1) Differentiate the functions:

a) $y = e^{\sqrt{3x+5}}$ $f'(g(x)) \cdot g'(x)$ $e^{(3x+5)^{\frac{1}{2}}} \times \frac{3}{2}(3x+5)^{-\frac{1}{2}} = \boxed{\frac{3}{2}(3x+5)^{\frac{1}{2}} e^{(3x+5)^{\frac{1}{2}}}}$

$f = e^u$ $f' = e^u$
$u = t^{\frac{1}{2}}$ $u' = \frac{1}{2}t^{-\frac{1}{2}}$ $\frac{1}{2}(3x+5)^{-\frac{1}{2}} \times 3 = \frac{3}{2}(3x+5)^{-\frac{1}{2}} = u'$
$t = 3x+5$ $t' = 3$

b) $y = (3x+4)^8$

$f'(g(x)) \cdot g'(x)$ $8(3x+4)^7 \cdot 3 = \boxed{24(3x+4)^7}$
$f = u^8$ $f' = 8u^7$
$u = 3x+4$ $u' = 3$

c) $y = \sin(x^3 - 2x + e^2)$

$f = \sin(u)$ $f' = \cos(u)$ $\cos(x^3 - 2x + e^2) \cdot (3x^2 - 2 + e^2)$
$u = x^3 - 2x + e^2$ $u' = 3x^2 - 2 + e^2$ $\boxed{= (3x^2 - 2 + e^2)\cos(x^3 - 2x + e^2)}$

2) A spherical ballon is being inflated by a compressor that is pumping air at a rate of 4.3 ft³/min. At what rate is the radius of the ballon increasing when the radius is 1.5 ft. $V = \frac{4}{3}\pi r^3$
round to 2 decimal places

$\frac{d}{dt}(\frac{4}{3}\pi r^3) = 3r^2$

$3(1.5)^2 = 6.75$

$3(1.5)^2(\frac{4}{3}\pi) = \boxed{28.26 \; ft^3/min}$ $f = \frac{4}{3}x$ $f' = 0$
$g = r^3$ $g' = 3r^2$

$0(r^3) + 3r^2(\frac{4}{3}x)$