

AP Calculus
Unit 6 Review

1. Find the general solution to the differential equation: $2x(y+1) - yy' = 0$.
- A. $2x^2 - y^2 \ln|y+1| = C$ B. $x^2 = y + \frac{1}{(y+1)^2} + C$
C. $\ln|y+1| + x^2 - y = C$ D. $x^2(y+1)^2 - y^2 = C$
-
2. In 1970 the population of a town was 21,000 and in 1980 it was 20,000. Assuming the population decreases continuously at a rate proportional to the existing population, estimate the population in the year 2000.
- A. 17,619 B. 18,000 C. 19,048 D. 18,141
-
3. A certain type of bacteria increases continuously at a rate proportional to the number present. If there are 500 present at a given time and 1000 present 2 hours later, how many will there be 5 hours from the initial time given.
- A. 1750 B. 2828 C. 3000 D. 2143
-
4. Find the particular solution to the differential equation $y' = 3y$ given the initial condition $y(1) = 20$.
- A. $20e^{3x-3}$ B. $20e^{3x}$ C. $20e^x$ D. $20e^{2x}$
-
5. Solve the differential equation: $2y' = y$.
- A. $y = Ce^{x/2}$ B. $2y = \frac{y^2}{2} + C$ C. $y = e^{2x} + C$ D. $y = e^{x/2} + C$
-
6. Find the general solution of the differential equation $xy' + 2y = 0$.
- A. $y = -2\ln|x| + C$ B. $x^2y + 2y^2 = C$ C. $y + 2x = C$ D. $y = \frac{C}{x^2}$
-
7. A certain type of bacteria increases continuously at a rate proportional to the number present. If there are 500 present at a given time and 1000 present 2 hours later, how many hours (from the initial given time) will it take for the number of bacteria to be 2500?
8. Solve the differential equation: $xy' = y$.
9. Find the general solution of the differential equation: $\frac{y'}{x} = \frac{e^{x^2}}{y}$.

10. Find the particular solution of the differential equation $\frac{dy}{dx} = 500 - y$ that satisfies the initial condition $y(0) = 7$.

11. Determine the area of the region bounded by the graphs of $y = x^2 - 4x$ and $y = x - 4$.

- A. $-\frac{9}{2}$ B. $\frac{23}{6}$ C. $\frac{9}{2}$ D. $\frac{8}{3}$
-

12. Find the volume of the solid formed by revolving the region bounded by the graphs of $y = x^3$, $y = 1$ and $x = 2$ about the x -axis.

- A. $\frac{127\pi}{7}$ B. $\frac{120\pi}{7}$ C. $\frac{240\pi}{7}$ D. $\frac{1013\pi}{10}$
-

13. Determine the area of the region bounded by the graphs of $y = -x^2 + 2x + 3$ and $y = 3$.

- A. $\frac{4}{3}$ B. $\frac{9}{2}$ C. $\frac{22}{3}$ D. $-\frac{4}{3}$
-

14. Find the volume of the solid formed by revolving the region bounded by the graphs of $y = x^3$, $x = 2$ and $y = 1$ about the y -axis.

- A. $\frac{93\pi}{5}$ B. $\frac{120\pi}{7}$ C. $\frac{47\pi}{5}$ D. $\frac{62\pi}{5}$
-

15. Which of the following integrals represents the volume of the solid formed by revolving the region bounded by the graphs of $y = x^3$, $x = 2$ and $y = 1$ about the line $y = 10$?

- A. $\pi \int_1^8 (10 - y)(2 - \sqrt[3]{y}) dy$ B. $\pi \int_1^2 [81 - (10 - x^3)^2] dx$
C. $2\pi \int_1^8 y(2 - \sqrt[3]{y}) dy$ D. $\pi \int_1^2 [1 - (10 - x^3)^2] dx$
-

16. The integral $\int_a^b [(\sin x + 2) - e^{x^2}] dx$ computes the area of a region between two curves. Use a graphing calculator to estimate the value of a .

- A. 0 B. 1.0 C. -0.6 D. 3.1
-

17. Find the volume of the solid formed by revolving the region bounded by

$$y = \sqrt{x^3 - x^2}, y = 0, \text{ and } x = 3 \text{ about the } x\text{-axis.}$$

A. $\frac{34\pi}{3}$

B. $\frac{27\pi}{2}$

C. 13π

D. $\frac{\pi}{12}$

18. Find the area of the region bounded by the graphs of $y = \frac{1}{x}$ and $2x + 2y = 5$.

19. Find the volume of the solid formed by revolving the region bounded by the graphs of $y = e^x, y = 0, x = 0$, and $x = 1$ about the x -axis.

20. Find the volume of the solid formed by revolving the region bounded by the graphs of $y = x^2$ and $y = 4$ about the x -axis.

Text:

Pg. 403/ # ~~61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92~~ 62, 63, 83 - 88, 92

Pg. 471/ # ~~1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100~~ 1-7, 9, 15-18, 21, 22, 26, 28, 29, 30a

Answers

1) C

2) D

3) B

4) A

5) A

6) D

7) 4.64

8) $y = Cx$

9) $y^2 = e^{x^2} + C$

10) $y = 500 - 493e^{-x}$

11) C

12) B

13) A

14) C

15) B

16) C

17) A

18) $\frac{15}{8} - \ln 4$

19) $\frac{\pi}{2}(e^2 - 1)$

20) $\frac{256\pi}{5}$

