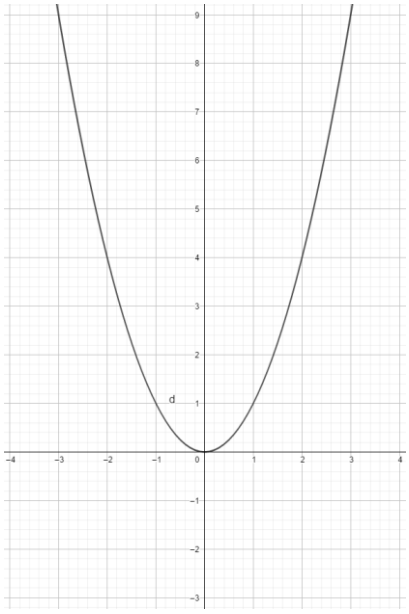
Quadratics and Harder Graphs Mark Scheme

1

x	-3	-2	-1	0	1	2	3
y	9	4	1	0	1	4	9

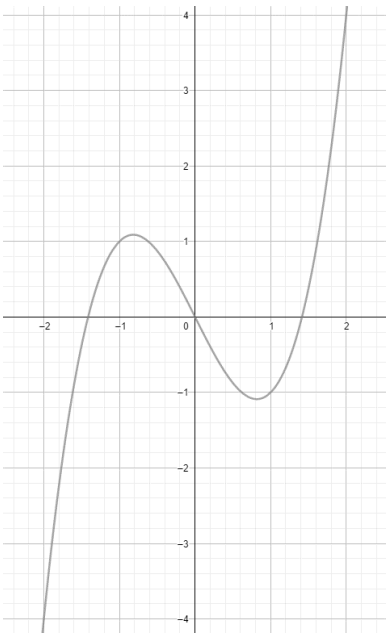


[1] for completed table for $y = x^2$

[1] for accurately plotted graph, plotting each point from the table and connecting with a smooth curve

2

x	-2	-1	0	1	2
y	-4	1	0	-1	4



[1] for completed table

[1] for accurately plotted graph, plotting each point from the table and connecting with a smooth curve.

[1] for turning/inflection points

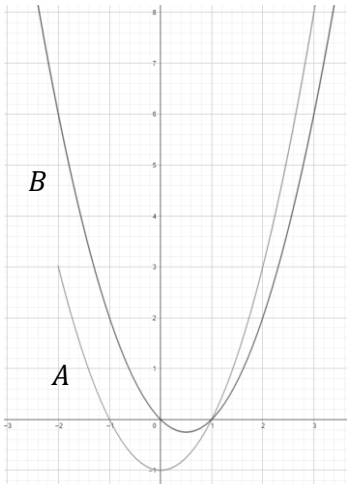
3

A

x	-2	-1	0	1	2	3
y	3	0	-1	0	3	8

B

x	-2	-1	0	1	2	3
y	6	2	0	0	2	6



[1] Table A completed

[1] Table B completed

[1] for accurately plotted graph A

[1] for accurately plotted graph B

[1] All correct

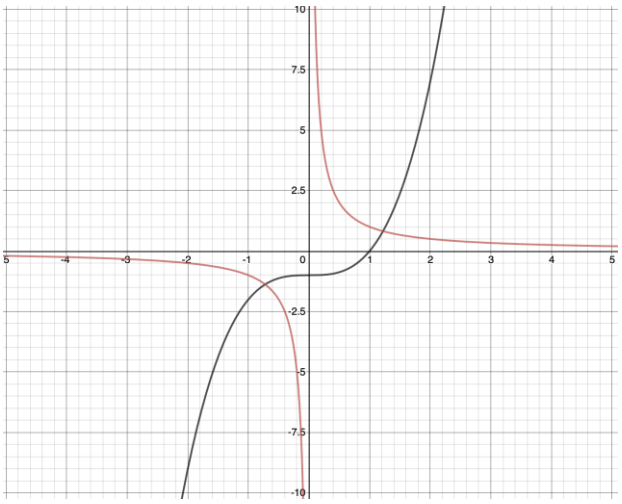
4(a)

x	-2	-1	0	1	2
y	-9	-2	-1	0	7

4(b)

x	-2	-1	-0.5	-0.25	0	0.25	0.5	1	2
y	-0.5	-1	-2	-4	Undefined	4	2	1	0.5

4(c)



[1] Table A completed

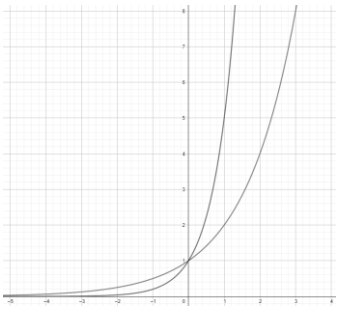
[1] Table B completed

[1] for accurately plotted graph A

[1] for accurately plotted graph B

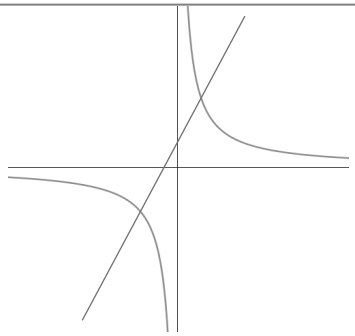
[1] All correct

<table>
<tr><td>4(d)</td><td>$x = -0.7\ ,\quad y = -1.4$
$x = 1.2\ ,\quad y = 0.8$</td><td>[1] Answers are approximations Award mark as long as intersection points correspond to the graph drawn.</td></tr>
<tr><td>5(a)</td><td><table>
<tr><td>$\boldsymbol{x}$</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>$\boldsymbol{y}$</td><td>0.25</td><td>0.5</td><td>1</td><td>2</td><td>4</td><td>8</td></tr>
</table></td><td>[1] mark awarded for at least 3 correct values in the table

[1] mark awarded for all correct values in the table</td></tr>
<tr><td>5(b)</td><td>  </td><td>[2] mark awarded for graph drawn from a smooth curve connecting the points from the table</td></tr>
<tr><td>5(c)</td><td>The graph of $y = 5^x$ grows quicker than $y = 2^x$ after $x = 0$.
The two graphs intersect at $(0,1)$.
As x goes toward negative infinity, the graphs get closer and closer, but never meet.
As x goes to positive infinity, the graphs grow further and further apart.</td><td>[1] Valid comment

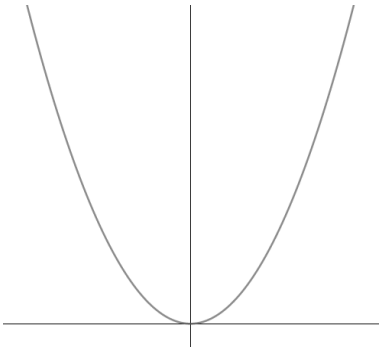
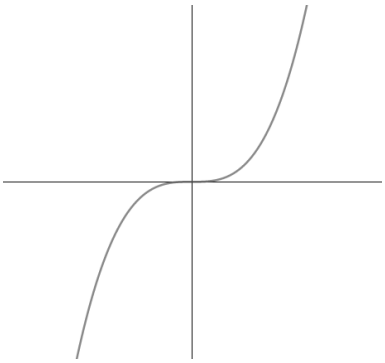
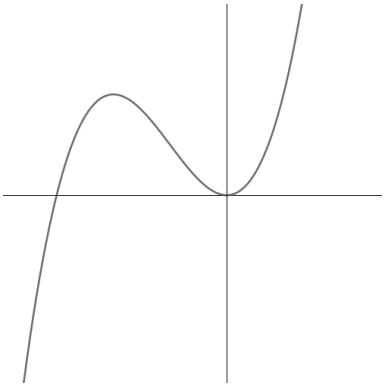
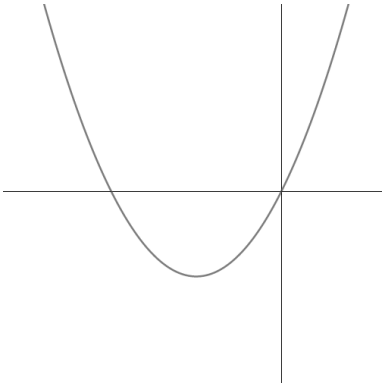
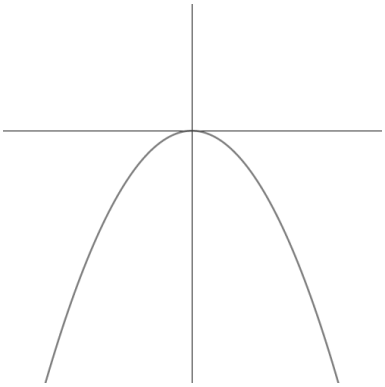
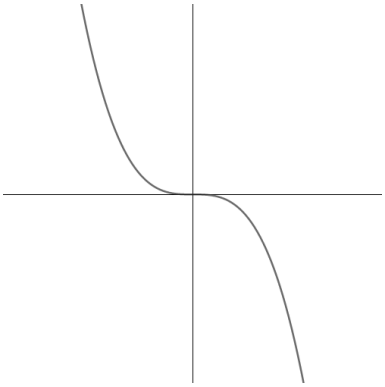
[1] Valid comment
[1] Valid comment

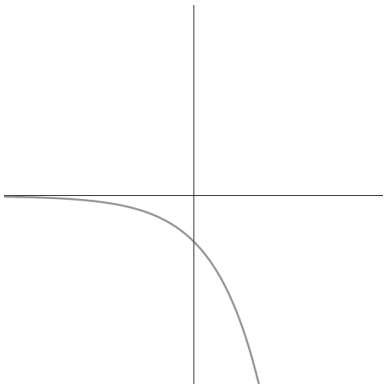
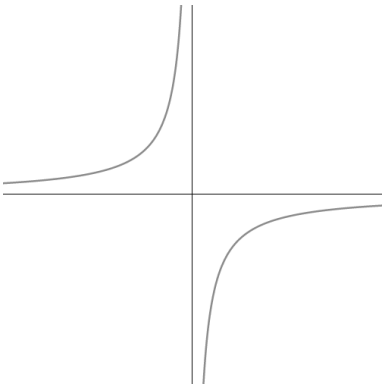
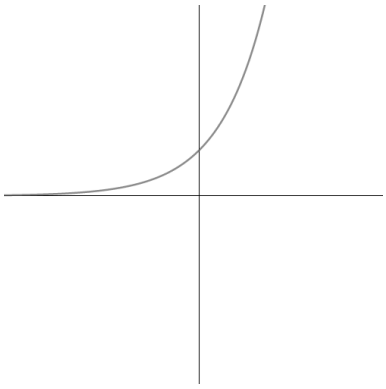
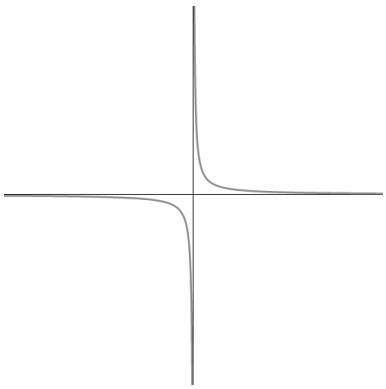
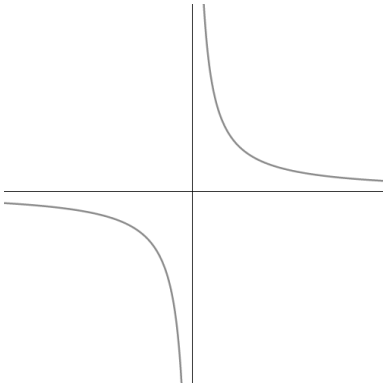
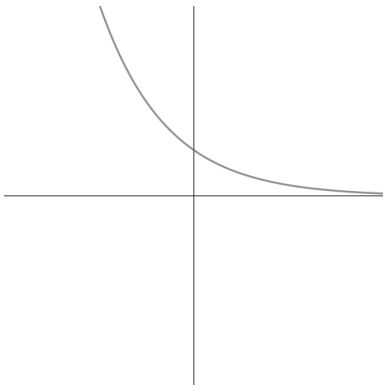
[1] Valid comment

1 mark per valid comment up to a maximum of 3 marks</td></tr>
<tr><td>6</td><td>A plot of a graph is more precise, using all the exact points. A sketch may use some of the known points that are then connected.</td><td>[1] Valid comment</td></tr>
<tr><td></td><td>  </td><td>[1] 1 correct sketch

[1] 1 correct sketch

[1] correctly identified roots</td></tr>
</table>

7	 $D: y = x^2$  $B: y = x^3$  $A: y = x^3 + 2x^2$  $E: y = x^2 + 2x$  $F: y = -x^2$  $C: y = -x^3$	
		[5] 1 mark per correct pair
8	Instead of x and y it is t and N. Two coordinates that can easily be chosen are: $(0,3)$ and $(1,6)$	[1] Select two points on the curve
	Substituting first to find A: $N = Ar^t$ $3 = A \times r^0$ $3 = A \times 1$ $A = 3$ $N = 3r^t$	[1] Find A, the value of N when $t = 0$
	Substituting the second set of coordinates to find r $N = 3r^t$ $6 = 3 \times r^1$ $6 = 3r$ $r = 2$ $\boldsymbol{A = 3}$ $\boldsymbol{r = 2}$	[1] Using A and second point to find r

9	 $F: y = -e^x$  $B: y = \frac{1}{x}$  $D: y = e^x$  $C: y = \frac{1}{10x}$  $A: y = \frac{1}{x}$  $E: y = 0.5^x$	
		[5] 1 mark per correct pair

END