



H2 Mathematics (9758)

Chapter 2 Transformation of Curves

Extra Practice Solutions

Qn 1	2020/VJC/8b
	<p>Before C, the equation of curve is $y = -\frac{x+3}{x+2}$</p> <p>Before B, the equation is $y = \frac{x+3}{x+2}$</p> <p>Before A, the equation is $y = \frac{(x-3)+3}{(x-3)+2} = \frac{x}{x-1}$</p> $\therefore y = \frac{x}{x-1}$

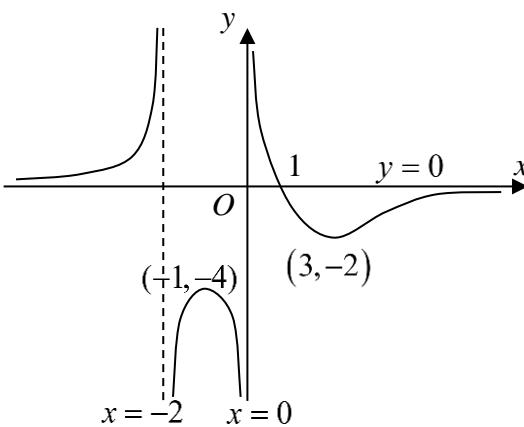
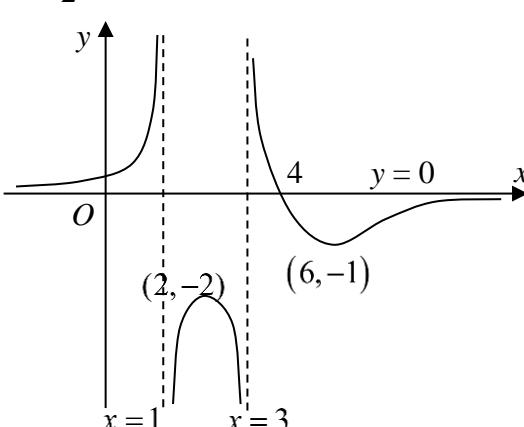
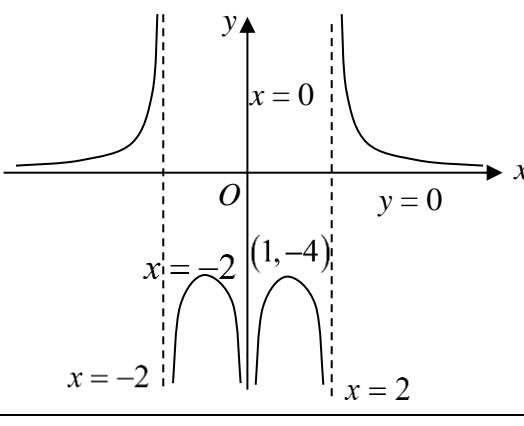
Qn 2	2020/CJC Prelim/1
(i) $\begin{aligned} f(x) &= \frac{2x+3}{3x+5} \\ &= \frac{2}{3} - \frac{1}{3(3x+5)} \\ &= \frac{2}{3} + \frac{-\frac{1}{3}}{3x+5} \end{aligned}$	
(ii) $y = \frac{1}{x} \rightarrow y = \frac{1}{9} \left(\frac{1}{x} \right) = \frac{1}{9x}$ <p>Step1: stretching by a factor of $\frac{1}{9}$ parallel to the y-axis</p> <p>Or stretching by a factor of $\frac{1}{9}$ parallel to the x-axis</p> $y = \frac{1}{9x} \rightarrow y = \frac{1}{9 \left(x + \frac{5}{3} \right)}$ <p>Step2: translation by $\frac{5}{3}$ units in the negative x-direction</p> $y = \frac{1}{9 \left(x + \frac{5}{3} \right)} \rightarrow y = -\frac{1}{9 \left(x + \frac{5}{3} \right)}$ <p>Step3: reflection in the x-axis</p>	

$$y = -\frac{1}{9\left(x + \frac{5}{3}\right)} \rightarrow y = \frac{2}{3} - \frac{1}{9\left(x + \frac{5}{3}\right)}$$

Step4: translation by $\frac{2}{3}$ units in the positive y-direction

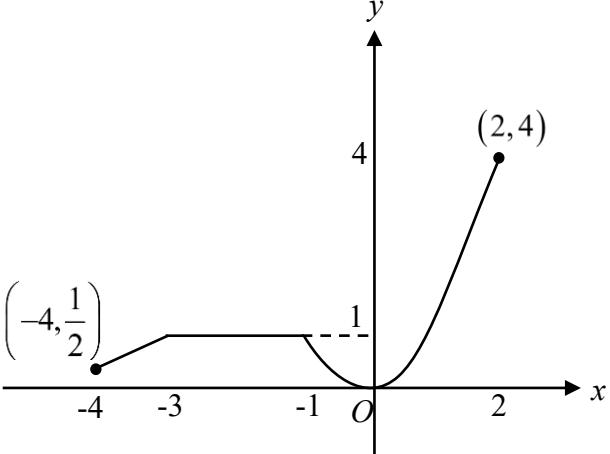
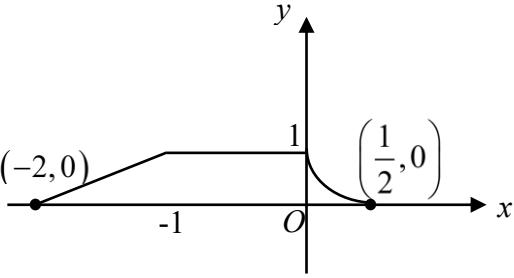
Qn 3	2020/RI Prelim/6
(a)	<p>Graph showing two curves. The first curve, $y = f(1-x)$, is symmetric about the vertical dashed line $x = -3$. It passes through the point $(-1, -3)$. The second curve is a horizontal line $y = 3$. Points $(1, 3)$ and $(3, 2)$ are marked on this line. The origin is labeled O.</p>
(b)	<p>Graph showing three curves. The first curve, $y = \frac{1}{f(x)}$, passes through the points $(-2, \frac{1}{2})$, $(0, \frac{1}{3})$, $(1, 0)$, $(2, -\frac{1}{3})$, and $(4, 0)$. The second curve is a horizontal line $y = \frac{1}{3}$. The origin is labeled O.</p>

Qn 4	2017/MI Promo/10 (modified)
(i)	<p>A Cartesian coordinate system showing the intersection of several curves. The x-axis is labeled x and the y-axis is labeled y. A point O is marked at the origin. Two dashed lines represent the equations $y = 5 - 2x$ and $y = 2x - 5$. A solid curve, labeled $y = f(x)$, is shown as a V-shape opening upwards, intersecting the dashed lines at points $(-1, 8)$ and $(2, 1)$.</p>
(ii)	<p>A Cartesian coordinate system showing the intersection of several curves. The x-axis is labeled x and the y-axis is labeled y. A point O is marked at the origin. A dashed line represents the equation $y = 2x + 5$. A solid curve, labeled $y = f(x)$, is shown as a V-shape opening upwards, intersecting the dashed line at points $(-2, -1)$ and $(2, -1)$.</p>
(iii)	<p>A Cartesian coordinate system showing the intersection of several curves. The x-axis is labeled x and the y-axis is labeled y. A horizontal line is labeled $y = 0$. A solid curve, labeled $y = \frac{1}{f(x)}$, is shown as a curve passing through the point $(-1, \frac{1}{8})$ and intersecting the horizontal line at points $(0, 0)$ and $(2, -1)$.</p>

Qn 5	2012/VJC Prelim/I/9(b) (modified)
(i)	$y = h(x+3)$ 
(ii)	$y = \frac{1}{2}h(x)$ 
(iii)	$y = h(- x +3)$  <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Just replace x by x using original graph of $y = h(3-x)$. </div>

Qn 6	2017/RVHS Promo/6
(a) (i)	<p>A Cartesian coordinate system showing a rational function $y = f(x)$. The graph has two vertical asymptotes at $x = -1$ and $x = 4$, indicated by dashed lines. The curve passes through the x-intercept $(-2, 0)$ and the y-intercept $(0, 4)$. It also passes through the point $(2, 0)$. A horizontal dashed line at $y = 4$ intersects the curve at its maximum point $(0, 4)$.</p>
(a) (ii)	$2y = \frac{1}{f(x)}$ <p>The graph shows the function $2y = \frac{1}{f(x)}$ plotted against y. The curve is symmetric about the y-axis, passing through the x-intercepts $(-4, 0)$ and $(4, 0)$. It also passes through the point $(0, \frac{1}{8})$. A horizontal dashed line at $y = \frac{1}{8}$ intersects the curve at its minimum point $(0, \frac{1}{8})$.</p> <p>Note: $\left(0, \frac{1}{8}\right)$ is a sharp point.</p>

Qn 7	2018/MI Promo/2
	<p>A Cartesian coordinate system showing a function curve. The curve has a local maximum at (c, d) and a local minimum at $(-k, 0)$. It approaches a horizontal dashed line at $y = a$ as x increases.</p>

Qn 8	2021/YIJC Prelim/2
(i)	 <p>A graph showing a piecewise function. It consists of a horizontal line segment from $x = -4$ to $x = -3$ at $y = \frac{1}{2}$. At $x = -3$, there is a jump down to $y = 1$. From $x = -3$ to $x = -1$, the function is a constant horizontal line at $y = 1$. At $x = -1$, there is a jump up to $y = 4$. From $x = -1$ to $x = 2$, the function is a smooth curve that starts at $(-1, 4)$ and increases monotonically, passing through $(2, 4)$.</p>
(ii)	 <p>A graph showing a piecewise function. It consists of a horizontal line segment from $x = -2$ to $x = -1$ at $y = 0$. At $x = -1$, there is a jump up to $y = 1$. From $x = -1$ to $x = \frac{1}{2}$, the function is a smooth curve that starts at $(-1, 1)$ and decreases monotonically, ending at $(\frac{1}{2}, 0)$.</p>