Name:_____

Given $y = (1+2x)^3$ and $\frac{dx}{dt} = 1.5$ units/s, find $\frac{dy}{dt}$ when $y = 27$.

1) Equation

$$y = (1+2x)^3$$

2) Take $\frac{d}{dt}$

$$\frac{dy}{dt} = \frac{dy}{dx}\frac{dx}{dt}$$

$$= 3(1+2x)^2(2)\frac{dx}{dt}$$

3) Missing Values

$$y = 27 \rightarrow y = (1+2x)^3$$

$$27 = (1+2x)^3$$

$$3 = 1+2x$$

$$x = 1$$

4) Solve

$$\frac{dy}{dt} = 3(1+2x)^2(2)\frac{dx}{dt}$$

$$= 3(3)^2(2)(1.5)$$

$$= 81 \quad \frac{\text{units}}{\text{s}}$$