Magnet Analysis 1A
Rose

Name KEY

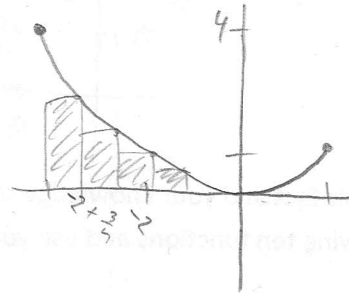
Practice with Integration

For #1 and #2, just express the limit as an integral. You do not need to compute the integral.

1. $\lim\limits_{n\to\infty} \sum_{i=1}^{n} \left(\left(\frac{3}{n}i - 2\right)^2 + 1\right) \cdot \frac{3}{n}$

$\Delta x = \frac{3}{n}$

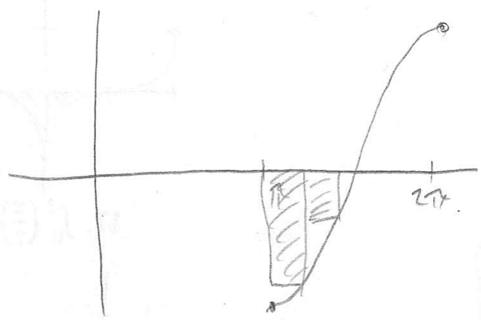
$\int_{-2}^{1} (x^2 + 1)\, dx$



2. $\lim\limits_{n\to\infty} \sum_{i=1}^{n} \cos\left(\frac{\pi}{n}i + \pi\right) \cdot \frac{\pi}{n}$

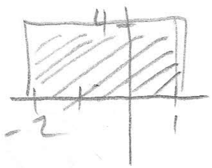
$\Delta x = \frac{\pi}{n}$

$\int_{\pi}^{2\pi} \cos x\, dx$

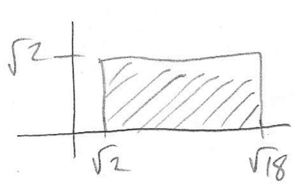


3. $\int_{-2}^{1} 4dx =$

$\boxed{12}$

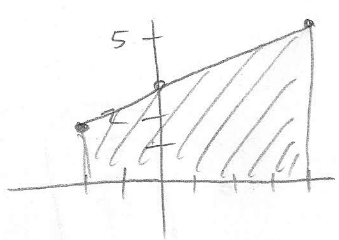


4. $\int_{\sqrt{2}}^{\sqrt{18}} \sqrt{2}dr =$



$(\sqrt{18} - \sqrt{2})\sqrt{2}$
$(3\sqrt{2} - \sqrt{2})\sqrt{2}$
$\boxed{4}$

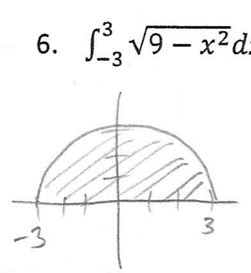
5. $\int_{-2}^{4} \left(\frac{x}{2} + 3\right) dx =$



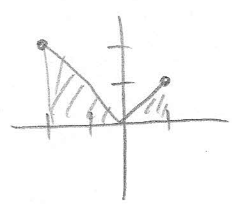
$\frac{5+2}{2} \cdot 6 = \boxed{21}$

6. $\int_{-3}^{3} \sqrt{9 - x^2}dx =$

$\boxed{\frac{9\pi}{2}}$



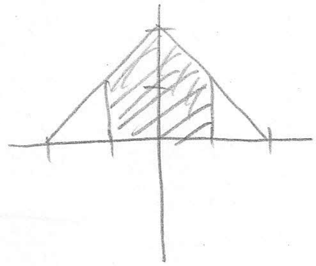
7. $\int_{-2}^{1} |x|\, dx =$



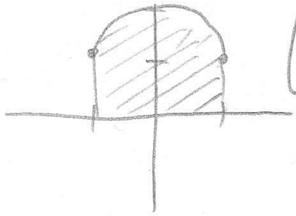
$\boxed{\frac{5}{2}}$

8. $\int_{-1}^{1} (2 - |x|)dx =$

$\boxed{3}$

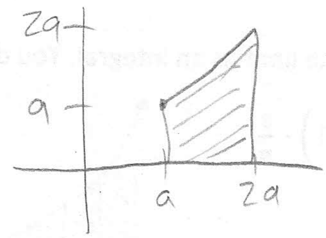


9. $\int_{-1}^{1}\left(1+\sqrt{1-x^2}\right)\,dx =$



$\boxed{2+\frac{\pi}{2}}$

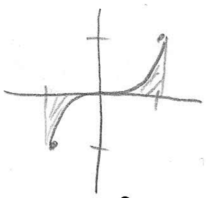
10. $\int_{a}^{2a} x\,dx =$ where $a > 0$



$\frac{3a}{2} \cdot a = \boxed{\frac{3}{2}a^2}$

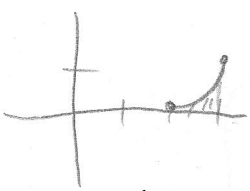
It can be shown that $\int_0^1 x^3 dx = \frac{1}{4}$. Using this fact and your knowledge of integration and function transformations, make graphs of the following ten functions and use your graph to determine the integral.

11. $\int_{-1}^{1} x^3 dx$



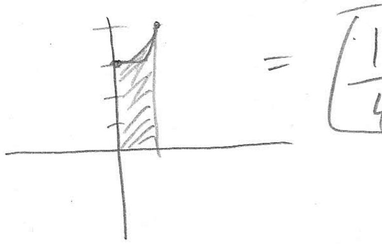
$\boxed{0}$

12. $\int_{2}^{3} (x-2)^3 dx$



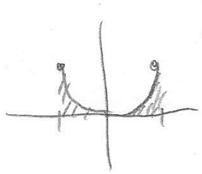
$= \boxed{\frac{1}{4}}$

13. $\int_{0}^{1} (x^3+3)dx$



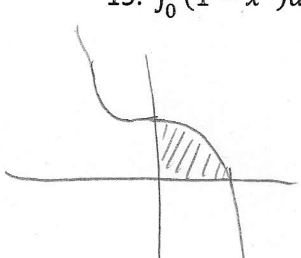
$= \boxed{\frac{13}{4}}$

14. $\int_{-1}^{1} |x|^3 dx$



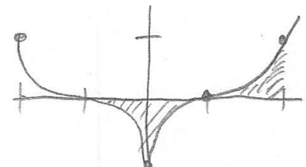
$= \boxed{\frac{1}{2}}$

15. $\int_{0}^{1} (1-x^3)dx$



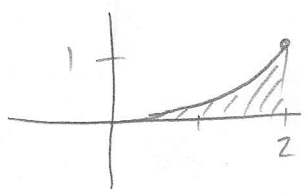
$\boxed{\frac{3}{4}}$

16. $\int_{-1}^{2} (|x|-1)^3 dx$



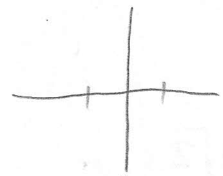
$= \boxed{-\frac{1}{4}}$

17. $\int_{0}^{2} \left(\frac{x}{2}\right)^3 dx$



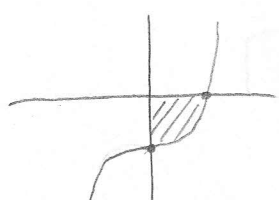
$= \boxed{\frac{1}{2}}$

18. $\int_{-8}^{8} x^3 dx$



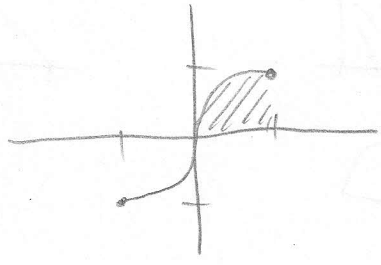
$\boxed{0}$

19. $\int_{0}^{1} (x^3-1)dx$



$= \boxed{-\frac{3}{4}}$

20. $\int_{0}^{1} \sqrt[3]{x}dx$



$= \boxed{\frac{3}{4}}$