Name_____

Calculus Practice: Implicit Differentiation 2a

For each problem, use implicit differentiation to find y' at the given point.

1) $4x = (3xy + 5)^2$ at $(1, -1)$
   A) At $(1, -1)$, $y' = 1$
   B) At $(1, -1)$, $y' = \dfrac{4}{3}$
   C) At $(1, -1)$, $y' = \dfrac{3}{4}$
   D) At $(1, -1)$, $y' = -4$

2) $(y^2 + 1)^2 = 4x^2$ at $(-1, 1)$
   A) At $(-1, 1)$, $y' = \dfrac{1}{7}$
   B) At $(-1, 1)$, $y' = -2$
   C) At $(-1, 1)$, $y' = 1$
   D) At $(-1, 1)$, $y' = -1$

3) $4x^2 = (y^2 + 1)^2$ at $(1, 1)$
   A) At $(1, 1)$, $y' = -2$
   B) At $(1, 1)$, $y' = 1$
   C) At $(1, 1)$, $y' = -\dfrac{5}{9}$
   D) At $(1, 1)$, $y' = -\dfrac{4}{9}$

4) $4x = (y^2 + 1)^2$ at $(1, 1)$
   A) At $(1, 1)$, $y' = \dfrac{1}{2}$
   B) At $(1, 1)$, $y' = -1$
   C) At $(1, 1)$, $y' = 1$
   D) At $(1, 1)$, $y' = 2$

5) $(4y^3 + 5)^2 = x$ at $(1, -1)$
   A) At $(1, -1)$, $y' = 1$
   B) At $(1, -1)$, $y' = \dfrac{1}{24}$
   C) At $(1, -1)$, $y' = -\dfrac{10}{7}$
   D) At $(1, -1)$, $y' = 24$

6) $(5y^3 + 3x^2)^2 = x^3 + 3$ at $(1, -1)$
   A) At $(1, -1)$, $y' = \dfrac{27}{4}$
   B) At $(1, -1)$, $y' = -\dfrac{9}{20}$
   C) At $(1, -1)$, $y' = 1$
   D) At $(1, -1)$, $y' = -\dfrac{20}{9}$

7) $5x^3 + 5 = \ln y^2$ at $(-1, 1)$
   A) At $(-1, 1)$, $y' = 1$
   B) At $(-1, 1)$, $y' = -3$
   C) At $(-1, 1)$, $y' = \dfrac{15}{2}$
   D) At $(-1, 1)$, $y' = \dfrac{2}{15}$

8) $4x^2 + 5x^3 + 1 = \ln x^3 y$ at $(-1, -1)$
   A) At $(-1, -1)$, $y' = 7$
   B) At $(-1, -1)$, $y' = -\dfrac{1}{10}$
   C) At $(-1, -1)$, $y' = -10$
   D) At $(-1, -1)$, $y' = 0$

9) $\ln y^2 = x + 1$ at $(-1, 1)$
   A) At $(-1, 1)$, $y' = \dfrac{1}{2}$
   B) At $(-1, 1)$, $y' = \dfrac{1}{9}$
   C) At $(-1, 1)$, $y' = 1$
   D) At $(-1, 1)$, $y' = 2$

10) $\ln y^3 = 2x + 2$ at $(-1, 1)$
   A) At $(-1, 1)$, $y' = \dfrac{2}{3}$
   B) At $(-1, 1)$, $y' = 1$
   C) At $(-1, 1)$, $y' = -4$
   D) At $(-1, 1)$, $y' = \dfrac{3}{2}$

11) $3x^3 + 3 = \ln xy^3$ at $(-1, -1)$

   A) At $(-1, -1)$, $y' = 0$

   B) At $(-1, -1)$, $y' = -\dfrac{3}{10}$

   C) At $(-1, -1)$, $y' = -\dfrac{10}{3}$

   D) At $(-1, -1)$, $y' = -3$

12) $\ln x^2 y = 3x + x^3 + 4$ at $(-1, 1)$

   A) At $(-1, 1)$, $y' = 8$

   B) At $(-1, 1)$, $y' = \dfrac{1}{8}$

   C) At $(-1, 1)$, $y' = 0$

   D) At $(-1, 1)$, $y' = 2$

For each problem, use implicit differentiation to find y'' at the given point.

13) $5x^3 = 3y^2 + 2$ at $(1, 1)$

   A) At $(1, 1)$, $y'' = -\dfrac{84}{5}$

   B) At $(1, 1)$, $y'' = -\dfrac{16}{25}$

   C) At $(1, 1)$, $y'' = \dfrac{9}{5}$

   D) At $(1, 1)$, $y'' = -\dfrac{5}{4}$

14) $1 = 5x - 4y^2$ at $(1, 1)$

   A) At $(1, 1)$, $y'' = 3$

   B) At $(1, 1)$, $y'' = -\dfrac{25}{64}$

   C) At $(1, 1)$, $y'' = \dfrac{64}{25}$

   D) At $(1, 1)$, $y'' = 175$

15) $-y^2 + 5 = x$ at $(1, 2)$

   A) At $(1, 2)$, $y'' = -5$
   B) At $(1, 2)$, $y'' = 8$

   C) At $(1, 2)$, $y'' = -\dfrac{1}{32}$

   D) At $(1, 2)$, $y'' = -1$

16) $5x - 4y^2 = 1$ at $(1, 1)$

   A) At $(1, 1)$, $y'' = -\dfrac{25}{64}$

   B) At $(1, 1)$, $y'' = 0$
   C) At $(1, 1)$, $y'' = -3$

   D) At $(1, 1)$, $y'' = \dfrac{64}{25}$

17) $2x^2 + 3y^2 = 5$ at $(1, 1)$

   A) At $(1, 1)$, $y'' = -\dfrac{10}{9}$

   B) At $(1, 1)$, $y'' = 2$

   C) At $(1, 1)$, $y'' = \dfrac{15}{4}$

   D) At $(1, 1)$, $y'' = -\dfrac{4}{5}$

18) $4 = 5x - y^2$ at $(1, 1)$

   A) At $(1, 1)$, $y'' = -\dfrac{25}{32}$

   B) At $(1, 1)$, $y'' = -\dfrac{25}{4}$

   C) At $(1, 1)$, $y'' = -\dfrac{3}{4}$

   D) At $(1, 1)$, $y'' = \dfrac{4}{25}$

19) $5x - 2y^2 = 2$ at $(2, 2)$

   A) At $(2, 2)$, $y'' = 0$

   B) At $(2, 2)$, $y'' = -\dfrac{3}{2}$

   C) At $(2, 2)$, $y'' = \dfrac{32}{25}$

   D) At $(2, 2)$, $y'' = -\dfrac{25}{128}$

20) $1 = x - y^2$ at $(2, 1)$

   A) At $(2, 1)$, $y'' = -1$
   B) At $(2, 1)$, $y'' = 1$
   C) At $(2, 1)$, $y'' = 4$

   D) At $(2, 1)$, $y'' = -\dfrac{1}{4}$

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