Integrals Worksheet

AP and College Calculus

Name _____ Date _____

Warm-up

1. Find $\int x^5\,dx$. Leave out $+C$.

2. $\int_0^3 3\,dx$

3. In $\int 2x(x^2+9)^5\,dx$, which u works?
   (A) x (B) x^2+9 (C) $(x^2+9)^5$ (D) $2x$

4. Find $\int 4\,dx$. Leave out $+C$.

5. $\int_0^8 2x\,dx$

Practice

6. Find $\int(2x+2)\,dx$. Leave out $+C$.

7. $\int_5^{10} 2x\,dx$

8. Find $\int 2x(x^2+4)^5\,dx$. Leave out $+C$.

9. Find $\int \dfrac{7}{x}\,dx$ for $x>0$. Leave out $+C$.

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10. $\int_0^4 3x^2\,dx$

11. Find $\int e^{5x}\,dx$. Leave out $+C$.

12. Find $\int 9x^2\,dx$. Leave out $+C$.

13. $\int_{-1}^1 x\,dx$

Challenge

14. A car's velocity is $v = 4t$, and it starts at position 0. Where is it at $t = 6$?

15. $\int_0^k x\,dx = 50$ with $k > 0$. Find k.

16. Find $\int \sin x \cos x\,dx$ with $u = \sin x$. Leave out $+C$.

17. Find $\int \sqrt{x}\,dx$. Leave out $+C$.

18. A pipe's flow is $r(t) = 2t$ liters per minute. How much water flows from $t = 0$ to $t = 9$?

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Integrals Worksheet: Answer Key

AP and College Calculus

1. $\dfrac{x^6}{6} + C$

   Add 1, then divide.

2. 9

   A rectangle's area.

3. (B) $x^2 + 9$

   Choose the inside. Its derivative, $2x$, is there.

4. $4x + C$

   A constant's antiderivative.

5. 64

   x^2 from 0 to 8.

6. $x^2 + 2x + C$

   Term by term.

7. 75

   $10^2 - 5^2$.

8. $\dfrac{(x^2+4)^6}{6} + C$

   $\int u^5\, du$.

9. $7 \ln x + C$

   The power rule fails here.

10. 64

    x^3 from 0 to 4.

11. $\dfrac{e^{5x}}{5} + C$

    Divide by 5.

12. $3x^3 + C$

    $\dfrac{9}{3} = 3$.

13. 0

    Areas above and below cancel.

14. 72

    $s = 2t^2$.

15. 10

    $\dfrac{k^2}{2} = 50$.

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16. $\dfrac{\sin^2 x}{2} + C$

    $\int u\,du$.

17. $\dfrac{2}{3}x^{3/2} + C$

    $\dfrac{x^{3/2}}{3/2}$.

18. 81

    t^2 from 0 to 9.

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