AP Calculus AB 5-1, 5-3 Review Name_____ ID: 1

Identify the domain and range of each.

1) $y = \ln(2x - 3) + 5$

A) Domain: $x < -\frac{3}{2}$
Range: All reals

B) Domain: $x > -\frac{3}{2}$
Range: All reals

C) Domain: $x < \frac{3}{2}$
Range: All reals

D) Domain: $x > \frac{3}{2}$
Range: All reals

2) $y = \ln(3x + 17) - 5$

A) Domain: $x > -\frac{17}{3}$
Range: All reals

B) Domain: $x > \frac{17}{3}$
Range: All reals

C) Domain: $x < -\frac{17}{3}$
Range: All reals

D) Domain: All reals
Range: $x > \frac{17}{3}$

Expand each logarithm.

3) $\ln(a \cdot b \cdot c^3)$

A) $\ln c + \frac{\ln a}{2} + \frac{\ln b}{2}$

B) $\ln a + \ln b + 3\ln c$

C) $15\ln a - 5\ln b$

D) $15\ln a + 5\ln b$

4) $\ln \frac{u^5}{v^2}$

A) $5\ln w + \frac{\ln u}{2}$

B) $10\ln u + 2\ln v$

C) $5\ln u - 2\ln v$

D) $5\ln u + 2\ln v$

Condense each expression to a single logarithm.

5) $\frac{\ln u}{2} + \frac{\ln v}{2} + \frac{\ln w}{2}$

A) $\ln \frac{u^5}{v^6}$

B) $\ln \frac{u^6}{v^{30}}$

C) $\ln \sqrt{wvu}$

D) $\ln \frac{u^{30}}{v^6}$

6) $\ln w + \frac{\ln u}{3} + \frac{\ln v}{3}$

A) $\ln\left(w^3\sqrt[3]{u}\right)$

B) $\ln\left(w\sqrt[3]{vu}\right)$

C) $\ln \frac{u^3}{v^4}$

D) $\ln \frac{u^{12}}{v^4}$

Find the inverse of each function.

7) $f(x) = \sqrt[5]{-x - 1}$

A) $f^{-1}(x) = 2x^3 - 2$

B) $f^{-1}(x) = -x^5 - 1$

C) $f^{-1}(x) = 1 + x^3$

D) $f^{-1}(x) = \sqrt[3]{\frac{-x - 2}{2}}$

8) $f(n) = \sqrt[3]{n + 1} + 2$

A) $f^{-1}(n) = (n - 2)^3 - 1$

B) $f^{-1}(n) = 2(n - 2)^3$

C) $f^{-1}(n) = \sqrt[5]{n - 1}$

D) $f^{-1}(n) = -2n^5 - 1$

Differentiate each function with respect to x.

9) $f(x) = \ln \sqrt[4]{\dfrac{2x^3}{3x^2 - 4}}$

A) $f'(x) = \dfrac{1 - x}{24x^2}$

B) $f'(x) = \dfrac{3(x^2 - 4)}{4x(3x^2 - 4)}$

C) $f'(x) = \dfrac{3x^2 - 4 - 2x^3}{8x^3(3x^2 - 4)}$

D) $f'(x) = \dfrac{2x^3 - 3x^2 + 4}{4}$

10) $f(x) = \ln \left(\dfrac{4x^2}{5x^3 - 3}\right)^5$

A) $f'(x) = \dfrac{5(5x^3 - 3 - 4x^2)}{4x^2(5x^3 - 3)}$

B) $f'(x) = \dfrac{5(-5x^3 - 6)}{x(5x^3 - 3)}$

C) $f'(x) = 5(4x^2 - 5x^3 + 3)$

D) $f'(x) = \dfrac{15x - 8}{24x^2}$

Use logarithmic differentiation to differentiate each function with respect to x.

11) $y = \sqrt[3]{x^2 + 1}$

A) $\dfrac{dy}{dx} = y \cdot \dfrac{10x}{3x^2 + 3}$

B) $\dfrac{dy}{dx} = y \cdot \dfrac{2x}{x^2 + 1}$

C) $\dfrac{dy}{dx} = y \cdot \dfrac{2x}{3x^2 + 3}$

D) $\dfrac{dy}{dx} = y \cdot \dfrac{8x}{3x^2 + 3}$

12) $y = x^{2x}$

A) $\dfrac{dy}{dx} = y(6 \ln x + 6)$

B) $\dfrac{dy}{dx} = y(2 \ln x + 2)$

C) $\dfrac{dy}{dx} = y(4 \ln x + 4)$

D) $\dfrac{dy}{dx} = y(8 \ln x + 8)$

For each problem, find $(f^{-1})'(a)$

13) $f(x) = 3x^5 + 2x + 5, a = 5$

A) $(f^{-1})'(a) = -\dfrac{1}{6}$

B) $(f^{-1})'(a) = \dfrac{1}{10}$

C) $(f^{-1})'(a) = 1$

D) $(f^{-1})'(a) = \dfrac{1}{2}$

14) $f(x) = 2x^3 + 4x + 5, a = 5$

A) $(f^{-1})'(a) = \dfrac{1}{8}$

B) $(f^{-1})'(a) = -1$

C) $(f^{-1})'(a) = \dfrac{1}{12}$

D) $(f^{-1})'(a) = \dfrac{1}{4}$

For each problem, find the equation of the line tangent to the function at the given point. Your answer should be in slope-intercept form.

15) $y = -\ln(x + 2)$ at $(-1, 0)$

A) $y = -x + 3$

B) $y = -\dfrac{1}{2}x - \ln 2$

C) $y = -x - 2$

D) $y = -x - 1$

AP Calculus AB 5-1, 5-3 Review Name_____ ID: 2

Identify the domain and range of each.

1) $y = \ln(2x+1)+1$

A) Domain: $x < \frac{1}{2}$
Range: All reals

B) Domain: $x > \frac{1}{2}$
Range: All reals

C) Domain: $x > -\frac{1}{2}$
Range: All reals

D) Domain: $x < -\frac{1}{2}$
Range: All reals

2) $y = \ln(4x-1)-2$

A) Domain: $x < \frac{1}{4}$
Range: All reals

B) Domain: $x > -\frac{1}{4}$
Range: All reals

C) Domain: $x > \frac{1}{4}$
Range: All reals

D) Domain: All reals
Range: $x > -\frac{1}{4}$

Expand each logarithm.

3) $\ln\left(\frac{x^2}{y}\right)^6$

A) $12\ln x - 6\ln y$

B) $2\ln z + \frac{\ln x}{3}$

C) $2\ln x - 6\ln y$

D) $2\ln x + 6\ln y$

4) $\ln\left(\frac{u}{v^3}\right)^2$

A) $\ln w + \frac{\ln u}{3} + \frac{\ln v}{3}$

B) $2\ln u - 6\ln v$

C) $3\ln u + 2\ln v$

D) $3\ln w + \frac{\ln u}{3}$

Condense each expression to a single logarithm.

5) $6\ln x - 5\ln y$

A) $\ln \frac{x^5}{y^{30}}$ B) $\ln \frac{x^6}{y^5}$

C) $\ln \sqrt{zyx}$ D) $\ln\left(y^{30}x^5\right)$

6) $\ln u + \ln v + 5\ln w$

A) $\ln\left(vuw^5\right)$ B) $\ln \frac{u^2}{v^{10}}$

C) $\ln\left(v^2u^{10}\right)$ D) $\ln\left(v^{10}u^2\right)$

Find the inverse of each function.

7) $g(x) = \sqrt[3]{x-2} - 1$

A) $g^{-1}(x) = -\sqrt[5]{x} - 3$

B) $g^{-1}(x) = (x+1)^3 + 2$

C) $g^{-1}(x) = 2(x+2)^3$

D) $g^{-1}(x) = \sqrt[3]{x} - 2$

8) $f(x) = -2x^3$

A) $f^{-1}(x) = -\sqrt[5]{x} + 2$

B) $f^{-1}(x) = -2 + (x-2)^5$

C) $f^{-1}(x) = (x-3)^3$

D) $f^{-1}(x) = \sqrt[3]{-\frac{x}{2}}$

Differentiate each function with respect to x.

9) $y = \ln \sqrt[4]{\dfrac{5x^5}{x^2 - 3}}$

A) $\dfrac{dy}{dx} = \dfrac{5x^5 - x^2 + 3}{4}$

B) $\dfrac{dy}{dx} = \dfrac{3(x^2 - 5)}{4x(x^2 - 3)}$

C) $\dfrac{dy}{dx} = \dfrac{2 - 25x^3}{200x^4}$

D) $\dfrac{dy}{dx} = \dfrac{x^2 - 3 - 5x^5}{20x^5(x^2 - 3)}$

10) $y = \ln \left(\dfrac{x^3}{3x^4 - 5}\right)^4$

A) $\dfrac{dy}{dx} = 4(x^3 - 3x^4 + 5)$

B) $\dfrac{dy}{dx} = \dfrac{4x - 1}{3x^3}$

C) $\dfrac{dy}{dx} = \dfrac{4(3x^4 - 5 - x^3)}{x^3(3x^4 - 5)}$

D) $\dfrac{dy}{dx} = \dfrac{12(-x^4 - 5)}{x(3x^4 - 5)}$

Use logarithmic differentiation to differentiate each function with respect to x.

11) $y = \sqrt[3]{x^2 + 1}$

A) $\dfrac{dy}{dx} = y \cdot \dfrac{10x}{3x^2 + 3}$

B) $\dfrac{dy}{dx} = y \cdot \dfrac{2x}{x^2 + 1}$

C) $\dfrac{dy}{dx} = y \cdot \dfrac{2x}{3x^2 + 3}$

D) $\dfrac{dy}{dx} = y \cdot \dfrac{8x}{3x^2 + 3}$

12) $y = x^{x^3}$

A) $\dfrac{dy}{dx} = y(3x^2 \ln x + x^2)$

B) $\dfrac{dy}{dx} = y(12x^2 \ln x + 4x^2)$

C) $\dfrac{dy}{dx} = y(9x^2 \ln x + 3x^2)$

D) $\dfrac{dy}{dx} = y(15x^2 \ln x + 5x^2)$

For each problem, find $(f^{-1})'(a)$

13) $f(x) = x^7 + 4x + 4,\ a = 4$

A) $(f^{-1})'(a) = -\dfrac{1}{10}$

B) $(f^{-1})'(a) = \dfrac{1}{4}$

C) $(f^{-1})'(a) = -\dfrac{1}{7}$

D) $(f^{-1})'(a) = \dfrac{1}{12}$

14) $f(x) = 4x^7 + 3x - 4,\ a = -4$

A) $(f^{-1})'(a) = \dfrac{1}{8}$

B) $(f^{-1})'(a) = -\dfrac{1}{10}$

C) $(f^{-1})'(a) = \dfrac{1}{3}$

D) $(f^{-1})'(a) = -\dfrac{1}{6}$

For each problem, find the equation of the line tangent to the function at the given point. Your answer should be in slope-intercept form.

15) $f(x) = -\ln(-x + 1)$ at $(0, 0)$

A) $y = \dfrac{1}{3}x + \dfrac{-3 \ln 3 + 2}{3}$

B) $y = x$

C) $y = 3x + 2$

D) $y = \dfrac{1}{4}x + \dfrac{-4 \ln 4 + 3}{4}$

AP Calculus AB 5-1, 5-3 Review Name_____ ID: 3

Identify the domain and range of each.

1) $y = \ln(4x + 5) + 3$

A) Domain: $x < -\frac{3}{4}$
Range: All reals

B) Domain: $x > \frac{5}{4}$
Range: All reals

C) Domain: $x > -\frac{5}{4}$
Range: All reals

D) Domain: $x < \frac{3}{4}$
Range: All reals

2) $y = \ln(2x - 6) - 5$

A) Domain: $x > 3$
Range: All reals

B) Domain: $x < \frac{5}{2}$
Range: All reals

C) Domain: All reals
Range: $x < -3$

D) Domain: $x > -3$
Range: All reals

Expand each logarithm.

3) $\ln\left(\frac{x^2}{y}\right)^2$

A) $4\ln x - 2\ln y$

B) $2\ln x - 4\ln y$

C) $2\ln x + 4\ln y$

D) $\frac{\ln x}{3} + \frac{\ln y}{3} + \frac{\ln z}{3}$

4) $\ln \sqrt[3]{x \cdot y \cdot z}$

A) $6\ln z + \frac{\ln x}{3}$

B) $3\ln x - 18\ln y$

C) $\ln z + \frac{\ln x}{3} + \frac{\ln y}{3}$

D) $\frac{\ln x}{3} + \frac{\ln y}{3} + \frac{\ln z}{3}$

Condense each expression to a single logarithm.

5) $20\ln x - 5\ln y$

A) $\ln \sqrt[3]{zyx}$

B) $\ln \frac{x^{20}}{y^5}$

C) $\ln\left(z\sqrt[3]{yx}\right)$

D) $\ln\left(y^5 x^{20}\right)$

6) $2\ln x + 12\ln y$

A) $\ln \sqrt[3]{zyx}$

B) $\ln\left(y^{12}x^2\right)$

C) $\ln \frac{x^2}{y^{12}}$

D) $\ln \frac{x^{12}}{y^2}$

Find the inverse of each function.

7) $f(n) = -n^5$

A) $f^{-1}(n) = -\sqrt[5]{n}$

B) $f^{-1}(n) = \frac{-2 + \sqrt[3]{4n}}{2}$

C) $f^{-1}(n) = \sqrt[3]{n} + 1$

D) $f^{-1}(n) = \sqrt[5]{n - 2}$

8) $f(x) = -(x - 3)^5$

A) $f^{-1}(x) = \sqrt[3]{x - 2} - 2$

B) $f^{-1}(x) = (x - 2)^3 + 1$

C) $f^{-1}(x) = -\sqrt[5]{x} + 3$

D) $f^{-1}(x) = (x - 1)^5 + 1$

Differentiate each function with respect to x.

9) $f(x) = \ln\left(\frac{2x^2}{4x^5+1}\right)^2$

A) $f'(x) = \frac{4x^5+1-2x^2}{x^2(4x^5+1)}$

B) $f'(x) = \frac{5x^3-1}{10x^4}$

C) $f'(x) = \frac{4(-6x^5+1)}{x(4x^5+1)}$

D) $f'(x) = 2(2x^2-4x^5-1)$

10) $y = \ln\left(\frac{x^2}{3x^4+4}\right)^5$

A) $\frac{dy}{dx} = \frac{10(-3x^4+4)}{x(3x^4+4)}$

B) $\frac{dy}{dx} = \frac{5(3x^4+4-x^2)}{x^2(3x^4+4)}$

C) $\frac{dy}{dx} = 5(x^2-3x^4-4)$

D) $\frac{dy}{dx} = \frac{5(6x^2-1)}{12x^3}$

Use logarithmic differentiation to differentiate each function with respect to x.

11) $y = \sqrt[3]{x^5+2}$

A) $\frac{dy}{dx} = y \cdot \frac{25x^4}{3x^5+6}$

B) $\frac{dy}{dx} = y \cdot \frac{5x^4}{3x^5+6}$

C) $\frac{dy}{dx} = y \cdot \frac{20x^4}{3x^5+6}$

D) $\frac{dy}{dx} = y \cdot \frac{10x^4}{3x^5+6}$

12) $y = 5x^{2x}$

A) $\frac{dy}{dx} = y(8\ln x + 8)$

B) $\frac{dy}{dx} = y(6\ln x + 6)$

C) $\frac{dy}{dx} = y(4\ln x + 4)$

D) $\frac{dy}{dx} = y(2\ln x + 2)$

For each problem, find $(f^{-1})'(a)$

13) $f(x) = 2x^7 + 2x + 4,\ a = 8$

A) $(f^{-1})'(a) = \frac{1}{24}$

B) $(f^{-1})'(a) = \frac{1}{6}$

C) $(f^{-1})'(a) = \frac{1}{16}$

D) $(f^{-1})'(a) = \frac{1}{21}$

14) $f(x) = 4x^3 + 3x + 2,\ a = 2$

A) $(f^{-1})'(a) = \frac{1}{6}$

B) $(f^{-1})'(a) = \frac{1}{3}$

C) $(f^{-1})'(a) = \frac{1}{9}$

D) $(f^{-1})'(a) = \frac{1}{5}$

For each problem, find the equation of the line tangent to the function at the given point. Your answer should be in slope-intercept form.

15) $f(x) = \ln(x+1)$ at $(1, \ln 2)$

A) $y = \frac{1}{2}x + \frac{2\ln 2 - 1}{2}$

B) $y = x$

C) $y = -2x - 1$

D) $y = x + 3$

AP Calculus AB 5-1, 5-3 Review Name_____ ID: 4

Identify the domain and range of each.

1) $y = \ln(2x + 3) + 4$

A) Domain: $x > \frac{3}{2}$
Range: All reals

B) Domain: All reals
Range: $x < -\frac{3}{2}$

C) Domain: $x > -\frac{3}{2}$
Range: All reals

D) Domain: $x < -2$
Range: All reals

2) $y = \ln(3x + 18) + 2$

A) Domain: $x > -6$
Range: All reals

B) Domain: $x > 6$
Range: All reals

C) Domain: $x < 6$
Range: All reals

D) Domain: All reals
Range: $x > 6$

Expand each logarithm.

3) $\ln\left(\frac{u^4}{v}\right)^3$

A) $4\ln w + \frac{\ln u}{2}$

B) $\ln u + \ln v + 4\ln w$

C) $3\ln u + 12\ln v$

D) $12\ln u - 3\ln v$

4) $\ln(ab^4)^2$

A) $8\ln a + 2\ln b$

B) $4\ln c + \frac{\ln a}{2}$

C) $\ln a + \ln b + 4\ln c$

D) $2\ln a + 8\ln b$

Condense each expression to a single logarithm.

5) $5\ln x - 30\ln y$

A) $\ln\frac{x^{30}}{y^5}$

B) $\ln(y^{30}x^5)$

C) $\ln\left(z^6\sqrt[3]{x}\right)$

D) $\ln\frac{x^5}{y^{30}}$

6) $4\ln x - 4\ln y$

A) $\ln\frac{x^4}{y^4}$

B) $\ln\sqrt[3]{zyx}$

C) $\ln(y^{16}x^4)$

D) $\ln(y^4x^{16})$

Find the inverse of each function.

7) $g(x) = (x-2)^5 + 2$

A) $g^{-1}(x) = \sqrt[5]{x-2} + 1$

B) $g^{-1}(x) = -\sqrt[5]{x} + 3$

C) $g^{-1}(x) = \sqrt[3]{\frac{-x-1}{2}}$

D) $g^{-1}(x) = \sqrt[5]{x-2} + 2$

8) $f(n) = \sqrt[5]{n+1} + 2$

A) $f^{-1}(n) = -\sqrt[5]{n} - 2$

B) $f^{-1}(n) = -(n+2)^3$

C) $f^{-1}(n) = -1 + (n-2)^5$

D) $f^{-1}(n) = \sqrt[3]{-n-1}$

Differentiate each function with respect to x.

9) $y = \ln \sqrt[5]{\dfrac{3x^3}{3x^2+2}}$

A) $\dfrac{dy}{dx} = \dfrac{3(x^2+2)}{5x(3x^2+2)}$

B) $\dfrac{dy}{dx} = \dfrac{3x^3 - 3x^2 - 2}{5}$

C) $\dfrac{dy}{dx} = \dfrac{3x^2 + 2 - 3x^3}{15x^3(3x^2+2)}$

D) $\dfrac{dy}{dx} = \dfrac{2-3x}{90x^2}$

10) $f(x) = \ln \left(\dfrac{3x^3}{x^2+3}\right)^3$

A) $f'(x) = \dfrac{x^2 + 3 - 3x^3}{x^3(x^2+3)}$

B) $f'(x) = \dfrac{3(x^2+9)}{x(x^2+3)}$

C) $f'(x) = 3(3x^3 - x^2 - 3)$

D) $f'(x) = \dfrac{2-9x}{6x^2}$

Use logarithmic differentiation to differentiate each function with respect to x.

11) $y = (3x^2+5)^2$

A) $\dfrac{dy}{dx} = y \cdot \dfrac{60x}{3x^2+5}$

B) $\dfrac{dy}{dx} = y \cdot \dfrac{24x}{3x^2+5}$

C) $\dfrac{dy}{dx} = y \cdot \dfrac{36x}{3x^2+5}$

D) $\dfrac{dy}{dx} = y \cdot \dfrac{12x}{3x^2+5}$

12) $y = 4x^{5x}$

A) $\dfrac{dy}{dx} = y(25 \ln x + 25)$

B) $\dfrac{dy}{dx} = y(5 \ln x + 5)$

C) $\dfrac{dy}{dx} = y(20 \ln x + 20)$

D) $\dfrac{dy}{dx} = y(15 \ln x + 15)$

For each problem, find $(f^{-1})'(a)$

13) $f(x) = 2x^7 + 2x + 2,\ a = 2$

A) $(f^{-1})'(a) = -\dfrac{1}{10}$

B) $(f^{-1})'(a) = \dfrac{1}{2}$

C) $(f^{-1})'(a) = \dfrac{1}{6}$

D) $(f^{-1})'(a) = -\dfrac{1}{8}$

14) $f(x) = x^3 + 2x - 5,\ a = -5$

A) $(f^{-1})'(a) = \dfrac{1}{2}$

B) $(f^{-1})'(a) = -\dfrac{1}{5}$

C) $(f^{-1})'(a) = \dfrac{1}{6}$

D) $(f^{-1})'(a) = -1$

For each problem, find the equation of the line tangent to the function at the given point. Your answer should be in slope-intercept form.

15) $f(x) = -\ln(-x+1)$ at $(-2, -\ln 3)$

A) $y = \dfrac{1}{3}x + \dfrac{-3 \ln 3 + 2}{3}$

B) $y = \dfrac{1}{4}x + \dfrac{-4 \ln 4 + 3}{4}$

C) $y = x$

D) $y = -2x + 3$

AP Calculus AB 5-1, 5-3 Review Name_____ ID: 5

Identify the domain and range of each.

1) $y = \ln(3x + 3) - 4$

A) Domain: $x > -1$
Range: All reals

B) Domain: $x > 1$
Range: All reals

C) Domain: All reals
Range: $x < -1$

D) Domain: All reals
Range: $x > 1$

2) $y = \ln(4x - 3) + 1$

A) Domain: $x > -\frac{3}{4}$
Range: All reals

B) Domain: $x < -\frac{1}{4}$
Range: All reals

C) Domain: $x < \frac{1}{4}$
Range: All reals

D) Domain: $x > \frac{3}{4}$
Range: All reals

Expand each logarithm.

3) $\ln\left(\frac{x}{y^6}\right)^6$

A) $6\ln x + 6\ln y$

B) $\frac{\ln x}{2} + \frac{\ln y}{2} + \frac{\ln z}{2}$

C) $\ln x + \ln y + 6\ln z$

D) $6\ln x - 36\ln y$

4) $\ln(a^3b^3)$

A) $\ln c + \frac{\ln a}{2} + \frac{\ln b}{2}$

B) $3\ln a - 3\ln b$

C) $3\ln a + 3\ln b$

D) $3\ln a + 9\ln b$

Condense each expression to a single logarithm.

5) $6\ln a + 2\ln b$

A) $\ln(b^2a^6)$ B) $\ln(b^2a^{12})$

C) $\ln(c^6\sqrt{a})$ D) $\ln\frac{a^{12}}{b^2}$

6) $2\ln x - 10\ln y$

A) $\ln(yxz^5)$ B) $\ln\frac{x^2}{y^{10}}$

C) $\ln\frac{x^5}{y^2}$ D) $\ln(y^2x^5)$

Find the inverse of each function.

7) $f(x) = -\sqrt[5]{x}$

A) $f^{-1}(x) = \sqrt[3]{-x - 1}$

B) $f^{-1}(x) = \sqrt[5]{x}$

C) $f^{-1}(x) = -x^3 - 1$

D) $f^{-1}(x) = -x^5$

8) $h(x) = 3 - x^3$

A) $h^{-1}(x) = -2(x - 1)^3$

B) $h^{-1}(x) = \frac{-2 - \sqrt[5]{16x}}{2}$

C) $h^{-1}(x) = \sqrt[3]{-x + 3}$

D) $h^{-1}(x) = \frac{-2 + \sqrt[3]{4x}}{2}$

Differentiate each function with respect to x.

9) $y = \ln \sqrt[5]{\dfrac{2x^5}{4x^2+3}}$

A) $\dfrac{dy}{dx} = \dfrac{4-5x^3}{200x^4}$

B) $\dfrac{dy}{dx} = \dfrac{2x^5-4x^2-3}{5}$

C) $\dfrac{dy}{dx} = \dfrac{3(4x^2+5)}{5x(4x^2+3)}$

D) $\dfrac{dy}{dx} = \dfrac{4x^2+3-2x^5}{10x^5(4x^2+3)}$

10) $y = \ln \sqrt[3]{\dfrac{5x^5}{4x^2+5}}$

A) $\dfrac{dy}{dx} = \dfrac{8-25x^3}{600x^4}$

B) $\dfrac{dy}{dx} = \dfrac{4x^2+5-5x^5}{15x^5(4x^2+5)}$

C) $\dfrac{dy}{dx} = \dfrac{12x^2+25}{3x(4x^2+5)}$

D) $\dfrac{dy}{dx} = \dfrac{5x^5-4x^2-5}{3}$

Use logarithmic differentiation to differentiate each function with respect to x.

11) $y = \sqrt{x^3+5}$

A) $\dfrac{dy}{dx} = y \cdot \dfrac{6x^2}{x^3+5}$

B) $\dfrac{dy}{dx} = y \cdot \dfrac{3x^2}{x^3+5}$

C) $\dfrac{dy}{dx} = y \cdot \dfrac{3x^2}{2x^3+10}$

D) $\dfrac{dy}{dx} = y \cdot \dfrac{9x^2}{2x^3+10}$

12) $y = x^{x^5}$

A) $\dfrac{dy}{dx} = y(15x^4 \ln x + 3x^4)$

B) $\dfrac{dy}{dx} = y(10x^4 \ln x + 2x^4)$

C) $\dfrac{dy}{dx} = y(20x^4 \ln x + 4x^4)$

D) $\dfrac{dy}{dx} = y(5x^4 \ln x + x^4)$

For each problem, find $(f^{-1})'(a)$

13) $f(x) = 5x^5 + x + 3,\ a = 3$

A) $(f^{-1})'(a) = -\dfrac{1}{10}$

B) $(f^{-1})'(a) = 1$

C) $(f^{-1})'(a) = -\dfrac{1}{3}$

D) $(f^{-1})'(a) = -\dfrac{1}{9}$

14) $f(x) = 4x^3 + 4x + 3,\ a = 3$

A) $(f^{-1})'(a) = \dfrac{1}{6}$

B) $(f^{-1})'(a) = \dfrac{1}{2}$

C) $(f^{-1})'(a) = -\dfrac{1}{6}$

D) $(f^{-1})'(a) = \dfrac{1}{4}$

For each problem, find the equation of the line tangent to the function at the given point. Your answer should be in slope-intercept form.

15) $y = \ln(-x)$ at $(-2, \ln 2)$

A) $y = x - 3$

B) $y = -x - 2$

C) $y = -\dfrac{1}{2}x + \ln 2 - 1$

D) $y = -x - 1$

Answers to (ID: 1)

1) D	2) A	3) B	4) C
5) C	6) B	7) B	8) A
9) B	10) B	11) C	12) B
13) D	14) D	15) D	

Answers to (ID: 2)

1) C	2) C	3) A	4) B
5) B	6) A	7) B	8) D
9) B	10) D	11) C	12) A
13) B	14) C	15) B	

Answers to (ID: 3)

1) C	2) A	3) A	4) D
5) B	6) B	7) A	8) C
9) C	10) A	11) B	12) D
13) C	14) B	15) A	

Answers to (ID: 4)

1) C	2) A	3) D	4) D
5) D	6) A	7) D	8) C
9) A	10) B	11) D	12) B
13) B	14) A	15) A	

Answers to (ID: 5)

1) A	2) D	3) D	4) C
5) A	6) B	7) D	8) C
9) C	10) C	11) C	12) D
13) B	14) D	15) C	