

ADVANCED GCE

Mathematics Core 1 2010 Specimen **SAMPLE**

1 hour 30 minutes



11 Questions. Total marks 72

Marks shown in brackets for each question (2)

Model Solutions

Marks shown in brackets for each question (2)

Legend used in answers

Yellow boxes – instructions or key points

Start with a column or row that has only one number missing

Green Box - Working out

5b means five times b
 $b = -3$ so $5 \times -3 = -15$

Red Box and ✓ - Answer

48 % ✓

A	B	C	D	E
80%	70%	60%	50%	40%

Authors Note

Every possible effort has been made to ensure that everything in this paper is accurate and the author cannot accept responsibility for any errors.

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1. Simplify $(4x + 5)^2 - (2x - 1)^2$ Your answer should be in the form $ax^2 + bx + c$

First you must square both brackets. Remember FOIL as a way to do this.

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

$(4x + 5)(4x + 5)$ → $16x^2 + 40x + 25$

$(2x - 1)(2x - 1)$ → $4x^2 - 4x + 1$

Now put the terms together and simplify. Be careful with the minus sign before the bracket. It changes the sign of the terms inside the bracket.

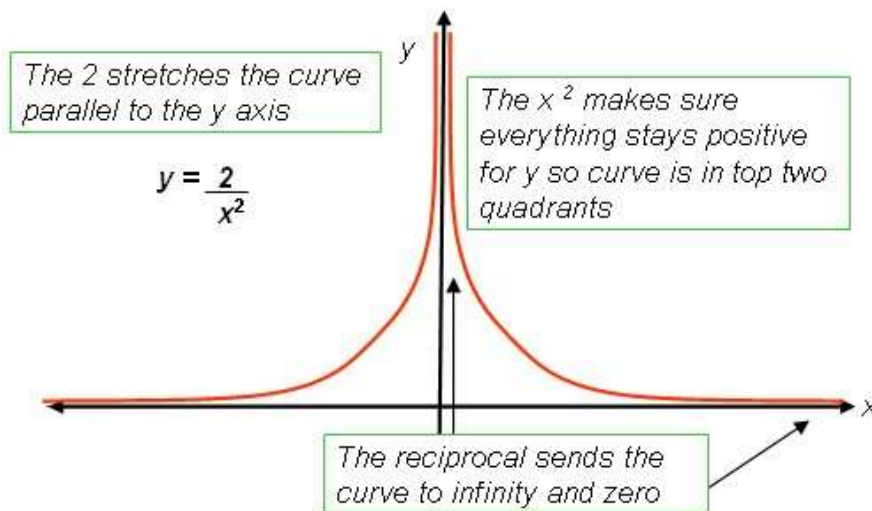
$(16x^2 + 40x + 25) - (4x^2 - 4x + 1) = 16x^2 + 40x + 25 - 4x^2 + 4x - 1$
 $= 12x^2 + 44x + 24$

$12x^2 + 44x + 24$ ✓

(3)

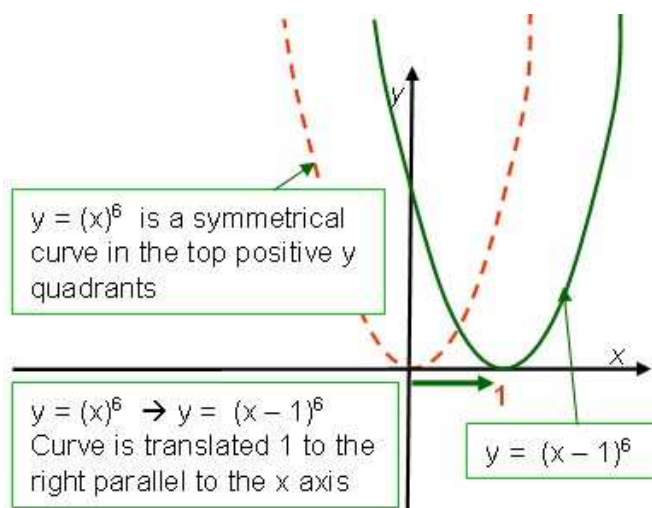
2. Sketch the graph of the following on separate diagrams:

i) $y = \frac{2}{x^2}$



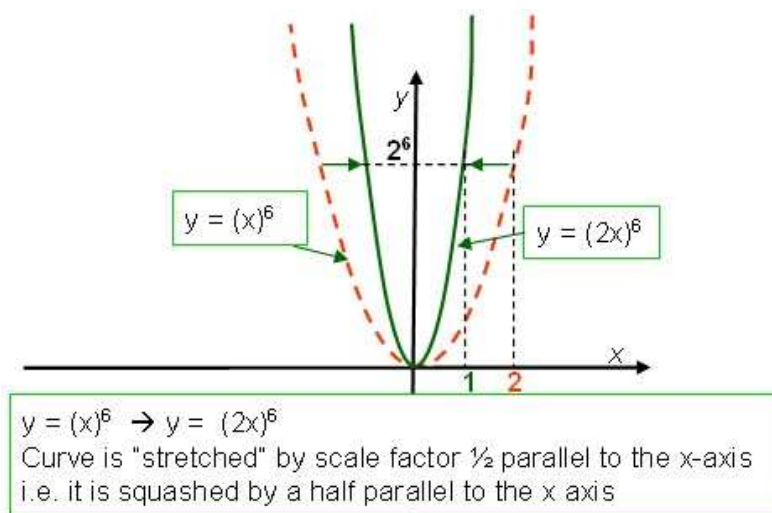
✓ (2)

ii) $y = (x - 1)^6$



✓ (1)

iii) What is the transformation that transforms the curve $y = x^6$ to $y = (2x)^6$



✓ (2)

3. Simplify the following giving each answer in the form $a\sqrt{5}$

Since they are looking for $\sqrt{5}$ in the answer, we need a way to form 5 from the two numbers we have in the square root signs

i) $4\sqrt{20} + 2\sqrt{45}$ Use the rule: $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$

Take 4 outside of $\sqrt{\quad}$

Take 9 outside of $\sqrt{\quad}$

$$4\sqrt{20} + 2\sqrt{45} = 4\sqrt{5 \times 4} + 2\sqrt{5 \times 9} = 4 \times 2\sqrt{5} + 2 \times 3\sqrt{5} = 8\sqrt{5} + 6\sqrt{5}$$

$$14\sqrt{5}$$

(2)

ii) $\sqrt{180} + \sqrt{605}$

Try to find a product (two numbers times each other) for 180 and 605 that includes 5 and a square number.

$$\sqrt{180} = \sqrt{5 \times 36} \quad \text{and} \quad \sqrt{605} = \sqrt{5 \times 121}$$

$$\sqrt{5 \times 36} = 6\sqrt{5} \quad \text{and} \quad \sqrt{5 \times 121} = 11\sqrt{5}$$

$$6\sqrt{5} + 11\sqrt{5} = (6 + 11)\sqrt{5} = 17\sqrt{5}$$

utilise this rule:

$$a\sqrt{a} + b\sqrt{a} = (a + b)\sqrt{a}$$

$$17\sqrt{5}$$

(3)

TOTAL FOR PAPER: 72 MARKS
END