5. $y = 3x^5 - 10x^3 + 15$

$y' = 15x^4 - 30x^2$

$y'' = 60x^3 - 60x$

$= 60x(x^2 - 1)$

$= 60x(x-1)(x+1)$

y'' : $-$ on $(-\infty, -1)$, $+$ on $(-1, 0)$, $-$ on $(0, 1)$, $+$ on $(1, \infty)$

The function is concave up over the interval $x \in (-1, 0) \cup (1, \infty)$ and concave down over the interval $x \in (-\infty, -1) \cup (0, 1)$

6. $f'(x) > 0$ over $x \in (-5, 2) \cup (8, \infty)$

$f'(x) < 0$ over $x \in (-\infty, -5) \cup (2, 8)$

$f''(x) > 0$ over $x \in (-\infty, -2) \cup (5, \infty)$

$f''(x) < 0$ over $x \in (-2, 5)$