MA 126-103 — Summer 2017 — Dr. Clontz — Readiness Quizzes

1. The Substitution Rule is the opposite of which derivative rule? (2017-06-05, 2.1)
   - A. Chain Rule
   - B. Product Rule
   - C. Quotient Rule
   - D. Power Rule

2. What is incorrect about the following attempt at using the Substitution Rule?

$$\int_0^1 (3-2x)^5\,dx = \int_0^1 u^5 \left(-\frac{1}{2}du\right)$$

   (2017-06-05, 2.1)
   - A. dx should have been replaced with $+\frac{1}{2}\,du$.
   - B. The bounds are incorrect.
   - C. u shouldn't be raised to the 5th power.
   - D. dx should have been replaced with $-2\,du$.

3. Which of these formulas would be most useful in finding $\int \sin^4\theta\cos^2\theta\,d\theta$? (2017-06-05, 2.2)
   - A. $\sin^2(\theta) = \frac{1}{2} + \frac{1}{2}\sin(2\theta)$
   - B. $\cos^2(\theta) = 1 - \sin^2(\theta)$
   - C. $\sin^2(\theta) = 1 - \cos^2(\theta)$
   - D. $\cos^2(\theta) = \frac{1}{2} + \frac{1}{2}\cos(2\theta)$

4. Which of these formulas would be most useful in finding $\int \sec^4(\theta)\,d\theta$? (2017-06-05, 2.2)
   - A. $\sec^2(\theta) = 1 - \tan^2(\theta)$
   - B. $\tan^2(\theta) = 1 + \sec^2(\theta)$
   - C. $\sec^2(\theta) = 1 + \tan^2(\theta)$
   - D. $\tan^2(\theta) = 1 - \sec^2(\theta)$

5. Which of these substitutions would be most useful in finding $\int \frac{1}{25x^2+9}\,dx$? (2017-06-05, 2.3)

   A. Let $25x^2 + 9 = 25\sec^2\theta + 25$.

   B. Let $25x^2 + 9 = 9\tan^2\theta + 9$.

   C. Let $25x^2 + 9 = 9\sin^2\theta + 9$.

   D. Let $25x^2 + 9 = 25\cos^2\theta + 25$.

6. Which of these substitutions would be most useful in finding $\int \frac{1}{x\sqrt{4-16x^2}}\,dx$? (2017-06-05, 2.3)

   A. Let $4 - 16x^2 = 16 - 16\cos^2\theta$.

   B. Let $4 - 16x^2 = 4 - 4\sin^2\theta$.

   C. Let $4 - 16x^2 = 4 + 4\tan^2\theta$.

   D. Let $4 - 16x^2 = 16 + 16\sec^2\theta$.

7. Which of these substitutions would be most useful in finding $\int_3^5 \frac{1}{\sqrt{x^2-9}}\,dx$? (2017-06-05, 2.3)

   A. Let $x^2 - 9 = 9\sin^2\theta + 9$.

   B. Let $x^2 - 9 = \tan^2\theta - 1$.

   C. Let $x^2 - 9 = 9\sec^2\theta - 9$.

   D. Let $x^2 - 9 = \cos^2\theta + 1$.

8. Which of these sums is the first step in expanding $\frac{4x^2+16x+17}{(x+2)^2(x^2+1)^2}$ into partial fractions? (2017-06-12, 2.4)

   A. $\frac{A}{x+2} + \frac{Bx}{x+2} + \frac{C}{(x^2+1)^2}$

   B. $\frac{A}{x+2} + \frac{B}{(x+2)^2} + \frac{Cx+D}{x^2+1} + \frac{Ex+F}{(x^2+1)^2}$

   C. $\frac{A}{x+2} + \frac{Bx}{(x+2)^2} + \frac{Cx+D}{(x^2+1)^2}$

   D. $\frac{Ax+B}{(x+2)^2} + \frac{Cx+D}{(x^2+1)^2}$

9. Why must $\frac{3+5x^5}{(x+1)(x+3)^2}$ first be simplifed using long polynomial division before using the method of partial fractions? (2017-06-12, 2.4)

   A. It is a rational function of x.

   B. The degree of its numerator is odd, while the degree of its demoninator is even.

   C. It is an irrational function of x.

   D. The degree of its numerator is greater than or equal to the degree of its denominator.

10. Integration by Parts is the opposite of which derivative rule? (2017-06-12, 2.5)

   A. Chain Rule

   B. Quotient Rule

   C. Power Rule

   D. Product Rule

11. Which choice is most appropriate for using integration by parts to find $\int 3x\cos(x)\,dx$? (2017-06-12, 2.5)

   A. $u = 3$, $dv = x\cos(x)\,dx$

   B. $u = \cos(x)$, $dv = 3x\,dx$

   C. $u = 3x$, $dv = \cos(x)\,dx$

   D. $u = x\cos(x)$, $dv = 3\,dx$

12. Which of these techniques is most appropriate as the first step to find $\int z^2\sin(z^3)\,dz$? (2017-06-12, 2.6)

   A. Integration by Substitution

   B. Integration by Parts

   C. Method of Partial Fractions

   D. Trigonometric Identities

13. Which of these techniques is most appropriate as the first step to find $\int \frac{t^2+3t+1}{t^3+t}\,dt$? (2017-06-12, 2.6)

    A. Method of Partial Fractions

    B. Trigonometric Substitution

    C. Trigonometric Identities

    D. Integration by Substitution

14. Which of these integrals represents the area bounded by the curves $x = y^2$ and $x = 4$? (2017-06-12, 3.1)

    A. $\int_0^2 2y\,dy$

    B. $\int_{-2}^2 ((4) - (y^2))\,dy$

    C. $\int_0^4 ((\sqrt{y}) - (2))\,dx$

    D. $\int_{-2}^0 ((4y^2) - (2\sqrt{y}))\,dx$

15. Which of these integrals also represents the area bounded by the curves $x = y^2$ and $x = 4$? (2017-06-12, 3.1)

    A. $\int_0^2 ((x^2) - (4))\,dx$

    B. $\int_2^4 ((x^2) - (-x^2))\,dx$

    C. $\int_0^4 ((\sqrt{x}) - (-\sqrt{x}))\,dx$

    D. $\int_2^0 ((x^2) - (\sqrt{x}))\,dx$

16. Let $A(x)$ be the area of the cross-section at x for a solid defined between $a \le x \le b$. Which of these integrals gives its volume? (2017-06-19, 3.2)

    A. $\int_b^a (A(x) - a - b)\,dx$

    B. $\int_a^b [A(x)]^2\,dx$

    C. $\int_a^b A(x)\,dx$

    D. $\int_b^a \frac{1}{2}A(x)\,dx$

17. Suppose the cross-sections of a solid defined between $0 \le x \le 5$ are triangles with base and height both equal to x. Find $A(x)$. (2017-06-19, 3.2)

    A. $\frac{1}{3}bh$

    B. $(x^2 + 5x)$

    C. πx^2

    D. $\frac{1}{2}x^2$

18. Suppose the cross-sections of a solid are circular washers with outside radius $R(x)$ and inside radius $r(x)$. Which of these gives the area of such a cross-section? (2017-06-19, 3.3)

    A. $A(x) = 2\pi R(x)r(x)$

    B. $A(x) = \pi R(x)r(x)$

    C. $A(x) = 2\pi([R(x)]^2 - [r(x)]^2)$

    D. $A(x) = \pi([R(x)]^2 - [r(x)]^2)$

19. Find the area of a cylindrical shell with radius 4 and height 3. (2017-06-19, 3.4)

    A. 12π

    B. 30π

    C. 6π

    D. 24π

20. In the work integral $\int_a^b F(x)\,dx$, the function $F(x)$ represents... (2017-06-19, 3.5)

    A. Friction

    B. Force

    C. Speed

    D. Mass

21. To calculuate the work done in lifting an unladen swallow, which of the following properties would be most useful to know? (2017-06-19, 3.5)

    A. Airspeed velocity

    B. Weight

    C. Volume

    D. Color

22. Suppose a tank of liquid has its base at height c and its top at height d. If dW describes the work required to pump a infintesimal cross-section of liquid at height y, which integral gives the work required to completely pump this tank? (2017-06-19, 3.5)

    A. $\int_{y=c}^{y=d} dW$

    B. $\int_{y=c}^{y=d} w^2\,dW$

    C. $\int_{y=c}^{y=d} -\frac{1}{2}y^2\,dW$

    D. $\int_{y=c}^{y=d} y\,dW$