

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Inverse Function Derivatives by Formula

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

1. Given $g(-12) = 2$
 $f(x) = -5 \cdot x - 2$
Write $g'(x)$ in terms of $g(x)$, then find $g'(-12)$.
 $g'(x) =$ _____
 $g'(-12) =$ _____

2. Given $g(-4) = -2$
 $f(x) = -1 \cdot x^2 - 3 \cdot x - 6$
Write $g'(x)$ in terms of $g(x)$, then find $g'(-4)$.
 $g'(x) =$ _____
 $g'(-4) =$ _____

3. Given $g(-1) = 2$
 $f(x) = 3 \cdot x^3 - 6 \cdot x^2 + 2 \cdot x - 5$
Write $g'(x)$ in terms of $g(x)$, then find $g'(-1)$.
 $g'(x) =$ _____
 $g'(-1) =$ _____

4. Given $g(-6) = 0$
 $f(x) = 5 \cdot x^4 - 5 \cdot x^3 - 6 \cdot x^2 + 4 \cdot x - 6$
Write $g'(x)$ in terms of $g(x)$, then find $g'(-6)$.
 $g'(x) =$ _____
 $g'(-6) =$ _____

5. Given $g(-256) = 2$
 $f(x) = -6 \cdot x^5 - 2 \cdot x^4 - 1 \cdot x^3 - 5 \cdot x^2 - 4$
Write $g'(x)$ in terms of $g(x)$, then find $g'(-256)$.
 $g'(x) =$ _____
 $g'(-256) =$ _____

6. Given $g(2) = 0$
 $f(x) = -4 \cdot x + 2$
Write $g'(x)$ in terms of $g(x)$, then find $g'(2)$.
 $g'(x) =$ _____
 $g'(2) =$ _____

7. Given $g(-4) = 0$
 $f(x) = 6 \cdot x^2 + 3 \cdot x - 4$
Write $g'(x)$ in terms of $g(x)$, then find $g'(-4)$.
 $g'(x) =$ _____
 $g'(-4) =$ _____

8. Given $g(4) = -1$
 $f(x) = 6 \cdot x^3 + 2 \cdot x^2 - 3 \cdot x + 5$
Write $g'(x)$ in terms of $g(x)$, then find $g'(4)$.
 $g'(x) =$ _____
 $g'(4) =$ _____

9. Given $g(68) = -2$
 $f(x) = 3 \cdot x^4 + 6 \cdot x^2 + 5 \cdot x + 6$
Write $g'(x)$ in terms of $g(x)$, then find $g'(68)$.
 $g'(x) =$ _____
 $g'(68) =$ _____

10. Given $g(2) = -1$
 $f(x) = -1 \cdot x^5 + x^4 + 3 \cdot x^3 + 6 \cdot x^2 - 2 \cdot x - 5$
Write $g'(x)$ in terms of $g(x)$, then find $g'(2)$.
 $g'(x) =$ _____
 $g'(2) =$ _____

11. Given $g(0) = -1$
 $f(x) = -5 \cdot x - 5$
Write $g'(x)$ in terms of $g(x)$, then find $g'(0)$.
 $g'(x) =$ _____
 $g'(0) =$ _____

12. Given $g(2) = -1$
 $f(x) = -6 \cdot x^2 - 3 \cdot x + 5$
Write $g'(x)$ in terms of $g(x)$, then find $g'(2)$.
 $g'(x) =$ _____
 $g'(2) =$ _____

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Inverse Function Derivatives by Formula

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

13. Given $g(19) = -2$

$$f(x) = -5 \cdot x^3 - 6 \cdot x^2 + 3$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(19)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(19) = \underline{\hspace{10cm}}$$

14. Given $g(-12) = -1$

$$f(x) = -6 \cdot x^4 + 3 \cdot x^3 + 2 \cdot x^2 - 1 \cdot x - 6$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(-12)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(-12) = \underline{\hspace{10cm}}$$

15. Given $g(6) = 0$

$$f(x) = 6 \cdot x^5 + x^4 + 6 \cdot x^3 - 5 \cdot x^2 - 4 \cdot x + 6$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(6)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(6) = \underline{\hspace{10cm}}$$

16. Given $g(-18) = 2$

$$f(x) = -6 \cdot x - 6$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(-18)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(-18) = \underline{\hspace{10cm}}$$

17. Given $g(13) = -2$

$$f(x) = 4 \cdot x^2 - 3$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(13)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(13) = \underline{\hspace{10cm}}$$

18. Given $g(6) = 1$

$$f(x) = -4 \cdot x^3 + 5 \cdot x^2 + x + 4$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(6)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(6) = \underline{\hspace{10cm}}$$

19. Given $g(-6) = 1$

$$f(x) = -6 \cdot x^4 - 3 \cdot x^3 - 6 \cdot x^2 + 5 \cdot x + 4$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(-6)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(-6) = \underline{\hspace{10cm}}$$

20. Given $g(-18) = -1$

$$f(x) = 6 \cdot x^5 - 4 \cdot x^4 - 1 \cdot x^3 - 1 \cdot x^2 + 6 \cdot x - 2$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(-18)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(-18) = \underline{\hspace{10cm}}$$

21. Given $g(2) = 0$

$$f(x) = -5 \cdot x + 2$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(2)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(2) = \underline{\hspace{10cm}}$$

22. Given $g(4) = 1$

$$f(x) = 5 \cdot x^2 + 3 \cdot x - 4$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(4)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(4) = \underline{\hspace{10cm}}$$

23. Given $g(2) = 0$

$$f(x) = -6 \cdot x^3 - 1 \cdot x^2 - 3 \cdot x + 2$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(2)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(2) = \underline{\hspace{10cm}}$$

24. Given $g(0) = 1$

$$f(x) = 6 \cdot x^4 + 3 \cdot x^3 - 6 \cdot x^2 - 3 \cdot x$$

Write $g'(x)$ in terms of $g(x)$, then find $g'(0)$.

$$g'(x) = \underline{\hspace{10cm}}$$

$$g'(0) = \underline{\hspace{10cm}}$$

Inverse Function Derivatives by Formula

Worked Answer Key

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

1. Differentiate f .

$$f(x) = -5$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-5}$$

$$\text{At } g(-12) = 2, f'(2) = -5, \text{ so } g'(-12) = 1 / (-5) = -1/5.$$

Because $f'(2)$ is nonzero and the certificate keeps f' the same sign near 2, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

2. Differentiate f .

$$f(x) = -2 \cdot x - 3$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-2 \cdot g(x) - 3}$$

$$\text{At } g(-4) = -2, f'(-2) = 1, \text{ so } g'(-4) = 1 / (1) = 1.$$

Because $f'(-2)$ is nonzero and the certificate keeps f' the same sign near -2, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

3. Differentiate f .

$$f(x) = 9 \cdot x^2 - 12 \cdot x + 2$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{9 \cdot g(x)^2 - 12 \cdot g(x) + 2}$$

$$\text{At } g(-1) = 2, f'(2) = 14, \text{ so } g'(-1) = 1 / (14) = 1/14.$$

Because $f'(2)$ is nonzero and the certificate keeps f' the same sign near 2, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

4. Differentiate f .

$$f(x) = 20 \cdot x^3 - 15 \cdot x^2 - 12 \cdot x + 4$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{20 \cdot g(x)^3 - 15 \cdot g(x)^2 - 12 \cdot g(x) + 4}$$

$$\text{At } g(-6) = 0, f'(0) = 4, \text{ so } g'(-6) = 1 / (4) = 1/4.$$

Because $f'(0)$ is nonzero and the certificate keeps f' the same sign near 0, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

Inverse Function Derivatives by Formula

Worked Answer Key

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

5. Differentiate f .

$$f(x) = -30 \cdot x^4 - 8 \cdot x^3 - 3 \cdot x^2 - 10 \cdot x$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-30 \cdot g(x)^4 - 8 \cdot g(x)^3 - 3 \cdot g(x)^2 - 10 \cdot g(x)}$$

At $g(-256) = 2$, $f'(2) = -576$, so $g'(-256) = 1 / (-576) = -1/576$.

Because $f'(2)$ is nonzero and the certificate keeps f' the same sign near 2, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

6. Differentiate f .

$$f(x) = -4$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-4}$$

At $g(2) = 0$, $f'(0) = -4$, so $g'(2) = 1 / (-4) = -1/4$.

Because $f'(0)$ is nonzero and the certificate keeps f' the same sign near 0, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

7. Differentiate f .

$$f(x) = 12 \cdot x + 3$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{12 \cdot g(x) + 3}$$

At $g(-4) = 0$, $f'(0) = 3$, so $g'(-4) = 1 / (3) = 1/3$.

Because $f'(0)$ is nonzero and the certificate keeps f' the same sign near 0, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

8. Differentiate f .

$$f(x) = 18 \cdot x^2 + 4 \cdot x - 3$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{18 \cdot g(x)^2 + 4 \cdot g(x) - 3}$$

At $g(4) = -1$, $f'(-1) = 11$, so $g'(4) = 1 / (11) = 1/11$.

Because $f'(-1)$ is nonzero and the certificate keeps f' the same sign near -1, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

Inverse Function Derivatives by Formula

Worked Answer Key

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

9. Differentiate f .

$$f(x) = 12 \cdot x^3 + 12 \cdot x + 5$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{12 \cdot g(x)^3 + 12 \cdot g(x) + 5}$$

At $g(68) = -2$, $f'(-2) = -115$, so $g'(68) = 1 / (-115) = -1/115$.

Because $f'(-2)$ is nonzero and the certificate keeps f the same sign near -2 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

10. Differentiate f .

$$f(x) = -5 \cdot x^4 + 4 \cdot x^3 + 9 \cdot x^2 + 12 \cdot x - 2$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-5 \cdot g(x)^4 + 4 \cdot g(x)^3 + 9 \cdot g(x)^2 + 12 \cdot g(x) - 2}$$

At $g(2) = -1$, $f'(-1) = -14$, so $g'(2) = 1 / (-14) = -1/14$.

Because $f'(-1)$ is nonzero and the certificate keeps f the same sign near -1 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

11. Differentiate f .

$$f(x) = -5$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-5}$$

At $g(0) = -1$, $f'(-1) = -5$, so $g'(0) = 1 / (-5) = -1/5$.

Because $f'(-1)$ is nonzero and the certificate keeps f the same sign near -1 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

12. Differentiate f .

$$f(x) = -12 \cdot x - 3$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-12 \cdot g(x) - 3}$$

At $g(2) = -1$, $f'(-1) = 9$, so $g'(2) = 1 / (9) = 1/9$.

Because $f'(-1)$ is nonzero and the certificate keeps f the same sign near -1 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

Inverse Function Derivatives by Formula

Worked Answer Key

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

13. Differentiate f .

$$f(x) = -15 \cdot x^2 - 12 \cdot x$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-15 \cdot g(x)^2 - 12 \cdot g(x)}$$

At $g(19) = -2$, $f'(-2) = -36$, so $g'(19) = 1 / (-36) = -1/36$.

Because $f'(-2)$ is nonzero and the certificate keeps f' the same sign near -2 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

14. Differentiate f .

$$f(x) = -24 \cdot x^3 + 9 \cdot x^2 + 4 \cdot x - 1$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-24 \cdot g(x)^3 + 9 \cdot g(x)^2 + 4 \cdot g(x) - 1}$$

At $g(-12) = -1$, $f'(-1) = 28$, so $g'(-12) = 1 / (28) = 1/28$.

Because $f'(-1)$ is nonzero and the certificate keeps f' the same sign near -1 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

15. Differentiate f .

$$f(x) = 30 \cdot x^4 + 4 \cdot x^3 + 18 \cdot x^2 - 10 \cdot x - 4$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{30 \cdot g(x)^4 + 4 \cdot g(x)^3 + 18 \cdot g(x)^2 - 10 \cdot g(x) - 4}$$

At $g(6) = 0$, $f'(0) = -4$, so $g'(6) = 1 / (-4) = -1/4$.

Because $f'(0)$ is nonzero and the certificate keeps f' the same sign near 0 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

16. Differentiate f .

$$f(x) = -6$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-6}$$

At $g(-18) = 2$, $f'(2) = -6$, so $g'(-18) = 1 / (-6) = -1/6$.

Because $f'(2)$ is nonzero and the certificate keeps f' the same sign near 2 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

Inverse Function Derivatives by Formula

Worked Answer Key

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

17. Differentiate f .

$$f(x) = 8 \cdot x$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{8 \cdot g(x)}$$

$$\text{At } g(13) = -2, f'(-2) = -16, \text{ so } g'(13) = 1 / (-16) = -1/16.$$

Because $f'(-2)$ is nonzero and the certificate keeps f' the same sign near -2 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

18. Differentiate f .

$$f(x) = -12 \cdot x^2 + 10 \cdot x + 1$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-12 \cdot g(x)^2 + 10 \cdot g(x) + 1}$$

$$\text{At } g(6) = 1, f'(1) = -1, \text{ so } g'(6) = 1 / (-1) = -1.$$

Because $f'(1)$ is nonzero and the certificate keeps f' the same sign near 1 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

19. Differentiate f .

$$f(x) = -24 \cdot x^3 - 9 \cdot x^2 - 12 \cdot x + 5$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-24 \cdot g(x)^3 - 9 \cdot g(x)^2 - 12 \cdot g(x) + 5}$$

$$\text{At } g(-6) = 1, f'(1) = -40, \text{ so } g'(-6) = 1 / (-40) = -1/40.$$

Because $f'(1)$ is nonzero and the certificate keeps f' the same sign near 1 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

20. Differentiate f .

$$f(x) = 30 \cdot x^4 - 16 \cdot x^3 - 3 \cdot x^2 - 2 \cdot x + 6$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{30 \cdot g(x)^4 - 16 \cdot g(x)^3 - 3 \cdot g(x)^2 - 2 \cdot g(x) + 6}$$

$$\text{At } g(-18) = -1, f'(-1) = 51, \text{ so } g'(-18) = 1 / (51) = 1/51.$$

Because $f'(-1)$ is nonzero and the certificate keeps f' the same sign near -1 , f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

Inverse Function Derivatives by Formula

Worked Answer Key

Use the inverse-function derivative theorem to write g' in terms of g , then calculate the exact derivative at the given point.

21. Differentiate f .

$$f(x) = -5$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-5}$$

At $g(2) = 0$, $f'(0) = -5$, so $g'(2) = 1 / (-5) = -1/5$.

Because $f'(0)$ is nonzero and the certificate keeps f' the same sign near 0, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

22. Differentiate f .

$$f(x) = 10 \cdot x + 3$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{10 \cdot g(x) + 3}$$

At $g(4) = 1$, $f'(1) = 13$, so $g'(4) = 1 / (13) = 1/13$.

Because $f'(1)$ is nonzero and the certificate keeps f' the same sign near 1, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

23. Differentiate f .

$$f(x) = -18 \cdot x^2 - 2 \cdot x - 3$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{-18 \cdot g(x)^2 - 2 \cdot g(x) - 3}$$

At $g(2) = 0$, $f'(0) = -3$, so $g'(2) = 1 / (-3) = -1/3$.

Because $f'(0)$ is nonzero and the certificate keeps f' the same sign near 0, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.

24. Differentiate f .

$$f(x) = 24 \cdot x^3 + 9 \cdot x^2 - 12 \cdot x - 3$$

Since $f(g(x)) = x$, the chain rule gives $f'(g(x)) \cdot g'(x) = 1$.

Substitute into $g'(x) = 1 / f'(g(x))$.

$$g'(x) = \frac{1}{24 \cdot g(x)^3 + 9 \cdot g(x)^2 - 12 \cdot g(x) - 3}$$

At $g(0) = 1$, $f'(1) = 18$, so $g'(0) = 1 / (18) = 1/18$.

Because $f'(1)$ is nonzero and the certificate keeps f' the same sign near 1, f has a local inverse there. The formula holds on that open inverse domain; f itself is defined for all real inputs.