(ii) $a^2(a^3 + a)$ PAS 5.2.1 1

(iii) $2x(4x-5) - 6x$ PAS 5.3.1 2

(iv) $m^2(m + 3n^2) - n^2(m^2 - 7)$ PAS 5.2.1 3

(v) $\frac{x}{2}\left(6 - \frac{8}{x}\right)$

Question 2 /12

a) Expand and simplify each of the following binomial products PAS 5.3.1

$$(a+b)(c+d) = a(c+d)+b(c+d)$$
$$= ac+ad+bc+bd$$

(i) $(x+4)(x+3)$ 2

(ii) $(3r-8)(3r+8)$ 2

(iii) $(p-5q)^2$ 2

b)

(i) $(x+3)^2-9-x^2$ PAS 5.3.1 3

(ii) $4y(y-5)-(y-2)$ PAS 5.2.1 3

Question 3 /19

a) Factorise and simplify where necessary PAS 4.3

(i) $18x-9y$ 1

(ii) x^2-49 PAS 5.3.1 1

(iii) $\frac{3a+3b}{4a+4b}$ PAS 5.2.1 2

(iv) $9m^2-4n^2$ PAS 5.3.1 2

b) Factorise the following quadratic trinomials PAS 5.3.1

(i) $x^2+13x+40$ 2

(ii) $2x^2-2x-12$ 2

(iii) $2a^2+5a-12$ 3

c) Factorise and simplify: $\frac{x^2-9}{x+4} \times \frac{3x+12}{x-3}$ 3

d) Simplify the following: $\frac{5}{y-2} - \frac{3}{y-3}$ PAS 5.2.1 3

Question 4 /5

Factorise and simplify the following PAS 5.3.1

$$\frac{a^2+3a+2}{a-5} \div \frac{2a^2+7a+6}{a^2-4a-5}$$ 5

End of Test

Question 1 /12

a) Simplify each of the following by collecting like terms PAS 4.3

(i) $4x+3-2x$ — $2x+3$ — 1

(ii) $8x^2+7x-3x^2$ — $5x^2+7x$ — 1

PAS 5.3.1

(iii) $5pq^2-p^2q-2pq^2-p^2q+pq$ — $3pq^2-2p^2q+pq$ — 1

b) Expand and simplify the following where possible PAS 4.3

(i) $3(2m+4)$ — $6m+12$ — 1

PAS 5.2.1

(ii) $a^2(a^3+a)$ — a^5+a^3 — 1

PAS 5.3.1

(iii) $2x(4x-5)-6x$ — $8x^2-10x-6x$ $=8x^2-16x$ — 2

PAS 5.2.1

(iv) $m^2(m+3n^2)-n^2(m^2-7)$ — $m^3+3m^2n^2-n^2m^2+7n^2$ $=m^3+2m^2n^2+7n^2$

(v) $\frac{x}{2}\left(6-\frac{8}{x}\right)$ — $\frac{6x}{2}-\frac{8x}{2x}$ $=3x-4$ — 2

Question 2 /12

a) Expand and simplify each of the following binomial products PAS 5.3.1

$(a+b)(c+d)=ac+ad+bc+bd$

(i) $(x+4)(x+3)$ — $=x^2+3x+4x+12$ $=x^2+7x+12$ — 2

(ii) $(3r-8)(3r+8)$ — $=9r^2-64$ — 2

(iii) $(p-5q)^2$ — $=p^2-10pq+25q^2$ — 2

b)

PAS 5.3.1

(i) $(x+3)^2-9-x^2$ — $x^2+6x+9-9-x^2$ $=6x$ — 3

PAS 5.2.1

(ii) $4y(y-5)-(y-2)$ — $4y^2-20y-y+2$ $=4y^2-21y+2$ — 3

Question 3 /20

a) Factorise and simplify where necessary PAS 4.3

(i) $18x-9y$ $9(2x-y)$ 1

(ii) x^2-49 $(x+7)(x-7)$ PAS 5.3.1 2

(iii) $\frac{3a+3b}{4a+4b}$ $\frac{3(a+b)}{4(a+b)} = \frac{3}{4}$ PAS 5.2.1 2

(iv) $9m^2-4n^2$ $(3m+2n)(3m-2n)$ PAS 5.3.1 2

b) Factorise the following quadratic trinomials PAS 5.3.1

(i) $x^2+13x+40$ $=(x+5)(x+8)$ $P=40$ $S=13$ 2

(ii) $2x^2-2x-12$ $=2(x^2-x-6)$ $P=-6$ $S=-1$ $=2(x-3)(x+2)$ 2

(iii) $2a^2+5a-12$ $=2a^2+8a-3a-12$ $P=-24$ $=2a(a+4)-3(a+4)$ $S=5$ $=(2a-3)(a+4)$ 3

c) Factorise and simplify: $\frac{x^2-9}{x+4} \times \frac{3x+12}{x-3}$ 3

$\frac{(x+3)(x-3)}{x+4} \times \frac{3(x+4)}{x-3}$

$= 3(x+3)$

d) Simplify the following: $\frac{5}{y-2} - \frac{3}{y-3}$ PAS 5.2.1 3

$= \frac{5(y-3)-3(y-2)}{(y-2)(y-3)}$

$= \frac{5y-15-3y+6}{(y-2)(y-3)}$

$= \frac{2y-9}{(y-2)(y-3)}$

Question 4 /6

Factorise and simplify the following PAS 5.3.1

$$\frac{a^2+3a+2}{a-5} \div \frac{2a^2+7a+6}{a^2-4a-5}$$

6

$$\frac{(a+1)(a+2)}{a-5} \times \frac{(a-5)(a+1)}{(a+2)(2a+3)}$$

Note: $2a^2+7a+6 = 2a^2+4a+3a+6$ $P=12$ $S=7$

$= 2a(a+2)+3(a+2)$

$= (2a+3)(a+2)$

$\therefore \frac{(a+1)^2}{2a+3}$

End of Test