2. \( \frac{dG}{dW} \) is the rate of change of population growth rate as a function of average per capita wage, in people per thousand per dollars per year. \( \frac{dQ}{dP} \) is the rate of change of average per capita wage as a function of mine production rate, measured in dollars per year per tons per year. \( \frac{dG}{dP} \) is the rate of change of population growth rate as a function of mine production rate, measured in people per thousand per tons per year.

3. (b) \( 5(2x - x^2)^4(2 - 2x) \). (c) \( -\frac{5}{27}(\frac{2}{x})^3 \). (d) \( 3(x - \frac{1}{2})^2(1 + \frac{1}{x^2}) \). (f) \( 3(1 - \cos x)^2 \sin x \). (g) \(-2x \sin(x^2) \). (h) \( 5 \sec^2 5x \). (j) \( 2xe^x \). (k) \( 3 \cdot 10^3x \ln 10 \). (l) \( 2 \sin x \ln 2 \cos x \).

4. (b) \( 3 \sec 3x \tan 3x \tan 4x + 4 \sec 3x \sec^2 4x \). (d) \(-5 \pi \cos^4 \pi x \sin \pi x \). (f) \( e^{-x}(-\cos 3x - 3 \sin 3x) \). (l) \( \frac{7e^{-0.02x}}{(1 + 7e^{-0.02x})^2} \).

5. (c) \(-2x \sin(x^2 + 4) \). (f) \( 9(x^3 - 1)^2 x^2 \).

6. (a) (iv)

7. If \( y = [f(x)]^n \), let \( y = u^n, u = f(x) \). Then \( \frac{du}{dx} = \frac{du}{dn} \cdot \frac{dn}{dx} = nu^{n-1} f'(x) = n[f(x)]^{n-1} f'(x) \).

8. \( \frac{d}{dx}(a^x) = \frac{d}{dx}(e^{x \ln a}) = (\ln a)e^{x \ln a} = (\ln a)a^x \).

9. \(-42 \)

10. \( 0 \)

11. \( \frac{dv}{dt} - \frac{dv}{ds} \frac{ds}{dt} = v \frac{dv}{ds} \).

18. If \( f \) is an even function, then \( f(-x) = f(x) \). Differentiating, we get \( f'(-x)(-1) = f'(x) \Rightarrow f'(-x) = -f'(x) \), and \( f' \) is an odd function.