Office Hours!

Instructor:

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Office Hours:

Mondays 1–2PM
Tuesdays 10:30–11:30AM
Thursdays 1–2PM
or by appointment

Office:

South Hall 6431X (Grad Tower, 6th floor, blue side, first door on the right)

Inverse Functions

Idea: You can plug in a power cord
Inverse is to unplug the cord.

Example: $f(x) = 3x - 2$ is a function of x
Inverse is $f^{-1}(y) = (y + 2)/3$

General idea: The inverse of $y = f(x)$ is $x = f^{-1}(y)$
Solve for x in terms of y

Example again: $y = 3x - 2$ is a function $f(x)$
Inverse is $x = f^{-1}(y) = (y + 2)/3$

More Examples

Try these, clicking as you go...

Click	$y = f(x)$	$x = f^{-1}(y)$
A	$y = 5x$	$x = y/5$
B	$y = x + 7$	$x = y - 7$
C	$y = 3x - 4$	$x = (y + 4)/3$
D	$y = x^3$	$x = \sqrt[3]{y} = y^{1/3}$
E	$y = 10^x$	$x = ???? \log(y)$

Converting Temperature

x = temperature in Celsius y = temperature in Fahrenheit

This table shows how to convert between Fahrenheit and Celsius.

^oC	0	10	**20**	30	40	50	60	70	80	90	100
^oF	32	50	**68**	86	104	122	140	158	176	194	212

There is a function f that converts the temperature x in Celsius to the temperature y in Fahrenheit: $y = f(x)$

Example $f(20) = 68$ means $\mathbf{20}^oC$ is $\mathbf{68}^oF$

The inverse function $x = f^{-1}(y)$ converts Fahrenheit back into Celsius
Example: $f^{-1}(68) = 20$

You can use a table of data two ways:

- Using it forwards gives you the function f
- Using it backwards gives you the inverse function f^{-1}

Find f and f^{-1} for Temperature

1. Find $y = f(x)$, the function that gives $y\,^\circ$F from $x\,^\circ$C.

A $y = 9x/5$ B $y = 9(x+32)/5$ C $y = (9x/5)+32$ D $y = (9x+32)/5$

Answer: C

2. Find $x = f^{-1}(y)$, the function that gives $x\,^\circ$C from $y\,^\circ$F.

A $x = 5y/9$ B $x = (5y+32)/9$ C $x = (5y/9)+32$ D $x = 5(y-32)/9$

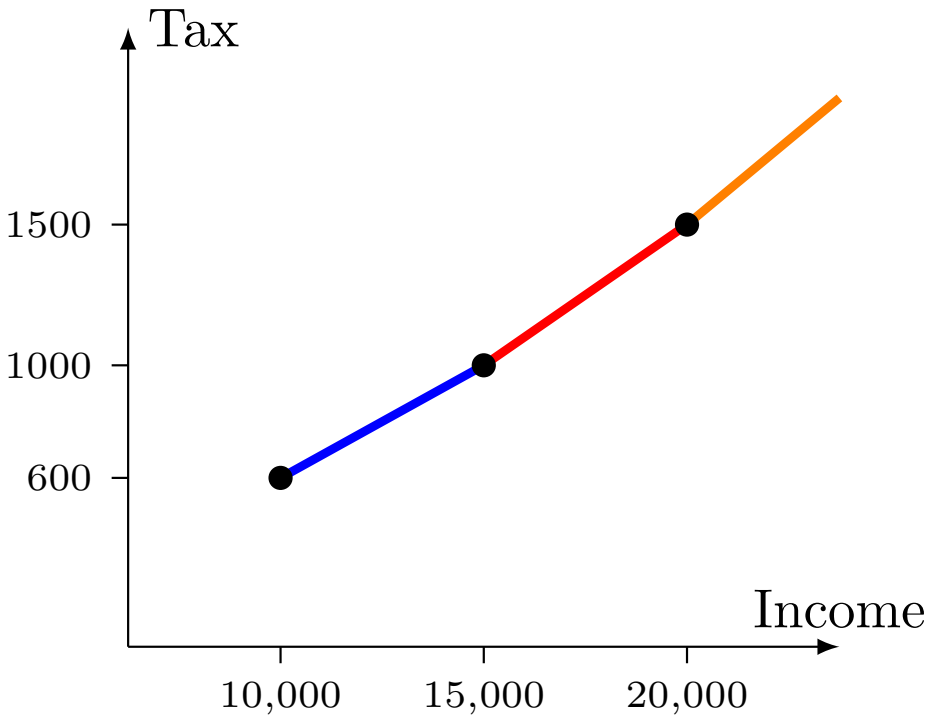
Answer: D

3. What temperature is the same in both Celsius and Fahrenheit?

A -50° B -40° C -30° D -20° E -10° B

Tax Table

Income	\$10,000 to \$14,999	\$15,000 to \$19,999	\$20,000 and over
Tax	\$600+ 8% of amount over \$10,000	\$1,000+ 10% of amount over \$15,000	\$1,500+ 12% of amount over over \$20,000



There are 3 tax brackets

10K to 15K
15K to 20K
above 20K

Tax, continued

Income	\$10,000 to \$14,999	\$15,000 to \$19,999	\$20,000 and over
Tax	\$600+ 8% of amount over \$10,000	\$1,000+ 10% of amount over \$15,000	\$1,500+ 12% of amount over over \$20,000

4. If you earn \$12,500, how much tax do you pay?
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A \$600 B \$700 C \$800 D \$900 E \$1,000 C

5. If you pay \$1,200 in tax, how much do you earn?

A \$16,000 B \$17,000 C \$18,000 D \$20,000 B

Tax, continued some more

Income	$10,000 to $14,999	$15,000 to $19,999	$20,000 and over
Tax	$600+ 8% of amount over $10,000	$1,000+ 10% of amount over $15,000	$1,500+ 12% of amount over over $20,000

If $x =$ income and $y =$ tax, then

- $y = f(x)$ is the function with input income and output tax
- The inverse function $x = f^{-1}(y)$ has input tax and output income

Bourne, Jason Bourne

6. The road from Santa Barbara (SB) to Palo Alto (PA) is 300 miles long. Your friend Marie leaves SB at noon driving at 60 mph to PA.

A bad guy leaves PA at 1pm driving along the same road at 60 mph.

At 2pm you find out and decide to save your friend. You drive at 80 mph from SB. Will you get to your friend before the bad guy does?

(A) YES (B) NO (C) SAME TIME (B)

Think - pair - share There are many ways to work it out

Bourne (continued!)

7. You jump into your car. You need to catch up with Marie before the bad guy. How long until you get to her?

But... your name is Jason Bourne. You always have a plan.

- SB to PA is 300 miles.
- Marie leaves SB at noon driving at 60 mph to PA.
- The bad guy leaves PA at 1pm driving at 60 mph.
- At 2pm you drive at 80mph from SB. At 2:01 you call Marie and tell her to stop her car.

About how many hours before bad guy do you get to Marie?
(A) 1 (B) 3/4 (C) 1/2 (D) same time (E) after C

Waitlist / Crashers

- All approval codes are controlled by the Math Department
  - Before Friday, April 7th:
    - Automatically done from waitlist through GOLD.
    - Approval codes emailed.
    - Approval codes are not currently available.
  - April 8th to April 21st (last day to add)
    - Only students on waitlist and crashing!
    - Approval codes mailed Thursdays: 4/13 and 4/20.
    - You have 24 hours to add.

- If you're crashing, please sign my crashers' list!