CALCULUS AB
REVIEW CIRCUIT – REVIEW FOR FINAL

NAME_____
PERIOD____DATE_____

Work problem 1. Find the problem with the answer to problem 1. Number this problem #2. Continue numbering the problems in this fashion.

Answer: $\frac{1}{3}\sin\left(x^3\right)+C$ # 1 – Evaluate: $\lim_{x\to 0}\frac{\sqrt{x+1}-2}{x-3}$	Answer: $-2\sqrt{3}$ #____ - At what value(s) of x does $f(x)=x^4-18x^2$ have a relative minimum?
Answer: $-\frac{2}{5}$ #____ - Find the derivative, $\frac{dy}{dx}$, of $x^2y-5y=12$ and evaluate it at the point $(1,-3)$.	Answer: $12x^2\sin^3\left(x^3\right)\cos\left(x^3\right)$ # ____ - Evaluate: $\lim_{x\to\infty}\frac{5x^3-3}{2x^3+1}$
Answer: (1, 5) #____ - A particle moves along a horizontal line so that its position is given by $s(t)=t^3-9t^2+15t+4$, where $t\geq 0$. When is the particle speeding up?	Answer: $\frac{1}{3}$ # ____ - Find y' given $y=x^2\cos x$.

Answer: $(1, 3)$ and $(5, \infty)$ #____ - Evaluate: $\int \sin^3(2x)\cos(2x)\,dx$	Answer: 2 #____ - Write an equation of the line tangent to the graph of $y = x^3 + 3x^2 + 2$ at its point of inflection.
Answer: $-x^2 \sin x + 2x\cos x$ #____ - Find $f'(x)$ given $f(x) = \dfrac{x^2}{\tan x}$.	Answer: -3 and 3 #____ - Evaluate: $\lim\limits_{h \to 0} \dfrac{\sin\left(\frac{\pi}{3} + h\right) - \sin\frac{\pi}{3}}{h}$
Answer: $\dfrac{5}{2}$ #____ - If $f(x) = \cos(4x)$, find $f'\left(\dfrac{\pi}{12}\right)$.	Answer: $\dfrac{1+\sqrt{2}}{4}$ #____ - Evaluate: $\int x^2 \cos\left(x^3\right)dx$

Answer: $-\frac{3}{2}$

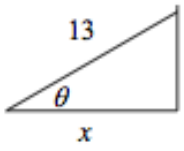
#____ - A spherical balloon is inflated with helium at the rate of $200\pi \frac{\text{ft}^3}{\text{min}}$. How fast is the balloon's radius increasing in ft/min at the instant the radius is 5 ft? $\left(\text{Volume of a sphere} = \frac{4}{3}\pi r^3\right)$

Answer: $\frac{2x\tan x - x^2\sec^2 x}{\tan^2 x}$

#____ - Find y' given $y = \sin^4\left(x^3\right)$.

Answer: $\frac{1}{2}$

#____ - If x is increasing at a rate of 2 units per second, find the rate of change of θ at the instant when $x = 12$ units.



Answer: $\frac{1}{8}\sin^4(2x) + C$

#____ - Evaluate: $\int_0^4 \frac{2x}{\sqrt{9+x^2}}\,dx$

Answer: 4

#____ - Evaluate: $\int_{-\pi/8}^{\pi/12} \cos(2x)\,dx$

Answer: $y - 4 = -3(x+1)$

#____ - A particle moves along a horizontal line so that its position is given by $s(t) = t^3 - 9t^2 + 15t + 4$, where $t \geq 0$. When is the particle moving to the left?