Answers for class prep quiz on section 3.2, Stewart's Calculus (8th ed.)

1. **Answer:** (b); this is the composition of two functions, for which we will see a formula (the Chain Rule) in Section 3.4. Formulas can be obtained for (c), (d), and (a) using the sum, product, and quotient rules, respectively.

2. **Answer:** (d); the problem is that $e^{x/2}$ is the composition of the functions e^x and $x/2$, and we have not yet seen the Chain Rule.

3. **Answer:** (a). Let $p(x) = 5e^x + x^3$ and $q(x) = x^2 + 13$, and note that $p'(x) = 5e^x + 3x^2$ and $q'(x) = 2x$. Since $g(x) = p(x)/q(x)$, the quotient rule gives:

$$\begin{aligned} g'(x) &= \frac{q(x)p'(x) - p(x)q'(x)}{q(x)^2} \\ &= \frac{(x^2+13)(5e^x+3x^2) - (5e^x+x^3)(2x)}{(x^2+13)^2}. \end{aligned}$$

4. **Answer:** (b). Let $p(x) = x^2 - 3x^{1/2}$ and $q(x) = e^x + 7$, and note that $p'(x) = 2x - \dfrac{3x^{-1/2}}{2}$ and $q'(x) = e^x$. Since $h(x) = p(x)q(x)$, the product rule gives:

$$\begin{aligned} h'(x) &= p(x)q'(x) + q(x)p'(x) \\ &= (x^2 - 3x^{1/2})e^x + (e^x + 7)\left(2x - \frac{3x^{-1/2}}{2}\right). \end{aligned}$$