AP Calculus Name_____ ID: 1

Initial-Value & FTC Part 2

Date_____ Period____

For each problem, find the particular solution of the differential equation that satisfies the initial condition.

1) $\frac{dy}{ds} = \frac{2s}{e^{2y}}, y(-2) = \frac{\ln 11}{2}$

2) $\frac{dy}{ds} = 3e^{s-y}, y(1) = \ln(3e+1)$

3) $\frac{dy}{dr} = 2r\sqrt{y}, y(1) = \frac{9}{4}$

4) $\frac{dy}{dt} = \frac{t}{y^2}, y(3) = \frac{\sqrt[3]{124}}{2}$

5) $\frac{dy}{dx} = 2xy, y(1) = e$

6) $\frac{dy}{dx} = 3x^2y, y(-2) = -\frac{1}{e^8}$

7) $\frac{dy}{dx} = 2yx + yx^2, y(0) = -1$

8) $\frac{dy}{dx} = 2y + 2, y(-3) = \frac{-2e^6 - 1}{2e^6}$

For each problem, find $F'(x)$.

9) $F(x) = \int_{-3}^{x} 2e^t \, dt$

10) $F(x) = \int_{-3}^{x} -\frac{4}{t} \, dt$

11) $F(x) = \int_{-3}^{x} \frac{2}{(t-1)^3}\,dt$

12) $F(x) = \int_{-1}^{x} \frac{5}{(t-2)^2}\,dt$

13) $F(x) = \int_{-\frac{\pi}{4}}^{2x} -2\cos t\,dt$

14) $F(x) = \int_{-1}^{2x} 3e^{t-1}\,dt$

15) $F(x) = \int_{1}^{x^3} \frac{5}{t}\,dt$

16) $F(x) = \int_{1}^{x^3} 5t^{\frac{1}{2}}\,dt$

17) $F(x) = \int_{x}^{2x} \left(t^3 - 3t^2 + 4\right)\,dt$

18) $F(x) = \int_{x}^{x^2} \frac{3}{t^2}\,dt$

19) $F(x) = \int_{x}^{x^2} \frac{3}{t}\,dt$

20) $F(x) = \int_{x}^{2x} 5t^{\frac{1}{2}}\,dt$

Answers to Initial-Value & FTC Part 2 (ID: 1)

1) $\frac{e^{2y}}{2} = s^2 + \frac{3}{2}$

$y = \frac{\ln\left(2s^2 + 3\right)}{2}$

2) $e^y = 3e^s + 1$

$y = \ln\left(3e^s + 1\right)$

3) $2\sqrt{y} = r^2 + 2$

$y = \left(\frac{r^2}{2} + 1\right)^2$

4) $\frac{y^3}{3} = \frac{t^2}{2} + \frac{2}{3}$

$y = \sqrt[3]{\frac{3t^2}{2} + 2}$

5) $\ln\left|y\right| = x^2$

$y = e^{x^2}$

6) $\ln\left|y\right| = x^3$

$y = -e^{x^3}$

7) $\ln\left|y\right| = x^2 + \frac{x^3}{3}$

$y = -e^{x^2 + \frac{x^3}{3}}$

8) $\frac{\ln\left|2y + 2\right|}{2} = x$

$y = \frac{-e^{2x} - 2}{2}$

9) $F'(x) = 2e^x$

10) $F'(x) = -\frac{4}{x}$

11) $F'(x) = \frac{2}{(x-1)^3}$

12) $F'(x) = \frac{5}{(x-2)^2}$

13) $F'(x) = -4\cos 2x$

14) $F'(x) = 6e^{2x-1}$

15) $F'(x) = \frac{15}{x}$

16) $F'(x) = 15x^{\frac{7}{2}}$

17) $F'(x) = 15x^3 - 21x^2 + 4$

18) $F'(x) = \frac{6}{x^3} - \frac{3}{x^2}$

19) $F'(x) = \frac{3}{x}$

20) $F'(x) = 10 \cdot (2x)^{\frac{1}{2}} - 5x^{\frac{1}{2}}$