1. (a) $-\frac{5}{9}$ m/s    (b) $-\frac{5}{8}$ m/s

2. (a) $\frac{1}{3}$    (b) 32

3. (a) B    (b) D    (c) C    (d) C

4. $- \frac{3}{\sqrt{r^5}} + 18r^2 - 3e^r$

5. (a) $\lim_{x \to 1^-} f(x) = -2$, $\lim_{x \to 1^+} f(x) = 2$    (b) The limit does NOT exist because the left and right hand limits are not equal.

6. No, my friend’s reasoning is not correct. The Intermediate Value Theorem requires that $f$ be continuous on $[0, 2]$ in order to deduce there is a root in $[0, 2]$. However, even though $f(0) < 0$ and $f(2) > 0$, $f$ is undefined at $x = 1$ and hence not continuous on $[0, 2]$. Thus IVT cannot be applied.

7. (a) $\frac{1}{2\sqrt{x + 4}}$    (b) $y - 3 = \frac{1}{6}(x - 5)$