(1.) (15 points) Let g be a differentiable function. Find formulas for the derivatives of the each of the following. [Your derivative formulas may contain g and/or g'.]

(a) $m(x) = \sin(x) \cdot g(x)$

$$m'(x) = \cos(x) \cdot g(x) + \sin(x) \cdot g'(x)$$

(b) $t(x) = \frac{\sin(x)}{g(x)}$

$$t'(x) = \frac{g(x) \cdot \cos(x) - \sin(x) \cdot g'(x)}{g^2(x)}$$

(c) $p(x) = \sin(a \cdot g(x))$, where a is a constant

$$p'(x) = \cos(a \cdot g(x)) \cdot a \cdot g'(x)$$

(d) $k(x) = \sin^2(g(x))$

$$k'(x) = 2\sin(g(x)) \cdot \cos(g(x)) \cdot g'(x)$$

(e) $f(x) = \sin(g(x^2))$

$$f'(x) = \cos(g(x^2)) \cdot g'(x^2) \cdot 2x$$