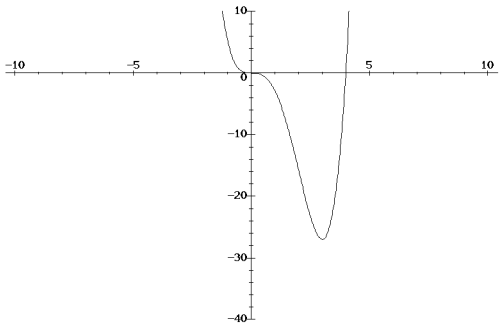
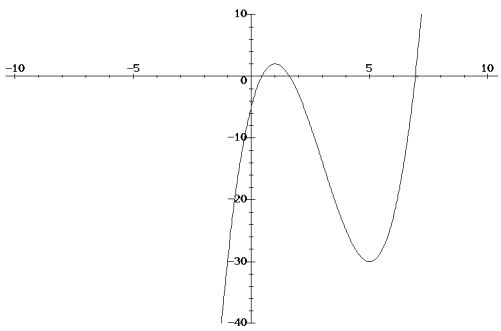
Answers to **Curve Sketching**: 5–12.

5.



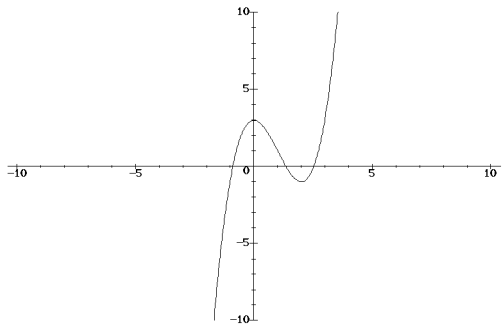
x-intercepts	$(0,0);(4,0)$
y-intercept	$(0,0)$
H.A.	none
V.A.	none
Increasing on	$(3,\infty)$
Decreasing on	$(-\infty,3)$
Concave up on	$(-\infty,0),(2,\infty)$
Concave down on	$(0,2)$
Rel. Max. at	none
Rel. Min. at	$(3,-27)$
Inflection pt. at	$(0,0);(2,-16)$

6.



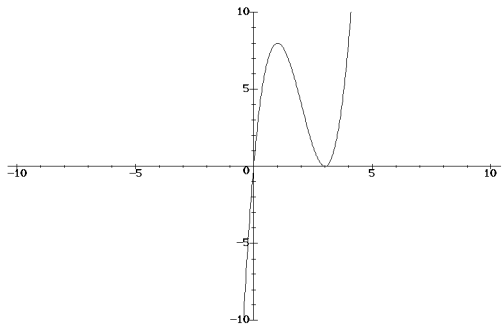
x-intercepts	irrational
y-intercept	$(0,-5)$
H.A.	none
V.A.	none
Increasing on	$(-\infty,1),(5,\infty)$
Decreasing on	$(1,5)$
Concave up on	$(3,\infty)$
Concave down on	$(-\infty,3)$
Rel. Max. at	$(1,2)$
Rel. Min. at	$(5,-30)$
Inflection pt. at	$(3,-14)$

7.



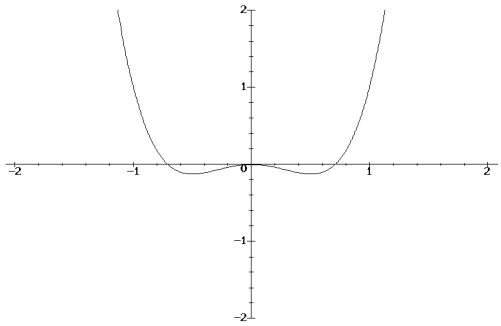
x-intercepts	irrational
y-intercept	$(0,3)$
H.A.	none
V.A.	none
Increasing on	$(-\infty,0),(2,\infty)$
Decreasing on	$(0,2)$
Concave up on	$(1,\infty)$
Concave down on	$(-\infty,1)$
Rel. Max. at	$(0,3)$
Rel. Min. at	$(2,-1)$
Inflection pt. at	$(1,1)$

8.



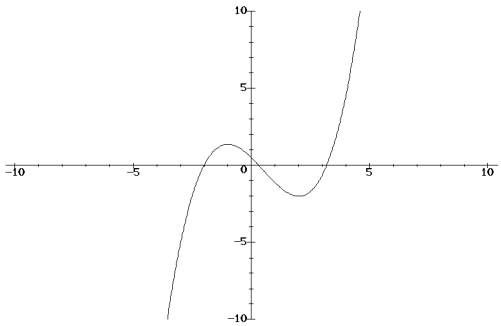
x-intercepts	$(0,0);(3,0)$
y-intercept	$(0,0)$
H.A.	none
V.A.	none
Increasing on	$(-\infty,1),(3,\infty)$
Decreasing on	$(1,3)$
Concave up on	$(2,\infty)$
Concave down on	$(-\infty,2)$
Rel. Max. at	$(1,8)$
Rel. Min. at	$(3,0)$
Inflection pt. at	$(2,4)$

9.



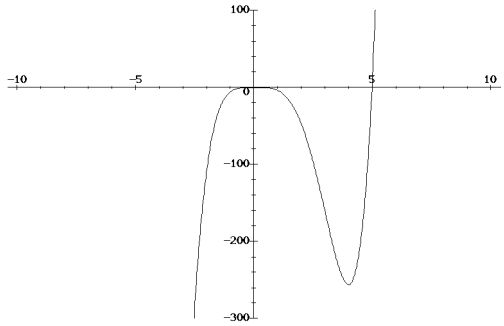
x-intercepts	$(0,0); (-\frac{1}{\sqrt{2}}, 0); (\frac{1}{\sqrt{2}}, 0)$
y-intercept	$(0,0)$
H.A.	none
V.A.	none
Increasing on	$(-\frac{1}{2}, 0), (\frac{1}{2}, \infty)$
Decreasing on	$(-\infty, -\frac{1}{2}), (0, \frac{1}{2})$
Concave up on	$(-\infty, -\frac{1}{\sqrt{12}}), (\frac{1}{\sqrt{12}}, \infty)$
Concave down on	$(-\frac{1}{\sqrt{12}}, \frac{1}{\sqrt{12}})$
Rel. Max. at	$(0,0)$
Rel. Min. at	$(-\frac{1}{2}, -\frac{1}{8}); (\frac{1}{2}, -\frac{1}{8})$
Inflection pt. at	$(-\frac{1}{\sqrt{12}}, -\frac{5}{72}); (\frac{1}{\sqrt{12}}, -\frac{5}{72})$

10.



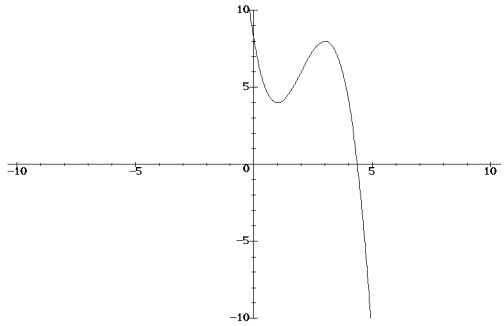
x-intercepts	$(-2,0); (\frac{7\pm\sqrt{33}}{4}, 0)$
y-intercept	$(0, \frac{1}{2})$
H.A.	none
V.A.	none
Increasing on	$(-\infty, -1), (2, \infty)$
Decreasing on	$(-1, 2)$
Concave up on	$(\frac{1}{2}, \infty)$
Concave down on	$(-\infty, \frac{1}{2})$
Rel. Max. at	$(-1, \frac{11}{8})$
Rel. Min. at	$(2, -2)$
Inflection pt. at	$(\frac{1}{2}, -\frac{5}{16})$

11.



x-intercepts	$(0,0); (5,0)$
y-intercept	$(0,0)$
H.A.	none
V.A.	none
Increasing on	$(-\infty, 0), (4, \infty)$
Decreasing on	$(0, 4)$
Concave up on	$(3, \infty)$
Concave down on	$(-\infty, 3)$
Rel. Max. at	$(0,0)$
Rel. Min. at	$(4, -256)$
Inflection pt. at	$(3, -162)$

12.



x-intercepts	irrational
y-intercept	$(0,8)$
H.A.	none
V.A.	none
Increasing on	$(1,3)$
Decreasing on	$(-\infty, 1), (3, \infty)$
Concave up on	$(-\infty, 2)$
Concave down on	$(2, \infty)$
Rel. Max. at	$(3,8)$
Rel. Min. at	$(1,4)$
Inflection pt. at	$(2,6)$