

- Which of these is a definition of a^x for all positive numbers a and all real numbers x ?
(2017-01-11, 1.1, practice)
 - A. $\ln(x \cdot e^a)$
 - B. a multiplied by itself x times
 - C. the unique function for which $\frac{d}{dx}[a^x] = a^x$
 - D. $\exp(x \ln a)$
- Which of these statements is false? (2017-01-11, 1.1, practice)
 - A. $\ln(abc) = \ln(a) + \ln(b) + \ln(c)$
 - B. $\frac{d}{dx}[\ln x] = \frac{1}{|x|}$ for all nonzero numbers x
 - C. $y = \exp(x)$ if and only if $x = \ln(y)$
 - D. $e^x = \exp(x)$

1. The Substitution Rule is the opposite of which derivative rule? (2017-01-19, 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?

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

(2017-01-19, 2.1)

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

3. Which of these formulas would be most useful in finding $\int \sin^4 \theta \cos^2 \theta \, d\theta$? (2017-01-25, 2.2)

A. $\sin^2(\theta) = \frac{1}{2} + \frac{1}{2} \sin(2\theta)$

B. $\cos^2(\theta) = \frac{1}{2} + \frac{1}{2} \cos(2\theta)$

C. $\cos^2(\theta) = 1 - \sin^2(\theta)$

D. $\sin^2(\theta) = 1 - \cos^2(\theta)$

4. Which of these formulas would be most useful in finding $\int \sec^4(\theta) \, d\theta$? (2017-01-25, 2.2)

A. $\sec^2(\theta) = 1 + \tan^2(\theta)$

B. $\sec^2(\theta) = 1 - \tan^2(\theta)$

C. $\tan^2(\theta) = 1 + \sec^2(\theta)$

D. $\tan^2(\theta) = 1 - \sec^2(\theta)$

5. Which of these substitutions would be most useful in finding $\int \frac{1}{25x^2+9} dx$? (2017-01-27, 2.3)
- A. Let $25x^2 + 9 = 25 \sec^2 \theta + 25$.
 - B. Let $25x^2 + 9 = 9 \sin^2 \theta + 9$.
 - C. Let $25x^2 + 9 = 9 \tan^2 \theta + 9$.
 - D. Let $25x^2 + 9 = 25 \cos^2 \theta + 25$.
6. Which of these substitutions would be most useful in finding $\int \frac{1}{x\sqrt{4-16x^2}} dx$? (2017-01-27, 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 $\int_3^5 \frac{1}{\sqrt{x^2-9}} dx$? (2017-01-27, 2.3)
- A. Let $x^2 - 9 = 9 \sin^2 \theta + 9$.
 - B. Let $x^2 - 9 = \tan^2 \theta - 1$.
 - C. Let $x^2 - 9 = \cos^2 \theta + 1$.
 - D. Let $x^2 - 9 = 9 \sec^2 \theta - 9$.

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?
(2017-02-01, 2.4)
- A. $\frac{A}{x+2} + \frac{Bx}{x+2} + \frac{C}{(x^2+1)^2}$
- B. $\frac{A}{x+2} + \frac{Bx}{(x+2)^2} + \frac{Cx+D}{(x^2+1)^2}$
- C. $\frac{A}{x+2} + \frac{B}{(x+2)^2} + \frac{Cx+D}{x^2+1} + \frac{Ex+F}{(x^2+1)^2}$
- 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 simplified using long polynomial division before using the method of partial fractions? (2017-02-01, 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. The degree of its numerator is greater than or equal to the degree of its denominator.
- D. It is an irrational function of x .

10. Which of these techniques is most appropriate as the first step to find $\int z^2 \sin(z^3) dz$?
(2017-02-09, 2.6)
- A. Integration by Substitution
 - B. Integration by Parts
 - C. Method of Partial Fractions
 - D. Trigonometric Identities
11. Which of these techniques is most appropriate as the first step to find $\int \frac{t^2+3t+1}{t^3+t} dt$?
(2017-02-09, 2.6)
- A. Method of Partial Fractions
 - B. Trigonometric Substitution
 - C. Trigonometric Identities
 - D. Integration by Substitution

12. Which of these integrals represents the area bounded by the curves $x = y^2$ and $x = 4$?
(2017-02-13, 3.1)

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

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

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

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

Answer the following questions about the solid of revolution obtained by rotating the triangle with vertices $(1, 1)$, $(2, 2)$, $(2, 3)$ around the line $y = -1$.

13. Which of these curves should be used to find the outer radius $R(x)$? (2017-02-16, 3.3)

- A. $y = \frac{1}{2}x$
- B. $y = 2x - 1$
- C. $y = -2x + 2$
- D. $y = -\frac{1}{2}x + 1$

14. What formula should be used for $R(x)$? (2017-02-16, 3.3)

- A. $R(x) = 2x$
- B. $R(x) = 1 - 2x$
- C. $R(x) = 2 - \frac{1}{2}x$
- D. $R(x) = \frac{1}{2}x - 1$

15. What are the correct bounds for the washer method integral? (2017-02-16, 3.3)

- A. $\pi \int_{-1}^3 ([R(x)]^2 - [r(x)]^2) dx$
- B. $\pi \int_2^3 ([R(x)]^2 - [r(x)]^2) dx$
- C. $\pi \int_1^2 ([R(x)]^2 - [r(x)]^2) dx$
- D. $\pi \int_0^2 ([R(x)]^2 - [r(x)]^2) dx$

16. In the work integral $\int_a^b F(x) dx$, the function $F(x)$ represents... (2017-02-24, 3.5)
- A. Friction
 - B. Speed
 - C. Force
 - D. Mass
17. When computing the work done in pumping water out of a container, the video suggests using which formula? (2017-02-24, 3.5)
- A. $\int_{y=c}^{y=d} dW$
 - B. $\int_a^b F(x) dx$
 - C. $\int_a^b \frac{W(x)}{x} dx$
 - D. $\int_{y=c}^{y=d} yF(y) dy$

18. The equations $x = 3 + 4 \cos(t)$, $y = -2 + 4 \sin(t)$ for $0 \leq t \leq 2\pi$ parametrize which kind of curve? (2017-03-01, 4.1)
- A. A parabola
 - B. A line segment
 - C. A circle oriented counter-clockwise
 - D. A circle oriented clockwise
19. The equations $x = 3 + 4t$, $y = -2 + 4t$ for $0 \leq t \leq 2\pi$ parametrize which kind of curve? (2017-03-01, 4.1)
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