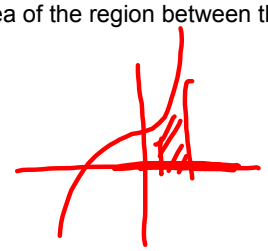
1. The area of the region between the graph of $4x^3 + 3$ and the x-axis from x=2 to x=3 is:

A. 36
B. 68
C. 20
D. 17
E. 9



$\int_2^3 4x^3+3\,dx$

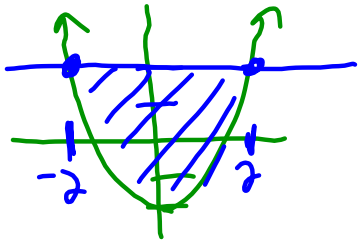
$x^4+3x\Big|_2^3 = (81+9)-(16+6)$

$90-22$

68

2. The area of the region enclosed by the graph of $y = x^2 - 2$ and the line y=2 is:

A. 14/3
B. 16/3
C. 28/3
D. 32/3
E. 8π



$x^2-2=2$

$x^2=4$

$x=\pm 2$

$2\int_0^2 2-(x^2-2)\,dx$

$2-x^2+2$

$2\int_0^2 4-x^2\,dx$

$2\left[4x-\frac{x^3}{3}\Big|_0^2\right]$

$2\left[\left(8-\frac{8}{3}\right)-(0)\right]$

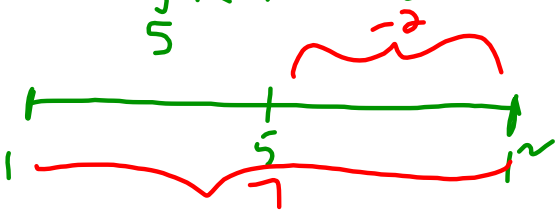
$\frac{24}{3}-\frac{8}{3}$

$2\left(\frac{16}{3}\right)=\frac{32}{3}$

3. If $\int_1^{12} f(x)dx = 7$ and $\int_{12}^{5} f(x)dx = 2$ then $\int_1^5 f(x)dx =$

A. -3
B. 0
C. 3
D. 9
E. 11

$-\int_5^{12} f(x)dx = -2$



$7--2=9$

4. If F and f are continuous functions such that F'(x)=f(x) for all x, then $\int_a^b f(x)dx$ is:

A. F'(a) - F'(b)
B. F'(b) - F'(a)
C. F(b) -F(a)
D. F(a) - F(b)
E. none of the above

$F(x)\Big|_a^b$

$F(b)-F(a)$

5. If $\int_{-4}^{4} (x^3+k)dx = 24$, then k =

A. -12
B. -4
C. 3
D. 4
E. 12

$\frac{4^4}{4^1}=4^3$

$\frac{(-4)^4}{4}=\frac{4^4}{4}=4^3$

$\frac{x^4}{4}+Kx\Big|_{-4}^{4}=24$

$(64+4K)-(64-4K)=24$

$64+4K-64+4K=24$

$8K=24$

$K=3$

6. $\int_1^3 x^{-4}\,dx =$

A. -1/3
B. 26/81
C. -26/81
D. 4/27
E. 15/16

$\frac{x^{-3}}{-3}\Big|_1^3 = \frac{1}{-3x^3}\Big|_1^3 = \left(-\frac{1}{81}\right)+\left(\frac{27+1}{3}\right)$

$\frac{-1}{81}+\frac{27}{81}$

$\frac{26}{81}$

7. $\int -\csc^2 x\,dx =$

A. tan x + C
B. cotx + C
C. cot² x + C
D. $\frac{\sec^3 x}{3}+C$
E. 2csc² x cot x + C

$\cot x + C$

8. $\int_4^5 \frac{3x}{x^2+1}\,dx =$

A. $\frac{1}{2}\ln\frac{5}{4}$
B. $\frac{3}{2}\ln 3$
C. $\ln 2$
D. $2\ln 2$
E. $\frac{3}{2}\ln\frac{26}{17}$

$u = x^2+1$ (26 / 17)

$\frac{3}{2}du = \frac{3}{2}x\,dx$

$\frac{3}{2}du = 3x\,dx$

$= \frac{3}{2}\int_{17}^{26}\frac{1}{u}\,du$

$= \frac{3}{2}\ln|u|\Big|_{17}^{26}$

$= \frac{3}{2}(\ln 26 - \ln 17)$

$\frac{3}{2}\ln\frac{26}{17}$

9. $\int_0^1 (x-7)^2\,dx =$

A. -7/3
B. -7/9
C. 113/3
D. 1
E. 127/3

$(x-7)(x-7)$

$\int_0^1 x^2-14x+49\,dx$

$\frac{x^3}{3}-7x^2+49x\Big|_0^1 = \left(\frac{1}{3}-7+49\right)-(0)$

$\frac{1}{3}+42 = \frac{1}{3}+\frac{126}{3}$

$\frac{127}{3}$

10. $\int(\cos(3x+5))\,dx =$

A. -3sin(3x+5)+C
B. -sin(3x+5)+C
C. -1/3sin(3x+5)+C
D. 1/3sin(3x+5)+C
E. sin(3x+5)+C

$\frac{\sin(3x+5)}{3}+C$