Worksheet

Compute the derivatives of the following functions:

$f(x) = 3x^7 - 9x^4 + 13x^3 - 9x^2 + 3x - 7$
$f'(x) =$

$A = s^2$
$\frac{dA}{ds} =$

$f(x) = 5\sqrt{x}$
$f'(x) =$

$g(t) = -6.3t^{\pi}$
$g'(t) =$

$V = \frac{4\pi}{3}r^3$
$\frac{dV}{dr} =$

$A = 4\pi r^3$
$\frac{dA}{dr} =$

$V = \left(\sqrt{\frac{A}{6}}\right)^3$
$\frac{dV}{dA} =$

$u(s) = 3s - \frac{5}{s^2}$
$u'(s) =$

$y = 4\sqrt[5]{x}$
$\frac{dy}{dx} =$

$u(x) = \frac{3x - 12x^2}{x^3}$
$u'(x) =$

$f(x) = \frac{3}{\sqrt[7]{x}}$
$f'(x) =$

$T = \cos\theta$
$\frac{dT}{d\theta} =$

$A = \frac{1}{2}b\sin\theta$ (b a constant)
$\frac{dA}{d\theta} =$

$F(z) = \frac{4}{z^4} - 3\tan z$
$F'(z) =$

$T(\alpha) = 32\tan\alpha - 3\cos\alpha$
$T'(\alpha) =$

$H(s) = \sin(s) + 2\cos(s) + 3\tan(s)$
$H'(s) =$

$f(t) = 4^t$ $\qquad$ $I(n) = P_0(1+r)^n$ $\qquad$ P_0 and r constants

$f'(t) =$ $\qquad$ $I'(n) =$

$A = 2\pi 5^r$ $\qquad$ $y = \frac{3}{7^x} + \cos x - \sqrt{x}$

$\frac{dA}{dr} =$ $\qquad$ $y' =$

1. The surface area A and volume V of a sphere of radius r are $A = 4\pi r^2$, $V = \frac{4}{3}\pi r^3$.
   (a) Find a formula for V in terms of A.
   (b) Compute the derivative $\frac{dV}{dA}$.
   (c) The volume of a ball of radius 4in is increased by .5in^3. Estimate the increase in the area.
2. The side of a cube is measured to be 10in with an error of $\pm$.01in. Approximate the error in using $10^3 = 1000$in^3 as volume of the cube.