Algebra 1 4.7

Find the inverse of a relation

Find the inverse of a linear function

$f(x)$

$f^{-1}(x)$

relation
inverse
function
inverse function
domain
range
whiteboards

Find the inverse of each relation

GuidedPractice

1A. $\{(-6, 8), (-15, 11), (9, 3), (0, 6)\}$

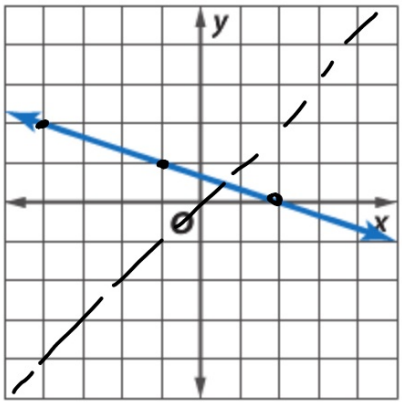
1B.

x	−10	−4	−3	0
y	5	11	12	15

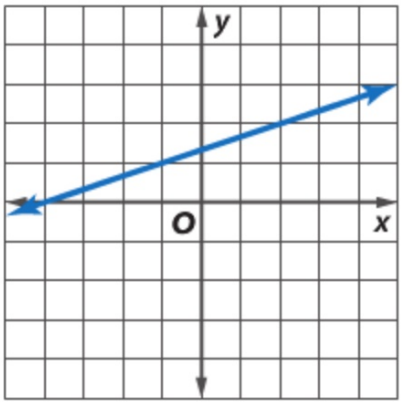
GuidedPractice

Graph the inverse of each relation.

2A.



2B.



$y^{-1} = \frac{1}{4}x + 3$

Find the inverse of each function:
"What should I expect to see?"

$f^{-1}(x) = 3x - 21$

GuidedPractice

3A. $y = 4x - 12$

$x = 4y - 12$
$+12 \quad +12$

$\frac{1}{4}x + \frac{12}{4} = \frac{4y}{4}$

$\frac{1}{4}x + 3 = y$

3B. $f(x) = \frac{1}{3}x + 7$

$y = \frac{1}{3}x + 7$

$x = \frac{1}{3}y + 7$
$-7 \quad -7$

$3(x - 7) = \left(\frac{1}{3}y\right) \cdot 3$

$3x - 21 = y$

1. Change to y= *(if necessary)*
2. Exchange x&y
3. Solve for y= again
4. Re-label f^{-1}

Find the inverse of each function.

14. $f(x) = 25 + 4x$

16. $f(x) = 4(x + 17)$

Distributive property first?
(might be easier)

1. Change to y=
2. Exchange x&y
3. Solve for y= again
4. Relabel f^{-1}

28. **DOWNLOADS** An online music subscription service allows members to download songs for $0.99 each after paying a monthly service charge of $3.99. The total monthly cost $C(x)$ of the service in dollars is $C(x) = 3.99 + 0.99x$, where x is the number of songs downloaded.

a. Find the inverse function.

b. What do x and $C^{-1}(x)$ represent in the context of the inverse function?

c. How many songs were downloaded if a member's monthly bill is $27.75?

cost is a function of # of songs
songs is a function of cost

21. LANDSCAPING At the start of the mowing season, Chuck collects a one-time maintenance fee of \$10 from his customers. He charges the Fosters \$35 for each cut. The total amount collected from the Fosters in dollars for the season is $C(x) = 10 + 35x$, where x is the number of times Chuck mows the Fosters' lawn.

a. Find the inverse function.

b. What do x and $C^{-1}(x)$ represent in the context of the inverse function?

c. ~~How many times did Chuck mow the Fosters' lawn if~~ he collected a total of \$780 from them?

Cost is a function of number of times mowed
# of times mowed is a function of cost

$f(x) = -2x + 12$

$f(x) = -\frac{1}{3}x + 15$

WB 4.7 skills
1-17