1. \( g'(-8) = -4 \)

2. \( dy = 2 \cos(2x) \, dx \), so when \( x = \pi/2 \) and \( dx = -1/10 \), we have \( dy = 1/5 \).

3. (a) \( f'(x) = x(2 \ln(x) + 1) \) and \( f'(e^3) = 7e^3 \)
   
   (b) \( g'(x) = \frac{\cos(x)x - \sin(x)}{x^2} \) and \( g'(\pi/2) = -4/\pi^2 \)
   
   (c) \( f'(x) = \frac{2}{1 + 4x^2} \) and \( f'(\sqrt{2}) = 2/9 \)

4. (a) \( G'(x) = 3e^{3x}(x + 3) \left( x + \frac{11}{3} \right) \)
   
   (b) \( f'(x) = 2 \arctan(x) \)
   
   (c) \( e^x(\sinh(3x) + 3 \cosh(3x)) \) and \( H'(0) = 3 \)

5. \( \lim_{x \to 0} \frac{\tan(10x)}{5x} = 2 \)

6. \( f_{\text{max}} = f(4) = 31 \) and \( f_{\text{min}} = f(2) = -21 \)

7. \( y = -2 - \frac{9}{4}(x - 1) \)

8. If \( z \) denotes the distance between Abercrombie and Benson, then \( \dot{z} = 4/5 \), which, being positive, indicates that \( z \) is increasing, so they are drawing apart.