

Math 150 Quiz Ch 4
(3 points each)

3 each / 33

Name _____ Key _____

Integrate:

1. $\int \frac{3x^5 - 2x + 7}{x^3} dx$

$$\int (3x^2 - 2x^{-2} + 7x^{-3}) dx$$

$$x^3 + 2x^{-1} - \frac{7}{2}x^{-2}$$

$$x^3 + \frac{2}{x} - \frac{7}{2x^2} + C$$

2. $\int (\theta^3 + 7 + \csc^2 \theta) d\theta$

$$\frac{1}{4}\theta^4 + 7\theta - \cot \theta + C$$

3. $\int \sec y (\tan y - \sec y) dy$

$$\int (\sec y \tan y - \sec^2 y) dy$$

$$\sec y - \tan y + C$$

4. $\int_{-6}^6 \sqrt{36 - x^2} dx$

Known shape

top $\frac{1}{2}$ \odot



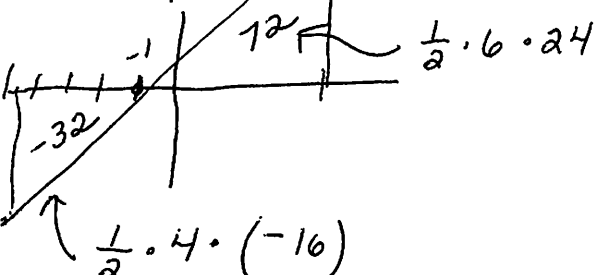
$$= \text{Area} = \frac{1}{2} \pi 6^2$$

$$18\pi$$

Don't know Fund Thm yet

5. $\int_{-5}^5 (4x + \frac{4}{x}) dx$

Known shape



$$-32 + 72 = 40$$

6. $\int_5^{-5} (4x + 4) dx$

$$-40$$

opp. value

7. $\int_{\pi}^{\pi} (\sin^2 \theta \cot^3 \theta \cdot 5\theta^2) d\theta$

$$0$$

8. Evaluate (w/o calculator) showing the formula

$$\sum_{k=7}^{1012} (2k-5)$$

9 + 11 + 13 + ... + 2019

Arithmetic

$$S = \frac{(9+2019)(1012-7+1)}{2}$$

$$S = \frac{(2028)(1006)}{2}$$

$$S = (1014)(1006) \text{ calc OK here}$$

$$S = 1,020,084$$

6 pts

9, 10. $f(x) = x^2 + 3$ on $[0, 8]$. Use 4 rectangles to \approx a lower sum and an upper sum for the area under the curve. Show calculations and a picture. How could you make your \approx 's better?

width $\frac{8-0}{4} = 2$

Lower: $2(f(0) + f(2) + f(4) + f(6))$
(left)

$$2(3 + 7 + 19 + 39) = 136$$

Upper: $2(f(2) + f(4) + f(6) + f(8))$
(right)

$$2(7 + 19 + 39 + 67) = 264$$

better - more rectangles
or average ...

11. $f''(x) = \frac{2}{x^3}$, $f'(1) = 4$, $f(1) = 3$ Find $f(x)$.

$$f' = \int 2x^{-3} dx$$

$$-1x^{-2}$$

$$f'(x) = -1x^{-2} + 5$$

$$f(x) = \int (-1x^{-2} + 5) dx$$

$$f' = \frac{-1}{x^2} + c$$

$$f'(1) = 4$$

$$f(x) = x^{-1} + 5x + c,$$

$$f(1) = 3 \quad 3 = 1 + 5 + c,$$

$$c = -3$$

$$4 = -1 + c$$

$$c = 5$$

$$f(x) = \frac{1}{x} + 5x - 3$$