Inverses of Functions 12-9-13

Inverses are symmetric about the line y = x!

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8,9

$g(n) = n^2 + 4n \quad f(n) = 4n - 5$

$g(f(n))$

$g(4n-5) = (4n-5)^2 + 4(4n-5)$

$(4n-5)(4n-5) + 16n - 20$

$16n^2 - 20n - 20n + 25 + 16n - 20$

$16n^2 - 24n + 5$

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To find the inverse of a function, you switch every x to a y and every y to an x.

Example 1:

Find the inverse to the function f(x) = 2x + 1.

$y = 2x + 1$

$x = 2y + 1$

$-1 \quad -1$

$\frac{x-1}{2} = \frac{2y}{2}$

$\frac{x}{2} - \frac{1}{2} = y$

(0,1) (1,2) y=x

① Switch x and y

② Solve for y

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Example 2:

Find the inverse to the function f(x) = $5 - \frac{2}{3}x$.

$y = 5 - \frac{2}{3}x$

$x = 5 - \frac{2}{3}y$

$-5 \quad -5$

$\frac{3}{2}(x-5) = -\frac{2}{3}y \cdot \frac{3}{2}$

$-\frac{3}{2}x + \frac{15}{2} = y$ ← inverse

Inverses are symmetric about y=x.

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Example 3:

Find $f^{-1}(x)$ for the function $f(x)=\sqrt{3x-2}$.

$y=\sqrt{3x-2}$

$x^2=\sqrt{3y-2}^2$

$x^2=3y-2$

$+2 \quad +2$

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

$\frac{x^2+2}{3}=y^{-1}$

Inverses are Symmetric about y = x.

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Example 4:

If $f(x) = (x - 5)^2 + 1$, what is the inverse?

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

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

$-1 \quad -1$

$\sqrt{x-1}=\sqrt{(y-5)^2}$

$\sqrt{x-1}=y-5$

$+5 \quad +5$

$\sqrt{x-1}+5=y^{-1}$

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Conclusion

1. **Inverse are symmetric about** $y=x$.
2. **What is the first step in finding an inverse?** Switch x and y
3. **What is the notation of inverse?** y^{-1} or $f(x)^{-1}$
4. **Questions**

Jan 7-4:03 PM

Assignment

Inverse Wkst#1

Dec 9-7:14 AM