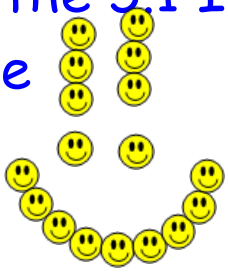
NO clickers OR calculators.

Please get the 5.1 Inverses notes from the brown table



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Algebra 2 Section 5-1

Inverses of Functions

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Inverse Relation

- Given a relation with input and outputs values an inverse relation interchanges the input and output values
- The domain of the original relation becomes the range of the inverse relation and the range of the original relation becomes the domain of the inverse relation
- The graph of an inverse relation is a reflection of the graph of the original relation
- The line of reflection is y = x

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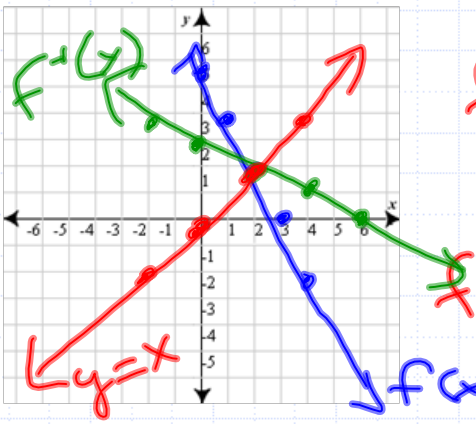
Graph the original relation using dots



x	0	1	2	3	4
y	6	4	2	0	-2

x	6	4	2	0	-2
y	0	1	2	3	4

Graph the inverse relation on the same graph using open circles

Now draw in the line y = x and notice the reflection

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Finding inverse relations

- To find the inverse relation of a given equation rewrite the equation switching the x and the y
- Now solve the new equation for y
- The resulting equation is the inverse relation

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Inverse Functions

- Functions have inverses also and we find them the same way
- Functions f and g are inverses of each other provided :

$f(g(x))=x$ and $g(f(x))=x$

- We often write the inverse of function f using the notation f^{-1}

Verify that f(x) = 3x – 5 and $\frac{1}{3}x+\frac{5}{3}$ are inverse

Show: that $f(f^{-1}(x)) = x$.

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Find an equation for the inverse of the relation $y = 3x - 5$.

Rewrite original relation

Solve for y.

$x = 3y - 5$

$+5 \quad +5$

$\frac{x+5}{3} = \frac{3y}{3}$

$\frac{x}{3} + \frac{5}{3} = y$

$g(x) = \frac{x}{3} + \frac{5}{3}$

Find an equation for the inverse of the relation $y = \frac{1}{2}x + 4$.

$x = \frac{1}{2}y + 4$

$-4 \quad -4$

$2(x-4) = \left(\frac{1}{2}y\right) \cdot 2$

$2(x-4) = g(x)$

$f^{-1}(x) = 2x - 8$

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Fitness

Elastic bands can be used in exercising to provide a range of resistance. A band's resistance R (in pounds) can be modeled by $R = \frac{3}{8}L - 5$ where L is the total length of the stretched band (in inches).

- Find the inverse of the model (Solve for L).

DO NOT Switch

$R = \frac{3}{8}L - 5$

$+5 \quad +5$

$\frac{8}{3}(R+5) = \left(\frac{3}{8}L\right)\frac{8}{3}$

$L = \frac{8}{3}(R+5)$

- Use the inverse function to find the length at which the band provides 19 pounds of resistance.

$L = \frac{8}{3}(19+5)$

$L = \frac{8}{3}(24)$

$L = \frac{8}{1}$

$L = 64$ in

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GUIDED PRACTICE

Find the inverse of the given function.

1. $f(x) = x + 4$

2. $f(x) = 2x - 1$

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Pg. 175-176
1-15
Pick 12

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