Evaluate the following. SHOW ALL WORK! Check your answer with your calculator.

17. $\int_0^2 (x^2+3x+5)\,dx$

$\frac{x^3}{3}+\frac{3x^2}{2}+5x\Big]_0^2$

$\frac{8}{3}+\frac{12}{2}+10-0$

$\frac{8}{3}+6+10$

$\frac{8}{3}+\frac{48}{3}=\boxed{\frac{56}{3}}$

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

$\frac{x^3}{3}+x\Big]_{-1}^{1}$

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

$\frac{1}{3}+1+\frac{1}{3}+1$

$2+\frac{2}{3}=\boxed{\frac{8}{3}}$

19. $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} (2\cos x)\,dx$

$2\sin x\Big]_{-\frac{\pi}{4}}^{\frac{\pi}{4}}$

$2\sin\frac{\pi}{4}-2\sin\left(-\frac{\pi}{4}\right)$

$\frac{2\sqrt{2}}{2}-2\left(\frac{-\sqrt{2}}{2}\right)$

$\sqrt{2}+\sqrt{2}=\boxed{2\sqrt{2}}$

20. $\int_{-1}^{2} \left(\frac{1}{x^4}-\frac{1}{x^3}\right)dx$

Improper – OMIT

21. Find the average value of the function $y = x^{-2}$ over the interval $x = 1$ to $x = 4$.

$\frac{1}{3}\int_1^4 x^{-2}\,dx=\frac{1}{3}\cdot\frac{x^{-1}}{-1}\Big]_1^4=-\frac{1}{3}\cdot\frac{-1}{x}\Big]_1^4=\frac{1}{3}\cdot\frac{-1}{4}-\frac{1}{3}\cdot-1$

$-\frac{1}{12}+\frac{1}{3}$

$-\frac{1}{12}+\frac{4}{12}$

$\frac{3}{12}$

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

22. Given the function $f(x) = \sin^2 x$.

a) Set up an integral to find the area under f(x) from $x = 0$ to $x = \pi$.

$\int_0^{\pi} \sin^2 x\,dx$

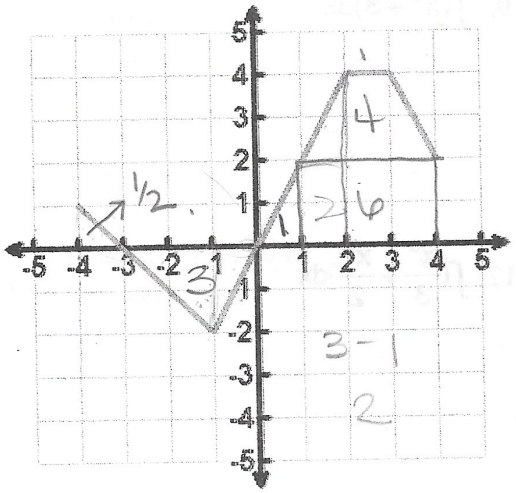
b) Use your calculator to find the area under f(x) from $x = 0$ to $x = \pi$.

1.571

c) Find the average value of f(x) from $x = 0$ to $x = \pi$.

$\frac{1}{\pi-0}\int_0^{\pi} \sin^2 x\,dx=\frac{1}{\pi}(1.571)=.5$

23. Use the graph of f(x) to the right to answer the following.



a) $\int_{-3}^{0} f(x)\,dx = -3$

b) $\int_0^4 f(x)\,dx = 11$

c) $\int_{-4}^{4} f(x)\,dx = 8.5$

d) $\int_{-4}^{4} |f(x)|\,dx = 14.5$

e) $\int_{-4}^{4} (3f(x)+5)\,dx$

$3\int_{-4}^{4} f(x) + \int_{-4}^{4} 5$

25.5 + 40

$\boxed{65.5}$

f) $\int_2^{-1} f(x)\,dx = -3$

$= -\int_{-1}^{2}$

g) $\int_{-4}^{-4} f(x)\,dx$

0

h) $\left|\int_{-3}^{1} f(x)\,dx\right| = 2$