1 $\boldsymbol{g'(-8) = -4}$

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

3 (a) $\boldsymbol{f'(x) = x\big(2\ln(x) + 1\big)}$ and $\boldsymbol{f'(e^3) = 7e^3}$

(b) $\boldsymbol{g'(x) = \dfrac{\cos(x)x - \sin(x)}{x^2}}$ and $\boldsymbol{g'(\pi/2) = -4/\pi^2}$

(c) $\boldsymbol{f'(x) = \dfrac{2}{1 + 4x^2}}$ and $\boldsymbol{f'(\sqrt{2}) = 2/9}$

4 (a) $\boldsymbol{G'(x) = 3e^{3x}(x + 3)\left(x + \dfrac{11}{3}\right)}$

(b) $\boldsymbol{f'(x) = 2\arctan(x)}$

(c) $\boldsymbol{e^x\big(\sinh(3x) + 3\cosh(3x)\big)}$ and $\boldsymbol{H'(0) = 3}$

5 $\boldsymbol{\lim\limits_{x\to 0} \dfrac{\tan(10x)}{5x} = 2}$

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

7 $\boldsymbol{y = -2 - \dfrac{9}{4}(x - 1)}$

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