



CRANBROOK
SCHOOL

Year 10 5.2/5.3 & 9 Acc Mathematics

Factorising Test

Term 1, 2013

+ SOLUTIONS

Total Marks: 39

Time allowed: 50 mins

All questions must be answered in a separate writing booklet
Show all working to gain full marks



Yr 9Acc / Yr 10 Adv Mathematics Term 1 | 2013
Section A (7 marks) Expanding

Factorising Test
Marked by RABS

START A NEW BOOKLET

1. Expand and simplify the following:
 - a. $(2x+3)(x-5)$ 1
 - b. $(5p-8q)^2$ 1
 - c. $\left(2x+\frac{1}{x}\right)^2$ 1
 - d. $(2x+6)(2x-6)-(2x-6)^2$ 2
 - e. $(y+3)^3$ 2



Yr 9Acc / Yr 10 Adv Mathematics Term 1 | 2013
Section B (11 marks) Factorising

Factorising Test
Marked by TMS

START A NEW BOOKLET

1. Fully factorise the following:
 - a. $30q^2-18q+6pq$ 1
 - b. $14g^7+56g^4$ 1
 - c. $242-2g^2$ 2
 - d. $(2c+6)^2-16$ 2
 - ~~e. $xp+8p+4p+32$ 1~~
 - f. $ef-eg-fg+g^2$ 2
 - g. $(w+x)^2-(x+y)^2$ 2



START A NEW BOOKLET

1. Fully factorise the following quadratic trinomials:

- | | | |
|----|--------------------|---|
| a. | $y^2 + 6y + 9$ | 1 |
| b. | $x^2 - 13x + 40$ | 1 |
| c. | $19t - 84 - t^2$ | 2 |
| d. | $-49n + 7n^2 + 70$ | 2 |
| e. | $x^4 - 36x^2 + 35$ | 3 |



START A NEW BOOKLET

1. Simplify the following:

- | | | |
|----|---|---|
| a. | $\frac{m^2 - m}{m^2 - 1}$ | 2 |
| b. | $\frac{3x+15}{2} \times \frac{4x}{x+5}$ | 1 |
| c. | $\frac{1}{a+3} + \frac{1}{a+4}$ | 2 |
| d. | $\frac{c^2 - 11c + 28}{20 - 5c}$ | 2 |
| e. | $\frac{n^2 - 3n - 4}{3n^2 - 48} + \frac{n^3 - n}{n^2 + 4n}$ | 3 |
| f. | $\frac{n+5}{2n^2 + n - 1} - \frac{n-3}{2n^2 + 5n - 3}$ | 2 |

4R.10 5.3 FACTORISING TEST SOLNS 2013SECTION A

$$\underline{1a.} \quad (2x+3)(x-5) = 2x^2 - 10x + 3x - 15 \\ = 2x^2 - 7x - 15 \checkmark$$

$$\underline{b.} \quad (5p-8q)^2 = (5p-8q)(5p-8q) \\ = 25p^2 - 40pq - 40pq + 64q^2 \\ = 25p^2 - 80pq + 64q^2 \checkmark$$

$$\underline{c.} \quad \left(2x + \frac{1}{x}\right)^2 = \left(2x + \frac{1}{x}\right)\left(2x + \frac{1}{x}\right) \\ = 4x^2 + \frac{2x}{x} + \frac{2x}{x} + \frac{1}{x^2} \\ = 4x^2 + 4 + \frac{1}{x^2} \checkmark$$

$$\underline{d.} \quad (2x+b)(2x-b) - (2x-b)^2 \\ = 4x^2 - 36 - (4x^2 - 24x + 36) \checkmark \quad \text{DIFF. OF 2} \\ \text{SQUARES!} \\ = 4x^2 - 36 - 4x^2 + 24x - 36 \\ = 24x - 72 = 24(x-3) \checkmark \quad \text{FULLY FACTORISE}$$

$$\underline{e.} \quad (y+3)^3 = (y+3)(y+3)(y+3) \\ = (y^2+6y+9)(y+3) \checkmark \\ = y^3 + 6y^2 + 9y + 3y^2 + 18y + 27 \\ = y^3 + 9y^2 + 27y + 27 \checkmark$$

SECTION B

$$\underline{1a.} \quad 30q^2 - 18q + 6pq = 6q(5q - 3 + p) \checkmark$$

- TAKE OUT HCF.
- IT'S NOT A QUADRATIC!

$$\underline{b.} \quad 14g^7 + 56g^4 = 7g^4(2g^3 + 8) \checkmark$$

- TAKE OUT HCF.

$$\underline{c.} \quad 242 - 2g^2 = 2(121 - g^2) \checkmark \\ = 2(11-g)(11+g) \checkmark$$

- DIFF. OF 2 SQUARES

$$\underline{d.} \quad (2c+6)^2 - 16 = [(2c+6)+4][(2c+6)-4] \\ = (2c+10)(2c+2) \checkmark \\ = 4(c+5)(c+1) \checkmark$$

- DIFF OF 2 SQUARES
- COLLECT LIKE TERMS
- TAKE OUT HCF OF 2, TWICE

e. IGNORE!
CAN'T BE DONE! ☹

$$f. \quad ef - eg - fg + g^2$$

$$= e(f-g) - g(f-g) \quad \checkmark \quad \text{TAKE OUT -VE FACTOR}$$

$$= (e-g)(f-g) \quad \checkmark$$

- GROUPING BY PAIRS

$$g. \quad (w+x)^2 - (x+y)^2$$

$$= [(w+x) + (x+y)][(w+x) - (x+y)] \quad \checkmark$$

$$= (2x+w+y)(w-y) \quad \checkmark$$

- DIFF OF 2 SQUARES

- SIMPLIFY

SECTION C.

$$1a. \quad y^2 + 6y + 9 = (y+3)(y+3) \quad \checkmark$$

- FACTORISE IN YOUR HEAD!

$$b. \quad x^2 - 13x + 40 = (x-5)(x-8) \quad \checkmark$$

- DITTO!

$$c. \quad 19t - 84 - t^2 = -t^2 + 19t - 84 \\ = -(t^2 - 19t + 84) \quad \checkmark \\ = -(t-12)(t-7) \quad \checkmark$$

- TAKE OUT HCF OF -1

- FACTORISE

$$d. \quad -49n + 7n^2 + 70 = 7n^2 - 49n + 70 \\ = 7(n^2 - 7n + 10) \quad \checkmark \\ = 7(n-5)(n-2) \quad \checkmark$$

- REARRANGE

- TAKE OUT HCF OF 7

- FACTORISE

$$e. \quad x^4 - 36x^2 + 35$$

$$\text{Let } u = x^2 \Rightarrow = u^2 - 36u + 35 \quad \checkmark$$

$$= (u-35)(u-1)$$

$$= (x^2-35)(x^2-1) \quad \checkmark$$

$$= (x^2-35)(x+1)(x-1) \quad \checkmark$$

- FACTORISE...
- NOTE DIFF OF 2 SQUARES...

SECTION D

a. $\frac{m^2 - m}{m - 1} = \frac{m(m-1)}{(m+1)(m-1)}$ ✓
 • HCF
 • DIFF OF 2 □s
 $= \frac{m}{m+1}$ ✓

b. $\frac{3x+15}{2} \times \frac{4x}{x+5}$
 $= \frac{3(x+5)}{2} \times \frac{4x}{x+5}$
 $= 6x$ ✓

c. $\frac{1}{a+3} + \frac{1}{a+4}$
 $= \frac{(a+4) + (a+3)}{(a+3)(a+4)}$ ✓
 $= \frac{2a+7}{(a+3)(a+4)}$ ✓

d. $\frac{c^2 - 11c + 28}{20 - 5c} = \frac{(c-4)(c-7)}{5(4-c)}$ ✓
 • TAKE OUT HCF OF -1 = $\frac{(c-4)(c-7)}{-5(c-4)}$
 $= \frac{c-7}{-5}$ ✓ OR $\frac{7-c}{5}$

d. $\frac{n^2 - 3n - 4}{3n^2 - 48} \div \frac{n^3 - n}{n^2 + 4n}$
 $= \frac{(n-4)(n+1)}{3(n^2-16)} \times \frac{n(n+4)}{n(n^2-1)}$ ✓
 • FACTORISE & "FLIP"
 $= \frac{(n-4)(n+1)}{3(n+4)(n-4)} \times \frac{n(n+4)}{n(n+1)(n-1)}$ ✓
 • DIFF. OF 2 □s
 $= \frac{1}{3} \times \frac{1}{n-1}$ • CANCEL
 $= \frac{1}{3(n-1)}$ ✓

e. $\frac{n+5}{2n^2+n-1} - \frac{n-3}{2n^2+5n-3}$
 $= \frac{n+5}{(2n-1)(n+1)} - \frac{n-3}{(2n-1)(n+3)}$ ✓

P: -2	2n ² +2n-1
M: 1	= 2n(n+1) - (n+1)
F: 2, -1	= (2n-1)(n+1)

P: -6	2n ² +6n-3
M: 5	= 2n(n+3) - (n+3)
F: 6, -1	= (2n-1)(n+3)

$= \frac{(n+5)(n+3)}{(2n-1)(n+1)(n+3)} - \frac{(n+1)(n-3)}{(2n-1)(n+1)(n+3)}$
 $= \frac{(n^2 + 8n + 15) - (n^2 - 2n - 3)}{(2n-1)(n+1)(n+3)}$ ✓
 $= \frac{10n + 18}{(2n-1)(n+1)(n+3)} - \frac{2(5n+9)}{(2n-1)(n+1)(n+3)}$ ✓