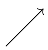
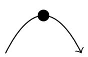
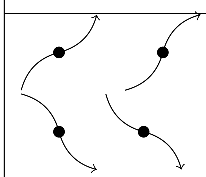
SECTION 4-3: HOW DERIVATIVES AFFECT THE SHAPE OF A GRAPH

picture	**property of f**	**how to recognize it**
	f is *increasing* on (a,b) if $f(x_1) \geq f(x_2)$ for all x_1, x_2 in (a,b)	$f'(x) \geq 0$
	f is *decreasing* on (a,b) if $f(x_1) \leq f(x_2)$ for all x_1, x_2 in (a,b)	$f'(x) \leq 0$
 or 	f is *concave up* on (a,b) if $f'(x)$ is increasing on (a,b)	$f''(x) \geq 0$
 or 	f is *concave down* on (a,b) if $f'(x)$ is decreasing on (a,b)	$f''(x) \leq 0$
	f has a *local maximum* at $x = c$ if $f(c) \geq f(x)$ for all x near c	**First Derivative Test:** $f'(c) = 0$ and f' changes from $+$ to $-$ at c **Second Derivative Test:** $f'(c) = 0$ **and** $f''(c) < 0$
	f has a *local minimum* at $x = c$ if $f(c) \leq f(x)$ for all x near c	**First Derivative Test:** $f'(c) = 0$ and f' changes from $-$ to $+$ at c **Second Derivative Test:** $f'(c) = 0$ **and** $f''(c) > 0$
	f has an *inflection point* at $x = c$ if f changes concavity at c	$f'(c)$ has a local max or min $\iff$ $f''(c) = 0$ and f'' changes sign at c