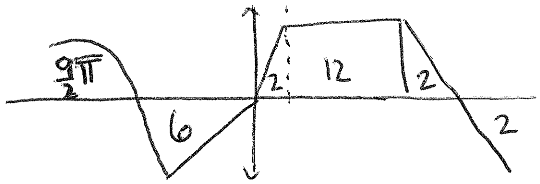


The Definite Integral as Area Homework

1. $\int_0^1 f(x)\,dx = \boxed{2}$

2. $\int_2^4 f(x)\,dx = 2(4) = \boxed{8}$

3. $\int_1^4 f(x)\,dx = \boxed{12}$

4. $\int_5^5 f(x)\,dx = \boxed{0}$

5. $\int_4^5 f(x)\,dx = \boxed{2}$

6. $\int_5^6 f(x)\,dx = \boxed{-2}$

7. $\int_4^6 f(x)\,dx = \boxed{0}$

8. $\int_0^6 f(x)\,dx = \boxed{14}$

9. $\int_3^2 f(x)\,dx = -\int_2^3 f(x)\,dx = \boxed{-4}$

10. $\int_5^0 = -\int_0^5 = -\boxed{16} = -16$

11. $\int_6^0 = -\int_0^6 = \boxed{-14}$

12. $\int_{-3}^0 f(x)\,dx = \boxed{-6}$

13. $\int_0^{-3} f(x)\,dx = -\int_{-3}^0 = 6$

14. $\int_{-3}^2 f(x)\,dx = \overset{-6+2+4}{0}$

15. $\int_4^{-3} = -\int_{-3}^4 = -(-6+2+12) = -8$

16. $\int_{-6}^{-3} f(x)\,dx = \boxed{\frac{9\pi}{4}}$

17. $\int_{-3}^{-6} f(x)\,dx = \boxed{-\frac{9\pi}{4}}$

18. $\int_{-6}^0 f(x)\,dx = \boxed{\frac{9\pi}{4} - 6}$

19. $\int_{-6}^6 f(x)\,dx = \frac{9\pi}{4} - 6 + 14 = \boxed{\frac{9\pi}{4} + 8}$

20. $\int_6^{-6} f(x)\,dx = \boxed{-\frac{9\pi}{4} - 8}$

21. $\left|\int_{-2}^1 f(x)\,dx\right| = \left|\frac{1}{2}(2)(-4) + \frac{1}{2}(1)(4)\right| = |-4+2| = |-2| = \boxed{2}$

22. $\int_{-2}^1 |f(x)|\,dx = 4 + 2 = 6$

23. 6 ← same as #22

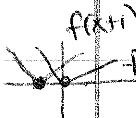
24. $\int_{-6}^6 |f(x)|\,dx = \frac{9\pi}{4} + 6 + 16 + 2 = \boxed{\frac{9}{4}\pi + 24}$

25. $\int_1^4 f(x)\,dx = \int_1^2 f + \int_2^4 f = -1 + 7 = \boxed{6}$

26. $3\int_0^4 f(x)\,dx = 3\left[\int_0^2 f(x)\,dx + \int_2^4 f(x)\,dx\right] = 3(2+7) = \boxed{27}$

27. $\int_0^1 f(x)dx = \int_0^2 f(x)dx + \int_2^1 f(x)dx = \int_0^2 f(x)dx - \int_1^2 f(x)dx = 2 - -1 = \boxed{3}$

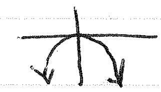
28. $\int_0^1 f(x+1)dx = \int_1^2 f(x)dx = \boxed{-1}$

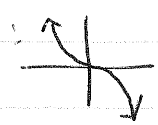


f(x) ← need to shift everything 1 right to "cancel out" x+1

29. $\int_0^2 (f(x)+3)dx = \int_0^2 f(x)dx + \int_0^2 3dx = 2 + 3(2-0) = 2+6 = 8$

30. $\int_2^4 f(x-2)dx = \int_0^2 f(x)dx = \boxed{2}$

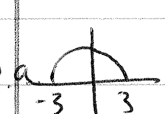
31. even (same from $-3 \to 0$ as $0 \to 3$: $\int_{-3}^{3} f(x)dx = -2$ ex 

odd (opposite from $-3 \to 0$ as $0 \to 3$: $\int_{-3}^{3} f(x)dx = 0$ ex: 

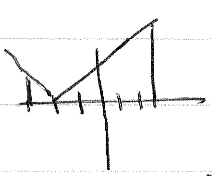
32. $3(2-0) = \boxed{6}$ $3(4-1) = \boxed{9}$ $3(1-5) = \boxed{-12}$ $|3(-9-9)| = |-54| = \boxed{54}$

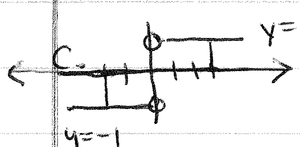
$a(2) = \boxed{2a}$ $a(3) = \boxed{3a}$ $a(1-5) = \boxed{-4a}$ $|a(-18)| = \boxed{|18a|}$

$-\sqrt{a}(2) = \boxed{-2\sqrt{a}}$ $-\sqrt{a}(3) = \boxed{-3\sqrt{a}}$ $-\sqrt{a}(1-5) = \boxed{4\sqrt{a}}$ $|-\sqrt{a}(-18)| = \boxed{18\sqrt{a}}$

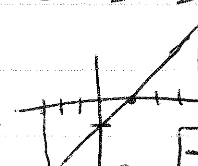
33. a. 

$A = \frac{\pi r^2}{2} = \boxed{\frac{9\pi}{2}}$

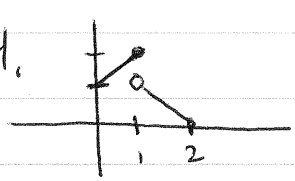
b.  $= \frac{1}{2}(1)(1) + \frac{1}{2}(5)(5) = \frac{1}{2} + \frac{25}{2} = \frac{26}{2} = \boxed{13}$

c. 

$3-2 = \boxed{1}$

d. $\frac{(\cancel{x+1})(x-1)}{(\cancel{x+1})} = \int_{-3}^{4} (x-1)dx$ 

$= -\frac{1}{2}(4)(4) + \frac{1}{2}(3)(3) = -8 + \frac{9}{2} = \boxed{\frac{-7}{2}}$

34. 

$\int_0^2 f(x)dx = \int_0^1 (1+x)dx + \int_1^2 (2-x)dx = \frac{1}{2}(1+2)(1) + \frac{1}{2}(1)(1) =$

$\frac{3}{2} + \frac{1}{2} = \frac{4}{2} = \boxed{2}$