(1) Differentiate the following functions.

(a) $f(x) = x^5 + \pi x + 4.2$

(b) $g(s) = 4s + \dfrac{7}{s}$

(c) $h(t) = 5t^{\frac{1}{3}}$

(d) $m(x) = \sin x + \sqrt{\pi}$

(e) $f(t) = 5\cos t + \dfrac{2}{\sqrt{t}}$

(f) $h(x) = \dfrac{x^2}{2} + 2e^x$

(g) $\mathbf{r}(t) = (t, 400 - 4.9t^2)$ (a vector function)

(h) $\mathbf{s}(t) = (5^t, \dfrac{1}{t})$

(2) Find the tangent line at the indicated point.

(a) $y = 5x^2 + 1$ at $x = 1$

(b) $y = \dfrac{1}{x^2}$ at $x = 2$

(c) $y = x^3 - 3x$ at $x = 1$

(d) $y = 2^t$ at $t = 0$

(e) $y = \sin t$ at $t = \frac{\pi}{6}$

(f) $y = |x^2 - 4|$ at $x = 1$

(g) $y = |x^2 - 4|$ at $x = 2$