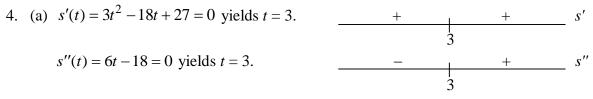
Activity 2.4 – Analyzing Cubic Functions

| 1. | (a) The graph isThe derivative (slope) isThe derivative (slope) is | Increasing Positive Increasing | Decreasing Negative Decreasing |
|----|--|--------------------------------------|--------------------------------------|
| | (b) The graph is | Increasing | Decreasing |
| | The derivative is | Positive | Negative |
| | The derivative is | Increasing | Decreasing |
| 2. | (a) The graph is | Increasing | Decreasing |
| | The derivative is | Positive | Negative |
| | The derivative is | Increasing | Decreasing |
| | (b) The graph is | Increasing | Decreasing) |
| | The derivative is | Positive | Negative |
| | The derivative is | Increasing | Decreasing |

3. $y' = 3x^2 - 4x - 5$; y'' = 6x - 4 = 0 yields x = 2/3. A sign test shows that y is concave up on $(2/3, \infty)$ and concave down on $(-\infty, 2/3)$. The inflection point is at x = 2/3 and the coordinates are (2/3, 56/27).



- (b) Speeding up on $(3, \infty)$; slowing down on $(-\infty, 3)$.
- 5. (a) $(x-5)(x^2+5x+25)$; *x*-intercept at x = 5.
 - (b) $(x+4)(x^2-4x+16)$; *x*-intercept at x = -4.
- 6. $x^3 + 2x^2 5x 6 = (x + 1)(x^2 + x 6) = (x + 1)(x + 3)(x 2)$; the solutions are x = -1, -3, 2.
- 7. $x^3 5x^2 12x + 60 = x^2(x-5) 12(x-5) = (x-5)(x^2 12) = (x-5)(x+\sqrt{12})(x-\sqrt{12});$ the solutions are x = 5, $\sqrt{12}$, $-\sqrt{12}$.