1. a) $N(8) = \dfrac{500\,(8)^2}{\sqrt{280+8^2}} + 10(8)$

$= \dfrac{32000}{\sqrt{344}} + 80$

$= 1805.32$

α

$= \boxed{1805}$

b) $N'(x) = \dfrac{\sqrt{280+x^2}\,(1000x) - (500x^2)(1/2)(280+x^2)^{-1/2}(2x)}{(\sqrt{280+x^2})} + 10$

$N'(6) = \dfrac{\sqrt{280+6^2}\,(6000) - (500)(36)(1/2)(280+6^2)^{-1/2}(12)}{280+6^2} \;+10$

$N'(6) = \cancel{} = \boxed{328.3}$

$= \cancel{}$

2. $y = (2v+1)[3-(2v+1)]$

$= (2v+1)[-2v+2]$

$= [2(x^3-5x)+1][-2(x^3-5x)+2]$

$= [2x^3-10x+1][-2x^3+10x+2]$

$\dfrac{dy}{dx} = (2x^3-10x+1)(-6x^2+10) + (-2x^3+10x+2)(6x^2-10)$

At $x=2$

$\dfrac{dy}{dx} = (16-20+1)(-24+10) + (-16+20+2)(24-10)$

$= \boxed{126}$

3. a) $g\left(\frac{1}{x}\right) = 5\sqrt{\frac{1}{x} - 1}$

$f\left(5\sqrt{\frac{1}{x} - 1}\right) = 3\left(5\sqrt{\frac{1}{x}} - 1\right)^2 - 8 = 3\left[25\left(\frac{1}{x} - 1\right)\right] - 8$

$= \frac{15}{x} - 75 - 8 = \boxed{\frac{75}{x} - 83}$

b) evaluate $\frac{15}{x} - 83$ at $x = 1/2$

$\frac{75}{1/2} - 83 = 150 - 83 = \boxed{67}$