Using First and Second Derivatives

	4.1 #8	4.1 #11	4.1 #14
$f(x)$	$x^3 - 6x + 1$	$x + 2\sin x$	xe^{-x^2}
$f'(x)$	$3x^2 - 6$	$1 + 2\cos x$	$(1 - 2x^2)e^{-x^2}$
$f''(x)$	$6x$	$-2\sin x$	$4x(x^2 - 3/2)e^{-x^2}$
Critical points	$\pm\sqrt{2}$	$\pm\frac{2\pi}{3}$ and $\pm\frac{4\pi}{3}$ $\pm$ integer multiples of 2π	$\pm\sqrt{1/2}$
Interval(s) where f is increasing	$(-\infty, -\sqrt{2}]$, $[\sqrt{2}, \infty)$	$\ldots, ([-2\pi/3, 2\pi/3]$, $[4\pi/3, 8\pi/3], \ldots$	$[-1/\sqrt{2}, 1/\sqrt{2}]$
Local maximum at $x =$	$-\sqrt{2}$	$2\pi/3 \pm 2n\pi$	$1/\sqrt{2}$
Local minimum at $x =$	$\sqrt{2}$	$4\pi/3 \pm 2n\pi$	$-1/\sqrt{2}$
Interval(s) where graph is concave up	$[0, \infty)$	$[(2n-1)\pi, 2n\pi]$	$[-\sqrt{3/2}, 0]$, $[\sqrt{3/2}, \infty)$
Inflection point(s)	0	$n\pi$, $n = 0, \pm 1, \pm 2, \ldots$	$0, \pm\sqrt{3/2}$
If $-3 \leq x \leq 3$ global maximum = at $x =$	10 3	$2\pi/3 + \sqrt{3}$ $2\pi/3$	$e^{-1/2}/\sqrt{2}$ $1/\sqrt{2}$
If $-3 \leq x \leq 3$ global minimum = at $x =$	-8 -3	$-2\pi/3 - \sqrt{3}$ $-2\pi/3$	$-e^{-1/2}/\sqrt{2}$ $-1/\sqrt{2}$