Good afternoon: we will assess after answering some q's

If you don't feel ready today, you will need to assess Monday at 8:15a OR Monday DS or it becomes a zero to retake with hw!!!

If $\frac{dy}{dx} = 2y^2$ and if $y = -1$ when $x = 1$, then when $x = 2$, $y =$

$(1, -1)$ $\quad (2, ?)$

$dx\left(\frac{dy}{dx} = 2y^2\right)dx$

$\frac{dy}{y^2} = \frac{2y^2 \cdot dx}{y^2}$

$\int y^{-2} dy = \int 2\ dx$

$\frac{y^{-1}}{-1} + C = 2x + C$

$-C \qquad -C$

$-\frac{1}{y} = 2x + C$

$\frac{1}{y} = -2x + C$

$y = \frac{1}{-2x + C}$ $\rightarrow (1, -1) \rightarrow \left(-1 = \frac{1}{-2 + C}\right) -2 + C$

$-2 + C$

$2 - C = 1$

$1 = C$

$y = \frac{1}{-2x + 1}$

$x = 2$

$y = \frac{1}{-2(2) + 1} = \left(\frac{1}{-3}\right)$

$\int \frac{1}{x}\,dx \qquad \int \frac{1}{x^4}\,dx$

$x^{-1} \qquad \int (x)^{-4}$

$\frac{x^0}{0}$!! $\qquad \searrow x^{-3}$

$\frac{x}{-3}$

$\frac{dy}{dx} = 3x^2$

$\int dy = \int 3x^2 \cdot dx$

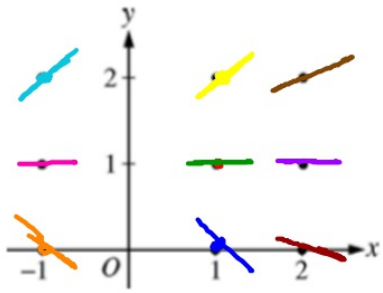
$y = x^3 + C$

5. Consider the differential equation $\frac{dy}{dx} = \frac{y-1}{x^2}$, where $x \neq 0$.

(a) On the axes provided, sketch a slope field for the given differential equation at the nine points indicated.

(Note: Use the axes provided in the exam booklet.)

(x,y)	dy/dx
$(1,1)$	0
$(2,1)$	$\frac{0}{4} = 0$
$(-1,2)$	$\frac{1}{1} = 1$
$(-1,1)$	$\frac{0}{1} = 0$
$(-1,0)$	$\frac{-1}{1} = -1$
$(1,2)$	$\frac{1}{1} = 1$
$(2,2)$	$\frac{1}{4}$
$(1,0)$	$\frac{-1}{1} = -1$
$(2,0)$	$\frac{-1}{4}$



(b) Find the particular solution $y = f(x)$ to the differential equation with the initial condition $f(2) = 0$.

(c) For the particular solution $y = f(x)$ described in part (b), find $\lim_{x \to \infty} f(x)$.