Exercises for Sketching-1

(1) A twice differentiable function f is known to be symmetric about the origin and to have the values shown below. Sketch its graph. Solution

	0	$(0, 0.6)$	0.6	$(0.6, 1)$	1	$(1, \infty)$	∞
$f''(x)$	0	+	1.2	+	6	+	∞
$f'(x)$	-1	−	0	+	2	+	∞
$f(x)$	0	+	-0.1	−	0	+	∞

(2) A twice differentiable function f is known to have the properties and values shown below. Sketch its graph. Solution

	$-\infty$	-1	$(0, -0.5)$	-0.5	$(-0.5, 0)$	0	$(0, 0.3)$	0.3	$(0.3, 1.2)$	1.2	$(1.2, 2)$	2	$(2, \infty)$
$f''(x)$	$-\infty$	−	−	−	+	-2	−	0	+	+	+	+	+
$f'(x)$	∞	3	+	0	+	-2	−	−	−	0	+	+	+
$f(x)$	$-\infty$	0	+	0.6	+	0	−	−	−	-2.1	−	0	+

(3) A twice differentiable function f is known to have the properties and values shown below. Sketch its graph. Solution

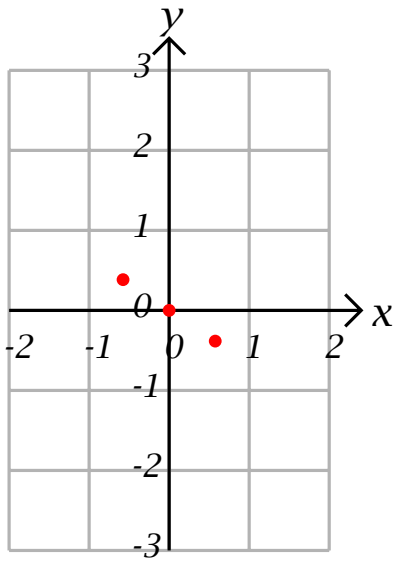
	$(-\infty,0)$	0	$(0,0.4)$	0.4	$(0.4,1)$	1	$(1,1.6)$	1.6	$(1.6,2)$	2	$(2,\infty)$	∞
$f''(x)$	$-$	$-$	$-$	$-$	$-$	0	$+$	$+$	$+$	$+$	$+$	∞
$f'(x)$	$+$	2	$+$	0	$-$	-1	$-$	0	$+$	2	$+$	∞
$f(x)$	$-$	0	$+$	0.4	$+$	0	$-$	-0.4	$-$	0	$+$	∞

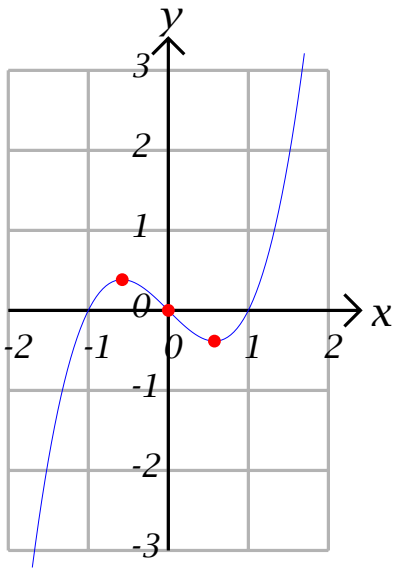
(4) A twice differentiable function f is known to be symmetric about the line $x = \frac{1}{2}$ and to have the properties and values shown below. Sketch its graph. Solution

	0.5	$(0.5,1)$	1	$(1,1.3)$	1.3	$(1.3,1.6)$	1.6	$(1.6,2)$	2	$(2,\infty)$	∞
$f''(x)$	$-$	$-$	-2	$-$	0	$+$	$+$	$+$	22	$+$	∞
$f'(x)$	0	$-$	-2	$-$	$-$	$-$	0	$+$	42	$+$	∞
$f(x)$	0.6	$+$	0	$-$	$-$	$-$	-1	$-$	0	$+$	∞

Solutions

(1)





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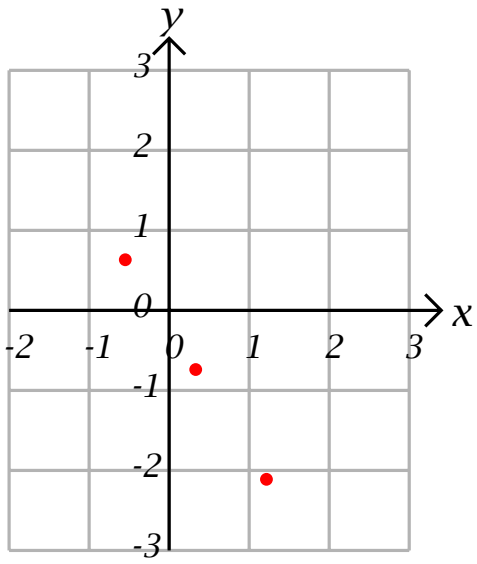
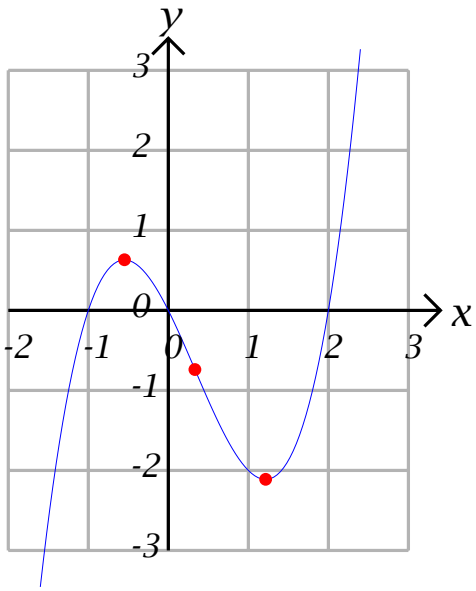
(2)





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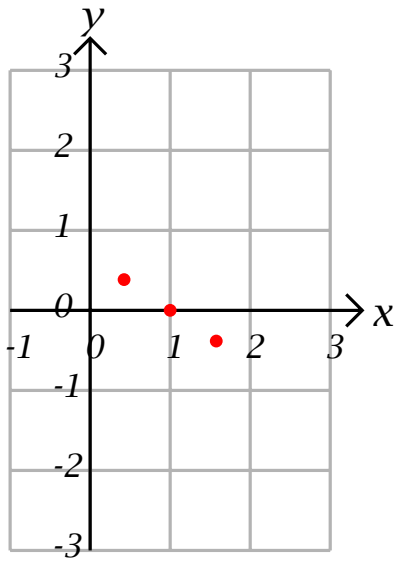
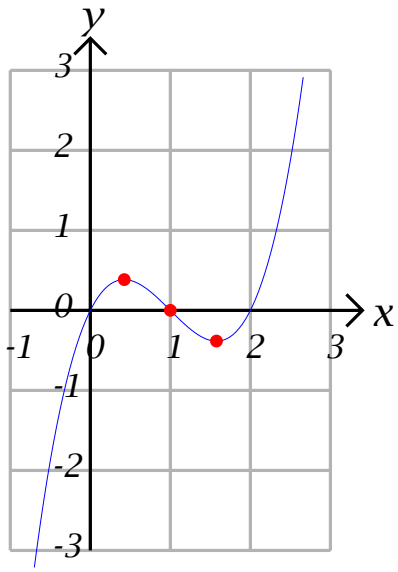
(3)





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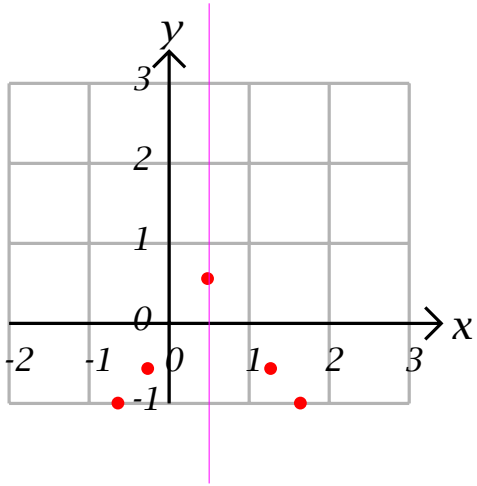
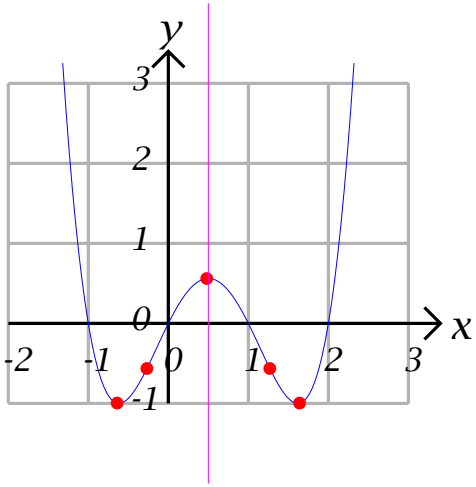
(4)





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