HW #4

1. D $\int x^{-2}dx = \frac{x^{-1}}{-1} + C = \frac{-1}{x} + C$

2. B $\int \sin(2x) + \cos(2x)\,dx$

$\int \sin(2x)\,dx + \int \cos(2x)\,dx$

$u = 2x \quad du = 2dx \qquad u = 2x \quad du = 2dx$

$\frac{1}{2}\int 2\sin(2x) + \frac{1}{2}\int 2\cos(2x)\,dx$

$\boxed{-\frac{1}{2}\cos(2x) + \frac{1}{2}\sin(2x) + C}$

3. D $g(-3) = \int_{-2}^{-3} f(t)\,dt = -\int_{-3}^{-2} f(t)\,dt < 0$

$g(-2) = \int_{-2}^{-2} f(t)\,dt = 0$

$g(0) = \int_{-2}^{0} f(t)\,dt = 3$

$g(1) = \int_{-2}^{1} f(t)\,dt = 4$

$g(2) = \int_{-2}^{2} f(t)\,dt = 3$

4. C

5. C $\int \frac{x}{x^2-4}\,dx \quad u = x^2-4 \quad du = 2x\,dx$

$\frac{1}{2}\int \frac{2x}{x^2-4}\,dx$

$\frac{1}{2}\ln(x^2-4) + C$

6. C $g(x) = \int_0^x f(x)\,dt$ g will have a pt. of inflection when f' changes from pos. to neg. this is when f changes from increasing to decreasing

$g'(x) = f(x)$

$g''(x) = f'(x)$

7. B $\int_{-5}^{5} f(x)\,dx = \int_{-5}^{2} f(x)\,dx + \int_{2}^{5} f(x)\,dx = \int_{-5}^{2} f(x)\,dx - \int_{5}^{2} f(x)\,dx$

$-17 - (-4) = -13$

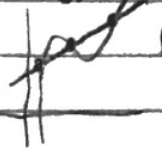
8. E $\int_2^4 f(x)\,dx = G(4) - G(2)$

$G(4) = G(2) + \int_2^4 f(x)\,dx$

$-7 + \int_2^4 f(x)\,dx$

9. B $y = x^3 - 8x^2 + 18x - 5$ ← should be −5, not −15

$y = x + 5$



intersects at $x = 1, 2\ 5$

$\int_1^2 (x^3 - 8x^2 + 18x - 5) - (x+5)\,dx + \int_2^5 (x+5) - (x^3 - 8x^2 + 18x - 5)\,dx$

10. C Avg Value $= \frac{1}{b-a}\int_a^b f(x)\,dx$

$$\frac{1}{3-(-1)}\int_{-1}^{3} \frac{\cos x}{x^2+x+2}\,dx$$

11. 3 $7 \int_0^4 f(x)\,dx$