Pure Year 1 exam questions (AS maths)-AQA

NOTE:
Please be aware that in the Year 12 collections, you will find questions from the A-Level (Year 13) papers. However, these questions are intentionally included because they align with Year 12 content and topics.
Happy studying!

Ch 8 Graphs and transformations

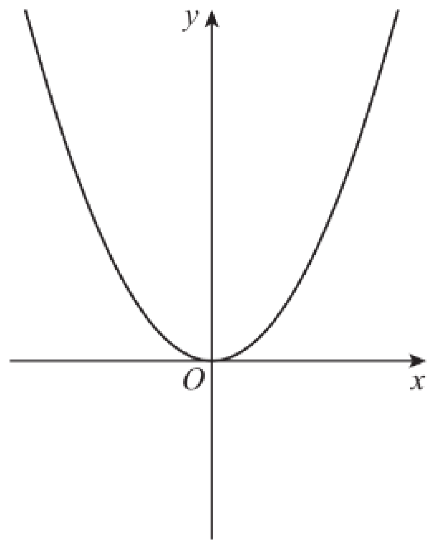
June 2022 Question 3 Paper 2 (A-Level)

3 The function f is concave and is represented by one of the graphs below.

Identify the graph which represents f.

Tick (✓) **one** box.

[1 mark]



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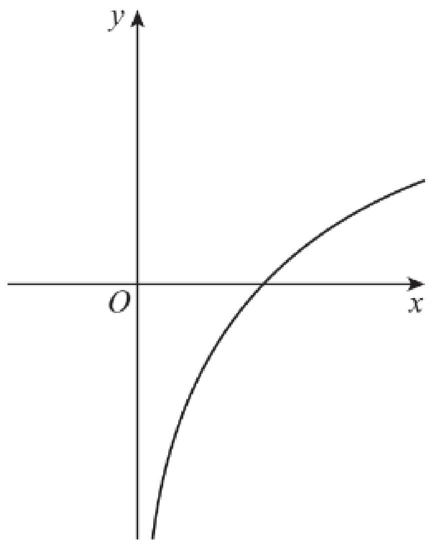

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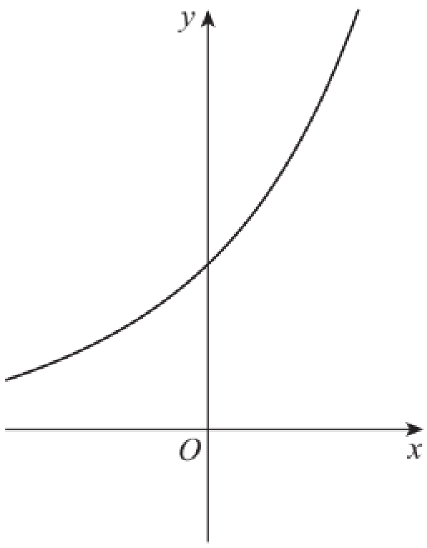

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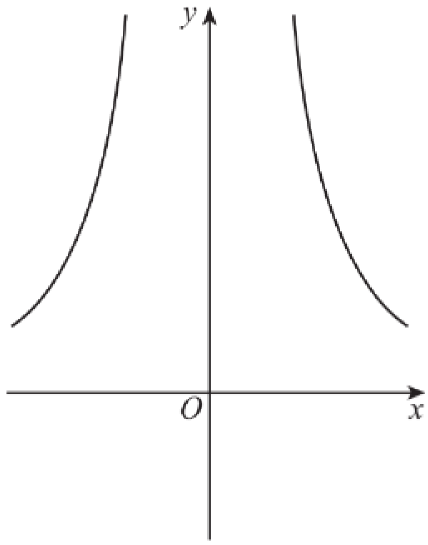

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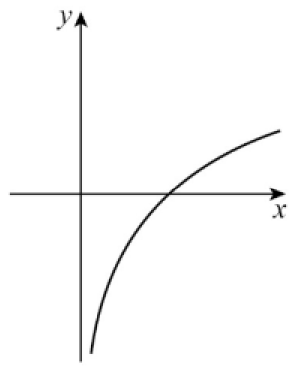
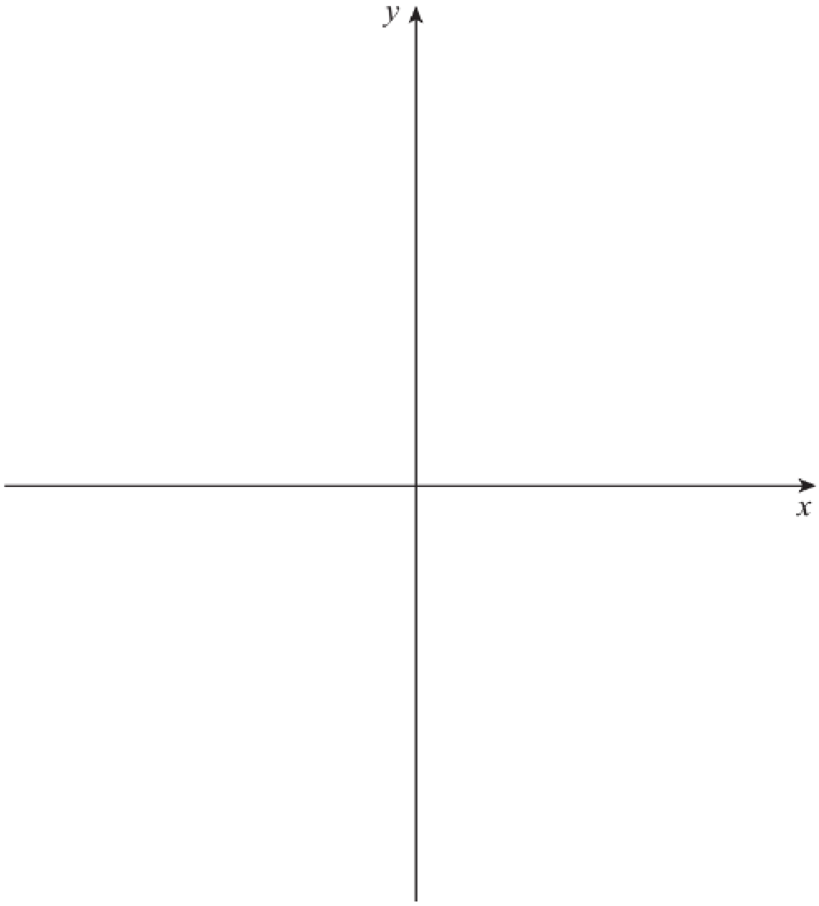
ANSWER

Q	Marking instructions	AO	Marks	Typical solution
3	Ticks correct box	1.2	B1	
	Question 3 Total		**1**	

June 2022 Question 8 Paper 2 (A-Level)

8 (a) Sketch the graph of $y = \dfrac{1}{x^2}$

[2 marks]



8 (b) The graph of $y = \dfrac{1}{x^2}$ can be transformed onto the graph of $y = \dfrac{9}{x^2}$ using a stretch in one direction.

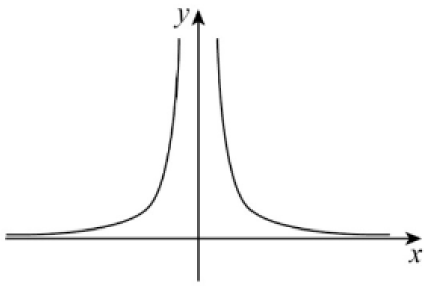
Beth thinks the stretch should be in the y-direction.

Paul thinks the stretch should be in the x-direction.

State, giving reasons for your answer, whether Beth is correct, Paul is correct, both are correct or neither is correct.

[3 marks]

ANSWER

Q	Marking instructions	AO	Marks	Typical solution
8(a)	Sketches a branch of the curve with correct shape in 1st or 2nd quadrant with correct asymptotes and not touching the axes	1.2	M1	
	Sketches a fully correct curve with correct asymptotes and not touching the axes	1.1b	A1	
	Subtotal		**2**	

Q	Marking instructions	AO	Marks	Typical solution
8(b)	Describes a stretch of scale factor 3 or 9 in either direction	2.4	M1	The curve can be stretched in the y-direction by a scale factor of 9 The curve can be stretched in the x-direction by a scale factor of 3 Beth and Paul are both correct.
	Explains that the curve can be stretched in the y-direction by a scale factor of 9 Scale factor PI by $9\mathrm{f}(x)$ OR Explains that the curve can be stretched in the x-direction by a scale factor of 3 Scale factor PI by $\mathrm{f}\left(\frac{x}{3}\right)$	2.4	A1	
	Explains that the curve can be stretched in the y-direction by a scale factor of 9 PI by $9\mathrm{f}(x)$ AND Explains that the curve can be stretched in the x-direction by a scale factor of 3 PI by $\mathrm{f}\left(\frac{x}{3}\right)$ AND Concludes both are correct	2.2a	R1	
	Subtotal		**3**	

November 2021 Question 3 Paper 1

3 The graph of the equation $y = \frac{1}{x}$ is translated by the vector $\begin{bmatrix} 3 \\ 0 \end{bmatrix}$

3 (a) Write down the equation of the transformed graph.

[1 mark]

3 (b) State the equations of the asymptotes of the transformed graph.

[2 marks]

ANSWER

Q	Marking instructions	AO	Marks	Typical solution
3(a)	Writes the correct equation ACF. Condone omission of y =. ISW after correct answer.	1.1b	B1	$y = \frac{1}{x-3}$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
3(b)	Deduces correct equation of vertical asymptote	2.2a	B1	$x = 3$
	Recalls correct equation of horizontal asymptote	1.2	B1	$y = 0$
	Subtotal		**2**	

June 2019 Question 3 Paper 1

3 It is given that $(x+1)$ and $(x-3)$ are two factors of $\mathrm{f}(x)$, where

$$\mathrm{f}(x) = px^3 - 3x^2 - 8x + q$$

3 (a) Find the values of p and q.

[3 marks]

3 (b) Fully factorise $\mathrm{f}(x)$.

[2 marks]

ANSWER

Q	Marking Instructions	AO	Marks	Typical Solution
3(a)	Substitutes $x = -1$ or $x = 3$ into f(x) to obtain one equation or uses identity eg f(x) ≡ $(x + 1)(x - 3)(ax + b)$	3.1a	M1	$x = -1 \quad -p - 3 + 8 + q = 0$ $x = 3 \quad 27p - 27 - 24 + q = 0$ $p = 2$ and $q = -3$
	Obtains two correct equations by substitution method ACF or obtains $a = 2$, $b = 1$	1.1b	A1	
	Solves to find p and q CAO	1.1b	A1	
3(b)	Uses inspection, division by quadratic factor or repeated division or finds third root $x = -\frac{1}{2}$ PI by $(x + \frac{1}{2})$	1.1a	M1	$(x+1)(x-3) = x^2 - 2x - 3$ $(x^2 - 2x - 3)(2x + 1)$ $(x + 1)(x - 3)(2x + 1)$
	Completes factorisation	1.1b	A1	
	Total		**5**	

November 2020 Question 7 Paper 1

7 Curve C has equation $y = x^2$

C is translated by vector $\begin{bmatrix} 3 \\ 0 \end{bmatrix}$ to give curve C_1

Line L has equation $y = x$

L is stretched by scale factor 2 parallel to the x-axis to give line L_1

Find the exact distance between the two intersection points of C_1 and L_1

[6 marks]

ANSWER

Q	Marking Instructions	AO	Marks	Typical Solution
7	Identifies transformed functions as $(x \pm 3)^2$ **and** $2x$ or $\frac{1}{2}x$, at least one correct.	3.1a	M1	C_1 has equation $y = (x - 3)^2$ L_1 has equation $y = \frac{1}{2}x$
	Forms correct equation	1.1b	A1	$(x - 3)^2 = \frac{1}{2}x$
	Solves their quadratic equation	1.1a	M1	$x^2 - \frac{13}{2}x + 9 = 0$
	Obtains correct x values	1.1b	A1	$x = 2$ or $4\frac{1}{2}$
	Applies distance formula to their x and y values	1.1a	M1	$y = 1$ or $2\frac{1}{4}$ Distance = $\sqrt{(4\frac{1}{2} - 2)^2 + (2\frac{1}{4} - 1)^2}$
	Obtains correct distance for their intersection points (non-zero values), any equivalent exact form.	1.1b	A1F	$= \frac{5\sqrt{5}}{4}$
	Total		**6**	

June 2019 Question 5 Paper 1

5 (a) Sketch the curve $y = g(x)$ where

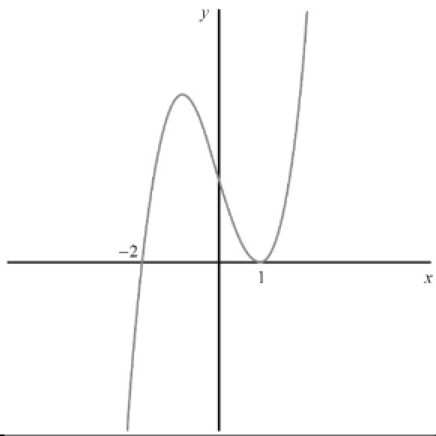
$$g(x) = (x+2)(x-1)^2$$

[3 marks]

5 (b) Hence, solve $g(x) \leq 0$

[2 marks]

ANSWER

Q	Marking Instructions	AO	Marks	Typical Solution
5(a)	Draws a correctly orientated cubic graph with a max and a min	1.1a	M1	$g(x) = 0$ at -2 and 1 (twice) 
	Shows that the curve meets x-axis at –2 and 1 Ignore an additional cutting of the axis	1.1b	A1	
	Deduces the graph touches the x-axis at 1	2.2a	B1	
5(b)	States correct lower region	2.5	B1	$x \leq -2$
	Deduces that point value x = 1 solves the inequality	2.2a	B1	$x = 1$
	Total		**5**	

June 2018 Question 2 Paper 1 (A-Level)

2 The graph of $y = 5^x$ is transformed by a stretch in the y-direction, scale factor 5

State the equation of the transformed graph.

Circle your answer.

[1 mark]

$y = 5 \times 5^x$ $\qquad$ $y = 5^{\frac{x}{5}}$ $\qquad$ $y = \frac{1}{5} \times 5^x$ $\qquad$ $y = 5^{5x}$

ANSWER

Q2	Marking Instructions	AO	Marks	Typical Solution
2	Circles correct answer	AO1.1b	B1	$y = 5 \times 5^x$
	Total		**1**	