DIGITLE – BC CALCULUS
Puzzle 202 – Integration by Parts

Directions: The first 5 problems have single digit or letter answers. The 6th problem has a 3-digit answer (counting leading zeros if present). You have a choice: solve the easier single-character answer problems or tackle the more difficult 3-digit answer and the multiple choice.

Green : the digit is in the answer and is in the correct spot.
Yellow: the digit is in the answer but is not in the correct spot.
Grey : the digit is not in the answer.

Single Digit Answers:

1) The function f is differentiable and its derivative is continuous. The table below give the value of f for x = 1, 2, 3, and 4. Find the approximate value of $\int_1^4 xf'(x)\,dx$ using a trapezoidal rule with 4 trapezoids.

x	$f(x)$
1	2
2	6
3	–4
4	4

2) $\int x\cos\frac{x}{2}\,dx =$

A. $x^2\sin\frac{x}{2}+C$

B. $x\sin\frac{x}{2}-\cos\frac{x}{2}+C$

C. $\frac{x}{2}\sin\frac{x}{2}+\frac{1}{8}\cos\frac{x}{2}+C$

D. $2x\sin\frac{x}{2}+4\cos\frac{x}{2}+C$

3) $\int_0^1 6x^3e^{x^2}\,dx =$

4) $\int 2x^2e^{-2x}\,dx =$

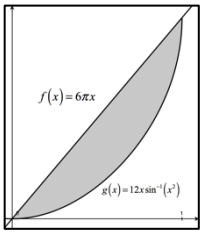
A. $-e^{-2x}\left(\frac{x^2-2x+1}{2}\right)+C$

B. $-e^{-2x}\left(x^2+2x+1\right)+C$

C. $-e^{-2x}\left(x^2+x+\frac{1}{2}\right)+C$

D. $-e^{-2x}\left(x^2+x\right)+C$

5) The shaded region in the figure to the right is the area between $f(x)=6\pi x$ and $g(x)=12x\arcsin\left(x^2\right)$. Find the area.



Three Digit Answer:

6) Find the area of the shaded region enclosed by $y=\ln x, x=1,$ and $y=6$ to the nearest Integer.