Dr. Tabanli's Exam #2 Review for Sections 13-15, 21-23

Answer Key

1. (i) $a = 0$ only
   (ii) $y = 2$
2. $h'(1) = \dfrac{3}{2\sqrt{5}}$
3. $Q'(2) = \dfrac{37}{9}$
4. $a = \frac{1}{2}$
5. $b = 2$, $c = 3$
6. $k = \frac{1}{2}$
7. True
8. True, see the graph of $f(x) = e^x$.
9. False, e^3 is a constant, $\dfrac{d(e^3)}{dx} = 0$.
10. True, $\sec x$ is not differentiable where $\cos x = 0$ that includes $x = \dfrac{\pi}{2}$.
11. False, a rational function is not continuous where the polynomial in the denominator equals 0.
12. False; the graph of a function can have zero, one or two horizontal asymptotes.
13. (a) The values of x in the interval $(0, e)$ at which f fails to be continuous are: $x = b, d$.
    (b) The values of x in the interval $(0, e)$ at which f fails to be differentiable are: $x = a, b, d$. Recall that continuity does not imply differentiability, there is a cusp at $x = a$.
    (c)
    - The sign of the slope of the curve at $x = \frac{a}{2}$ is positive.
    - The sign of the slope of the curve at $x = \frac{a+b}{2}$ is negative.
    - The sign of the slope of the curve at $x = c$ is zero. There is a horizontal tangent at $x = c$.