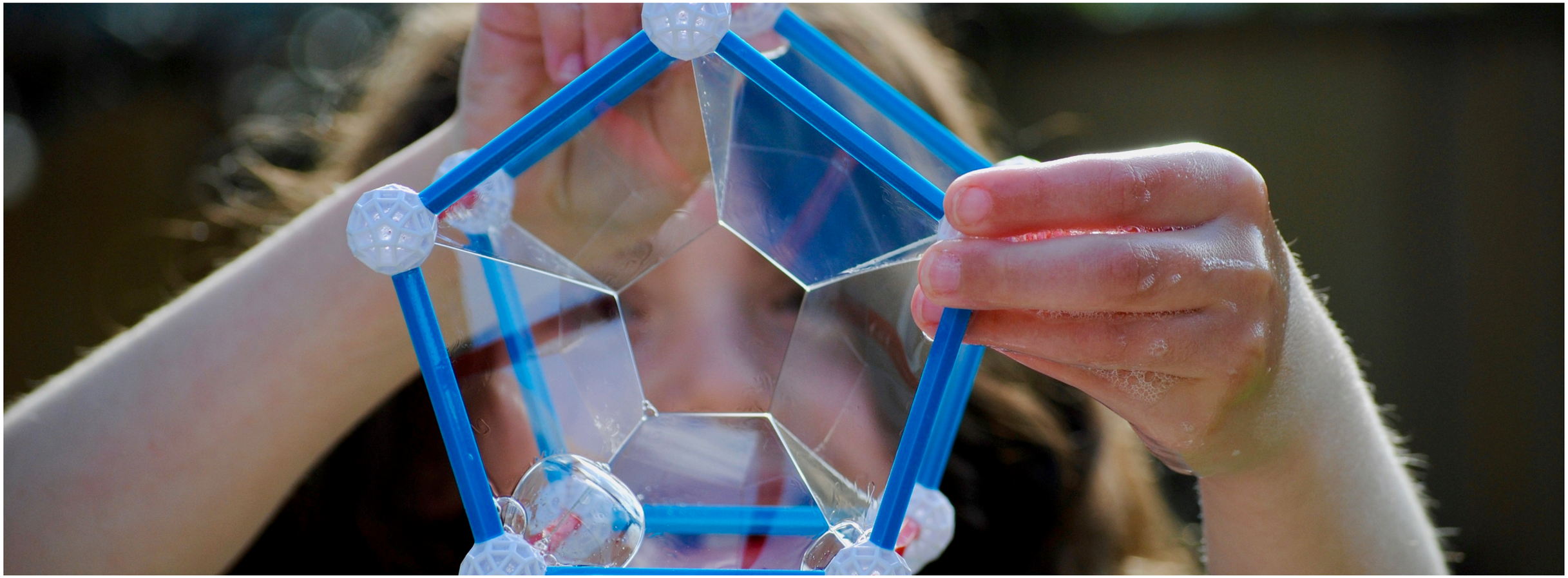
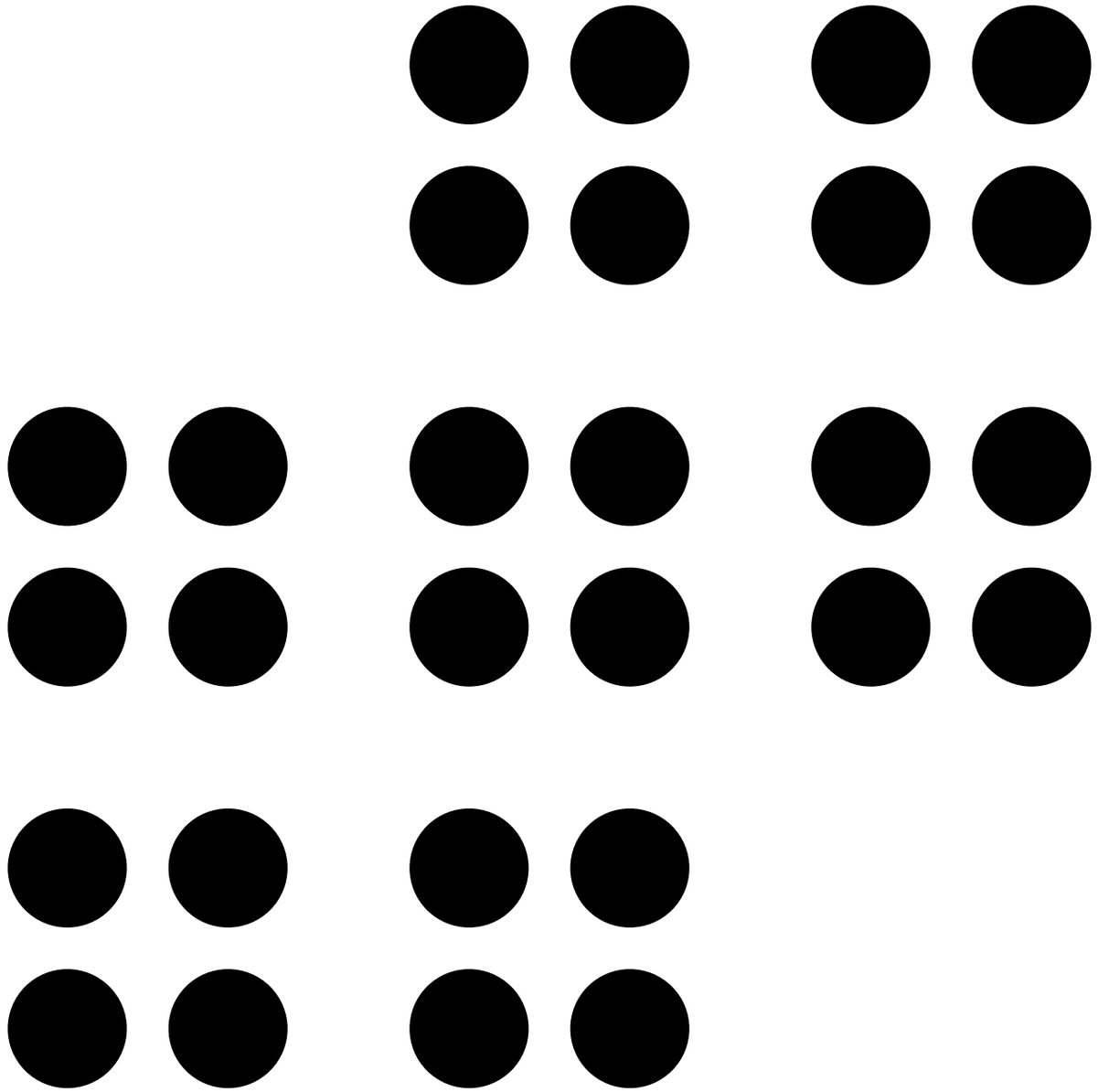


Operations Across the Grades

Chris Hunter • @ChrisHunter36
K-12 Numeracy Helping Teacher • Surrey, BC, Canada
reflectionsinthewhy.wordpress.com/nwmc2017
2017 Northwest Mathematics Conference • Portland, OR



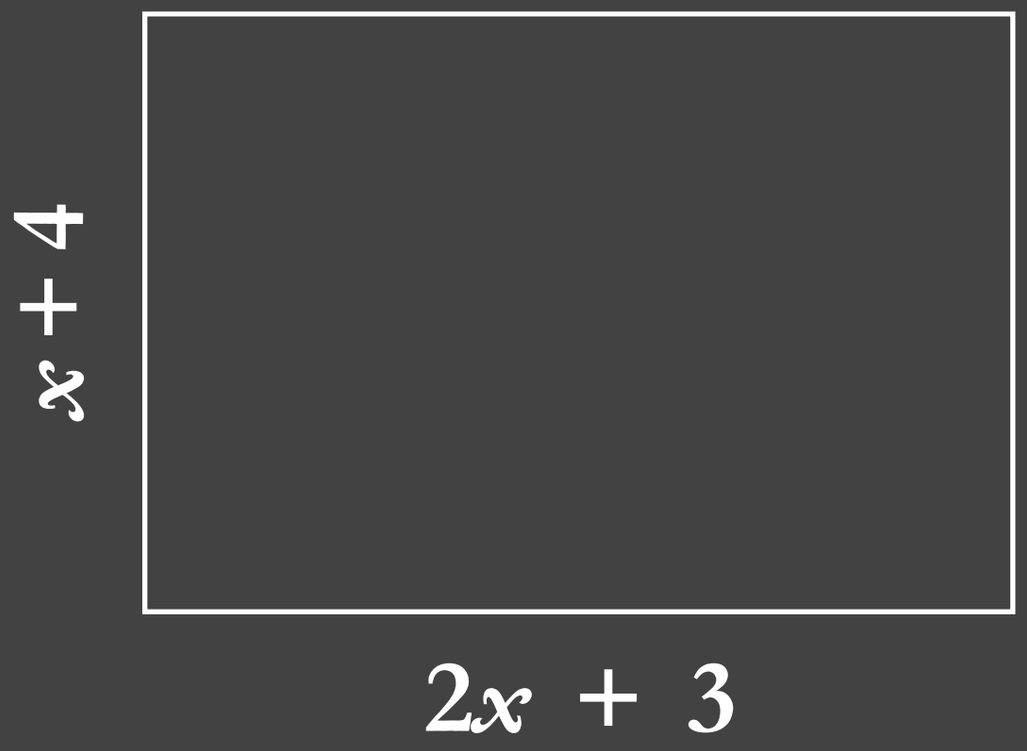
"The operations of addition, subtraction, multiplication, and division hold the same fundamental meanings no matter the domain in which they are applied."

–Marian Small

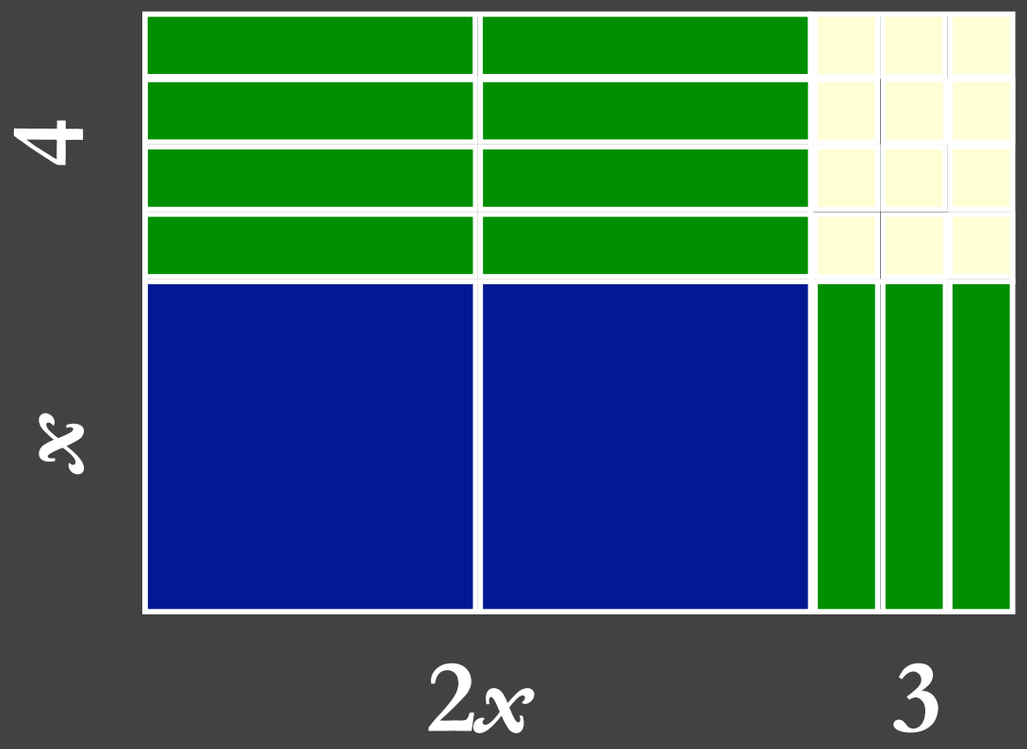

CREATE YOUR OWN
Tour of Italy
STARTING AT
$12.99

"The operations of addition, subtraction, multiplication, and division hold the same fundamental meanings no matter the domain in which they are applied."

–Marian Small

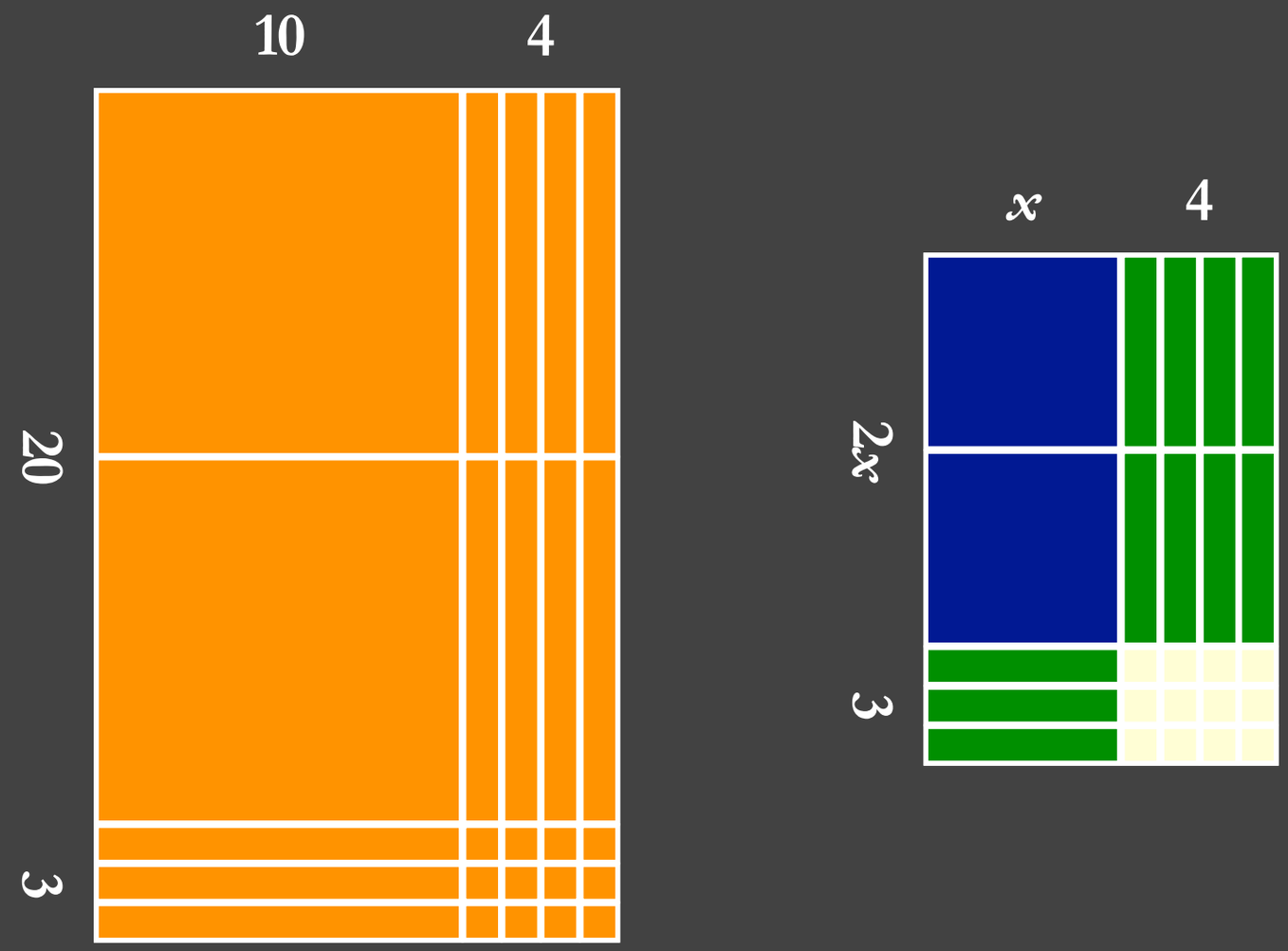

$x + 4$
$2x + 3$


14
23


4
x
2x
3

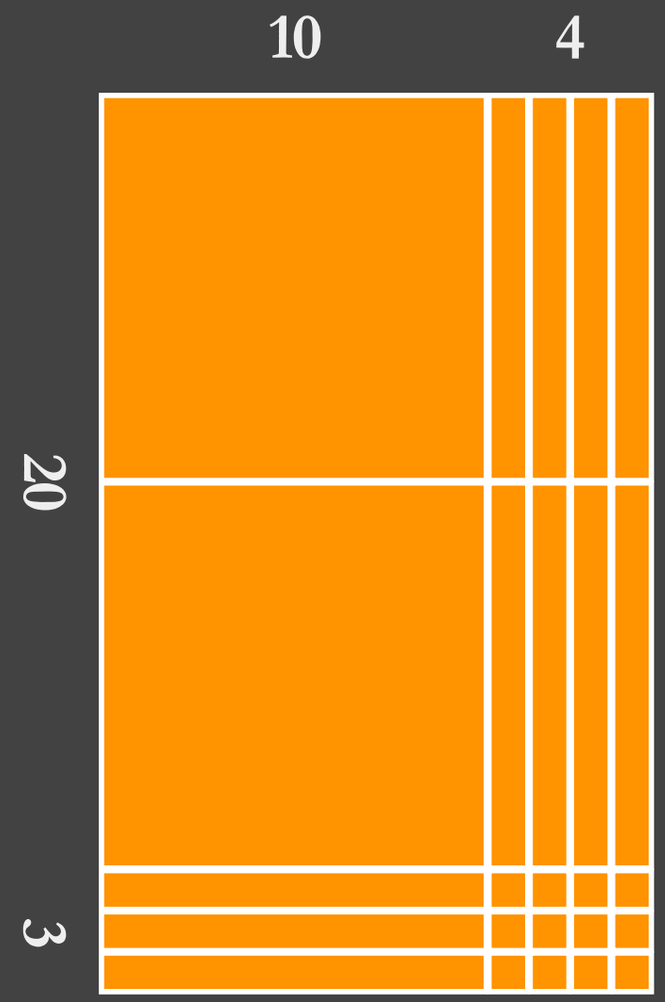
4
10
20
3

How are they the same? different?

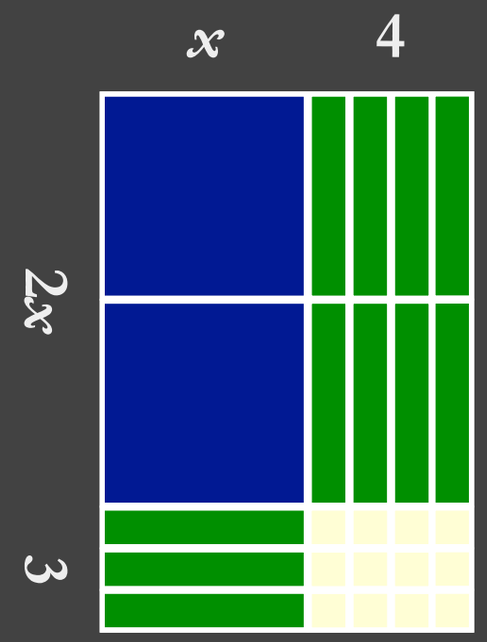


Make as many connections as you can, both conceptually and procedurally.

How are they the same? different?

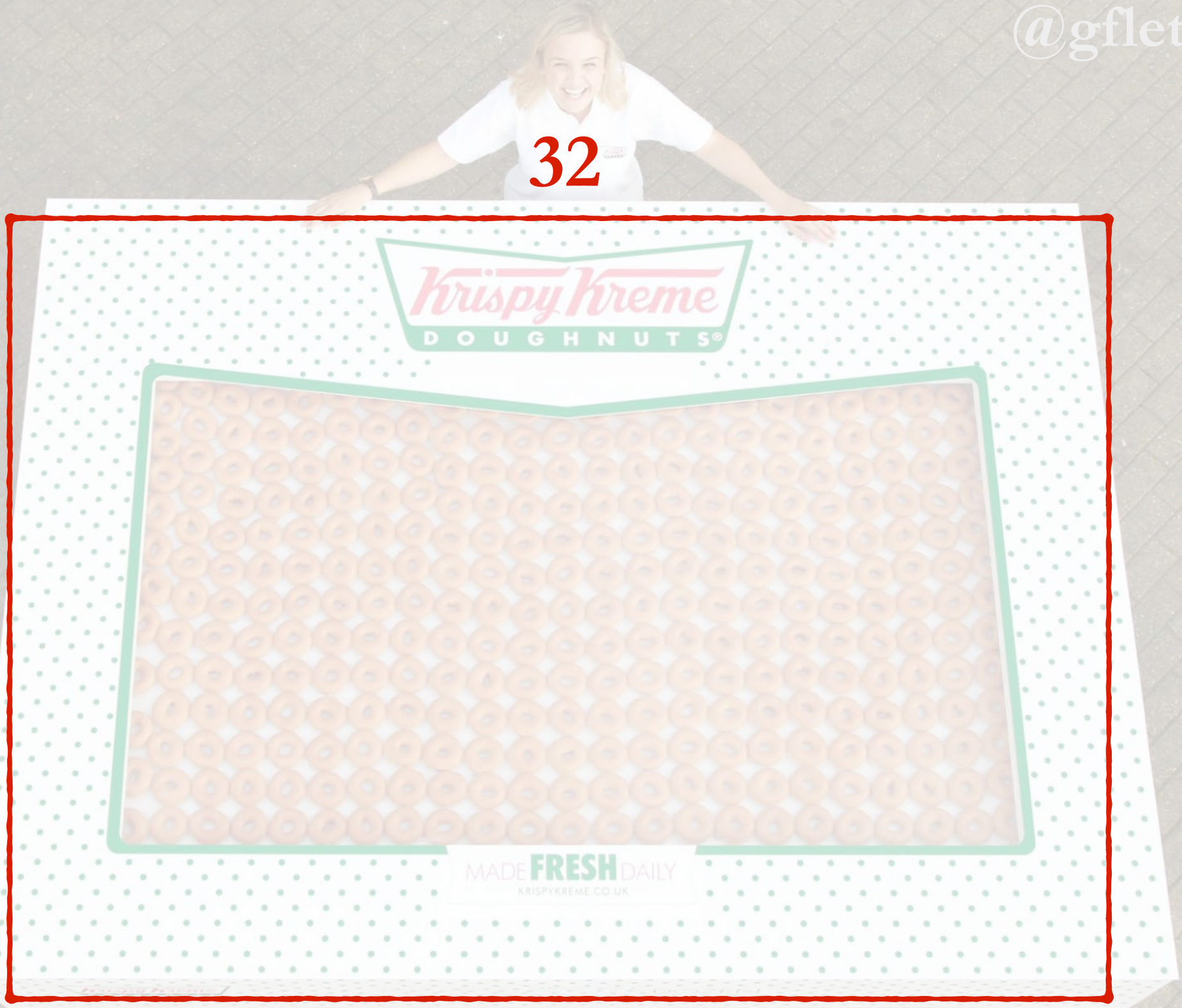


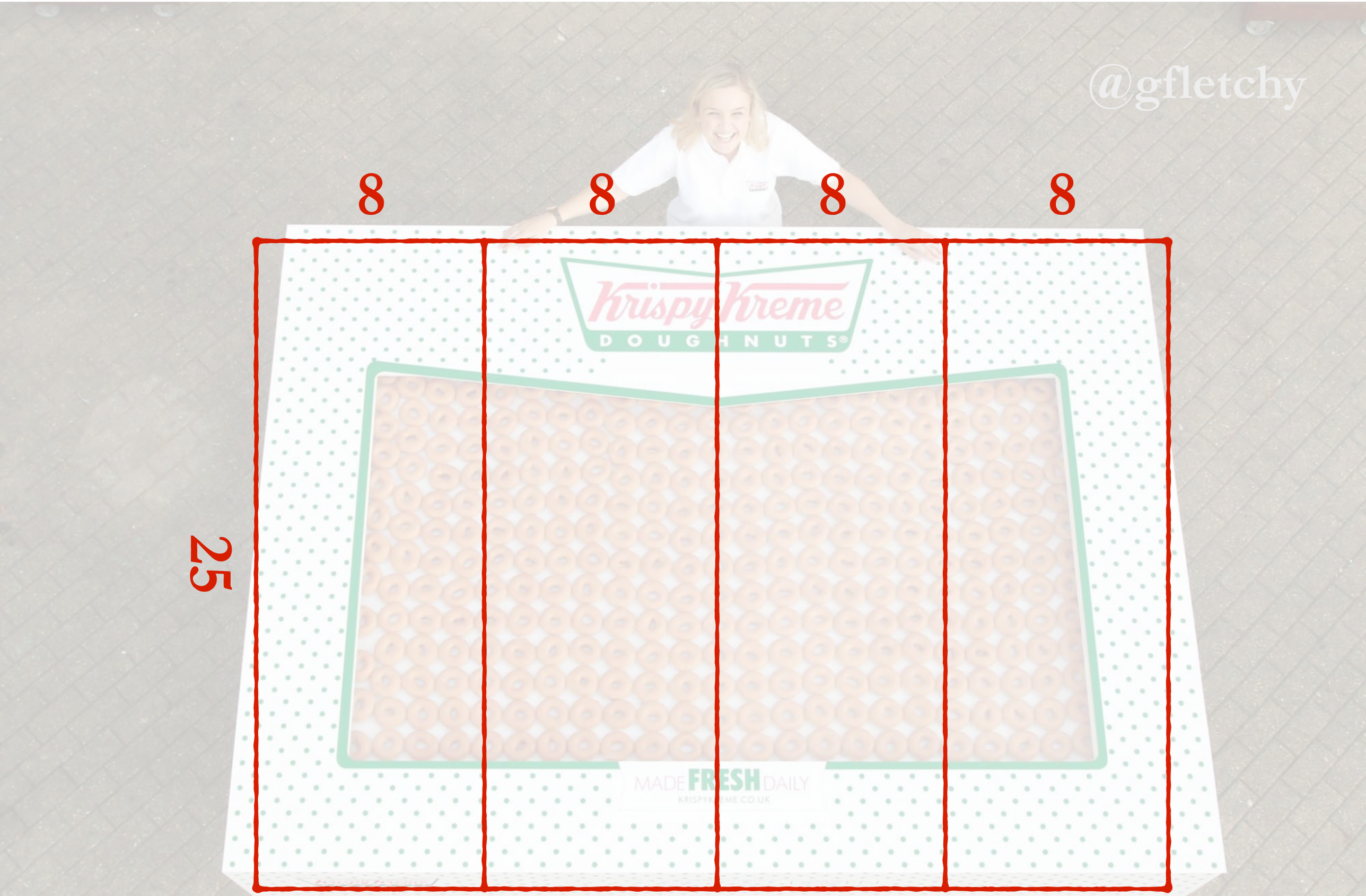
$$20 \times 14 = 2(10)^2 + 11(10) + 12$$



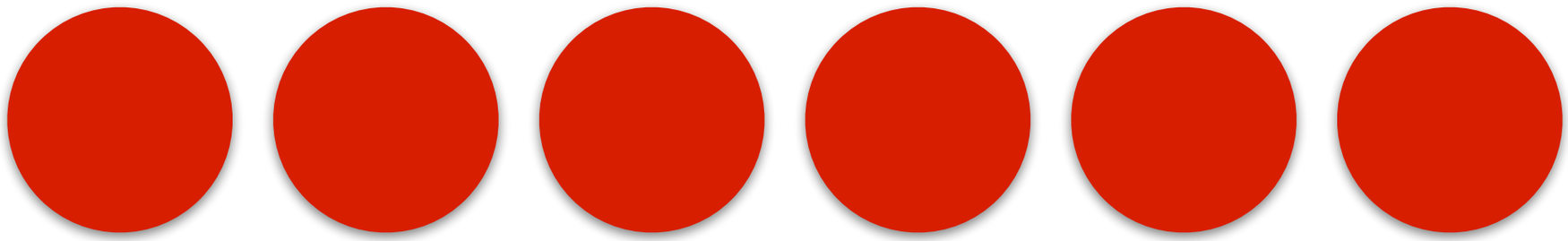
$$(2x + 3)(x + 4) = 2x^2 + 11x + 12$$


@gfletchy
Krispy Kreme
DOUGHNUTS®
MADE FRESH DAILY
KRISPYKREME.CO.UK


32
25
Krispy Kreme
DOUGHNUTS
MADE FRESH DAILY
KRISPYKREME.CO.UK

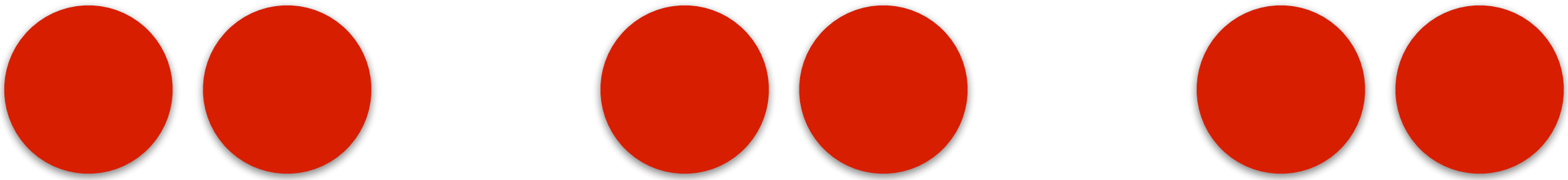

@gfletchy
8
8
8
8
25
Krispy Kreme
DOUGHNUTS
MADE FRESH DAILY
KRISPYKREME.CO.UK

Division: 6 ÷ 3



Division: 6 ÷ 3

The number of groups is known.
How many in each group?



partitive (sharing)

Division: 6 ÷ 3

The number in each group is known.
How many groups?

quotative (measurement)

"The operations of addition, subtraction, multiplication, and division hold the same fundamental meanings no matter the domain in which they are applied."

–Marian Small

Alike & Different

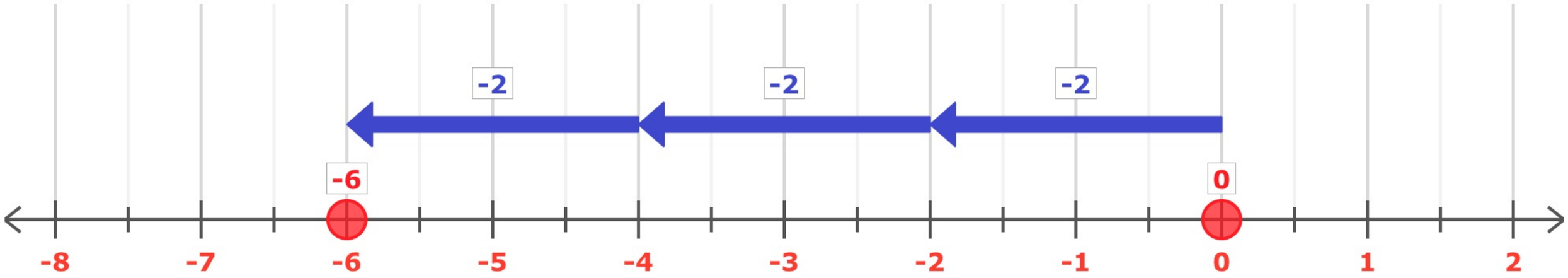
Which two expressions are most alike?

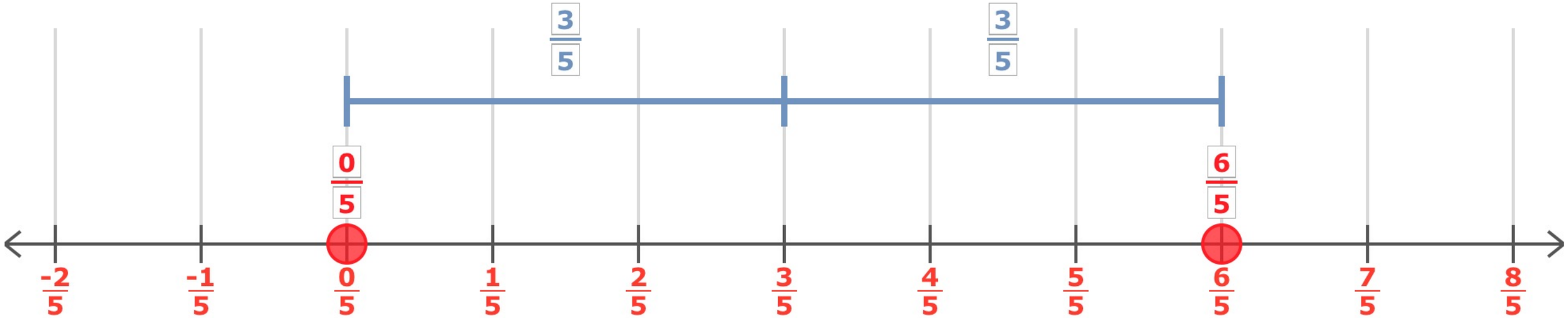
$$60 \div 3,\ 6 \div 0.3,\ 0.6 \div 3$$

$$600 \div 300,\ 6/5 \div 3,\ 6/5 \div 3/5$$

$$(-6) \div (+3),\ (-6) \div (-3),\ 6x \div 3x$$

Why?


-2
-2
-2
-6
0
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2


3/5
3/5
0/5
6/5
-2/5
-1/5
0/5
1/5
2/5
3/5
4/5
5/5
6/5
7/5
8/5

At home, Ralph and Flora spread the beans out on the table. They made two piles, one for each of them.

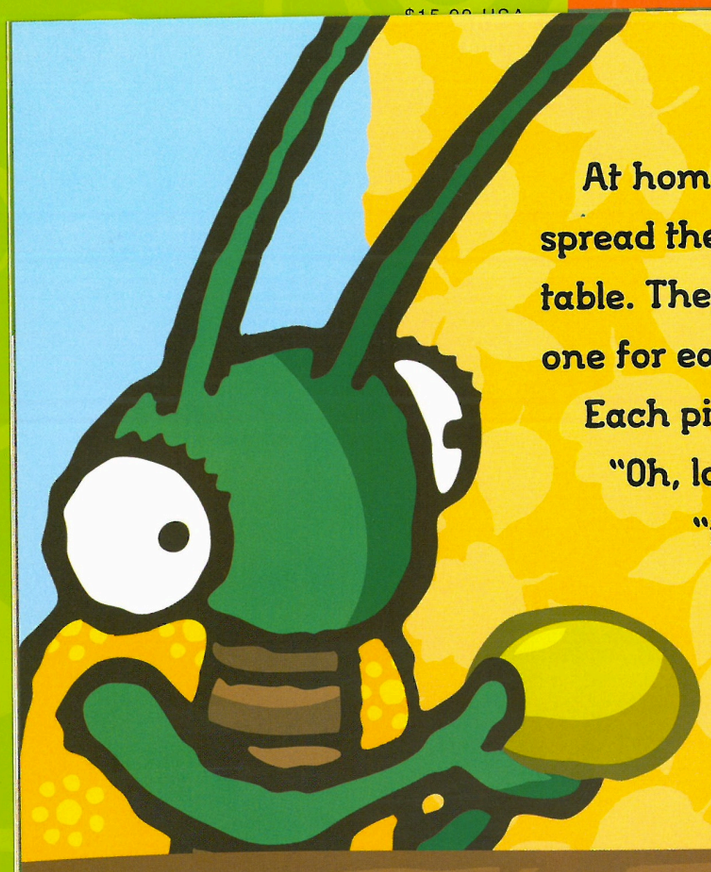
Each pile had six beans.

"Oh, look," said Flora, "there's one left over. You take it, Ralph."

"Bean thirteen?" gasped Ralph. "Never! It's bad luck."

"Ralph," said Flora, "please don't make a fuss."

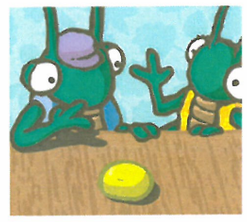
"I'm not eating it," said Ralph, "and you can't make me."



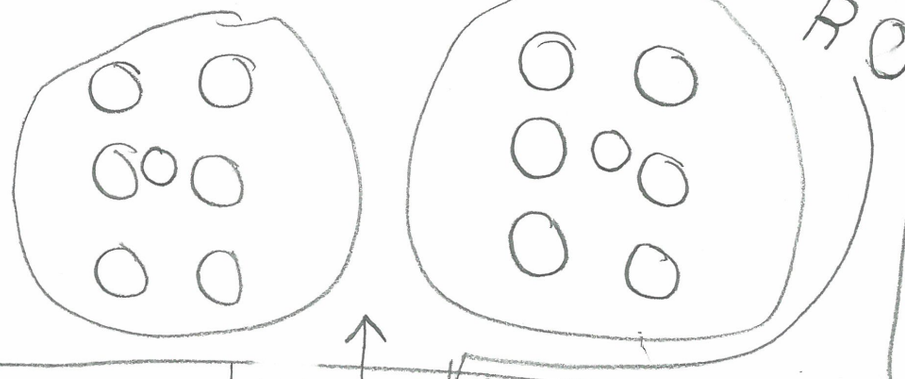
Imaan, Inesha

BEAN

14



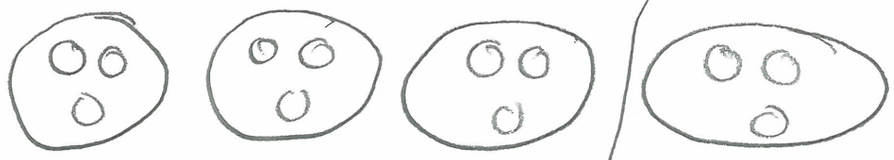
Frist we are starting with 2 groups and 7 beans.



R0

14 ÷ 2 = 6

Now we have 4 group and 3 beans.



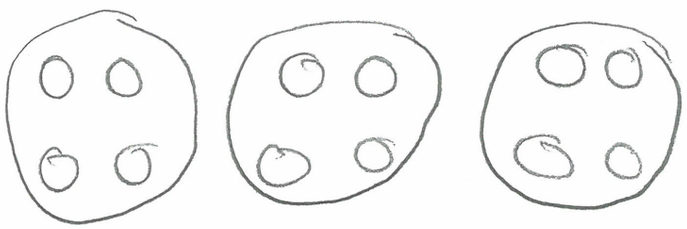
R2

14 ÷ 4 = 3

Now we have 3 groups and 3 beans.

R2

14 ÷ 3 = 3



R2

Now we have 3 groups and 4 beans.

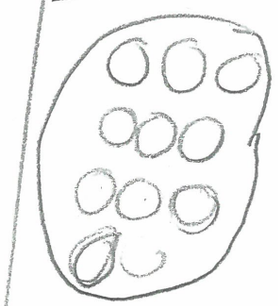
14 ÷ 3 = 4

R4

Now we have 5 group 2 beans.

14 ÷ 5 = 2

Now we have 1 group of 10's.



R4

Seesaw

standard:

Act 1

Watch the video:

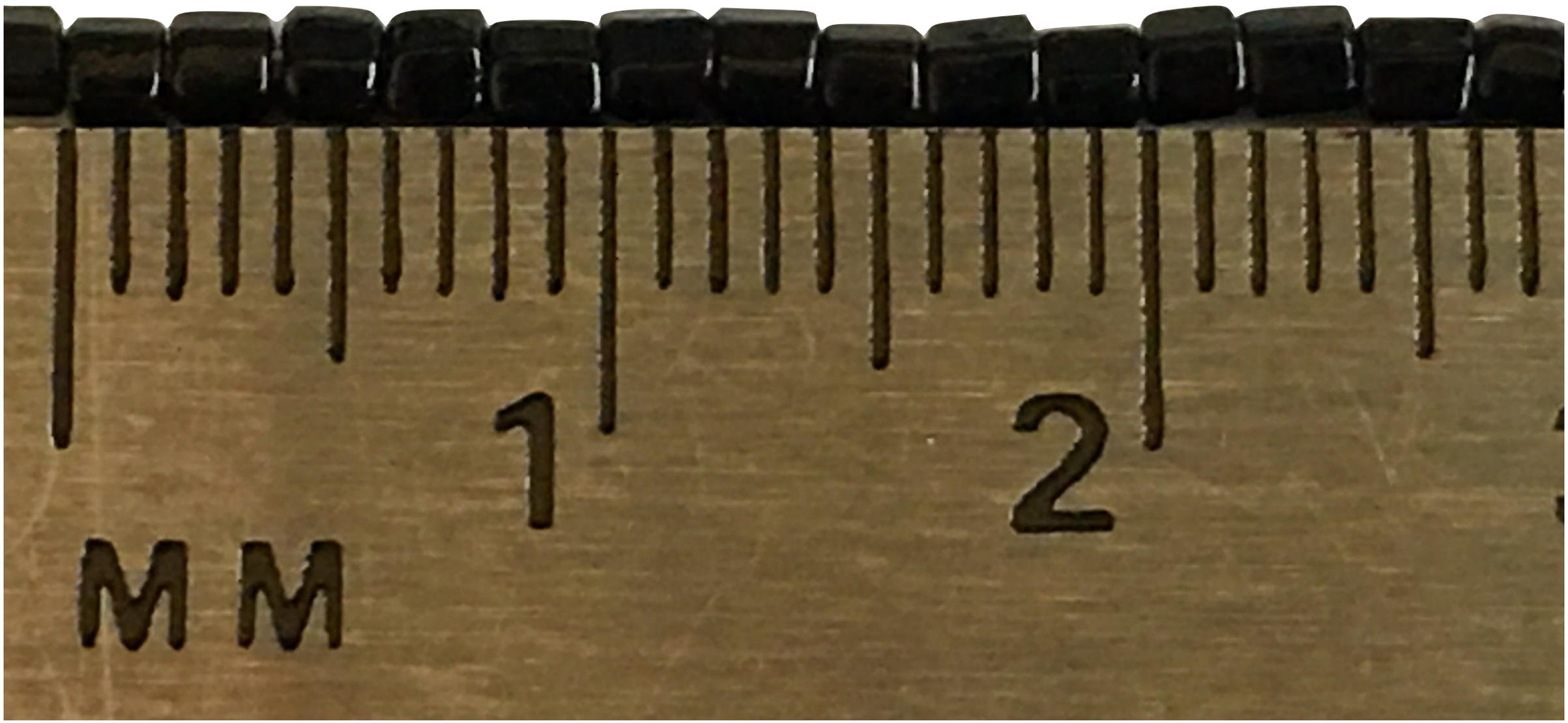
What do you notice? What do you wonder?

- How many bricks will it take balance out the seesaw? Estimate.
- Write an estimate you know is too high. Write an estimate you know is too low.

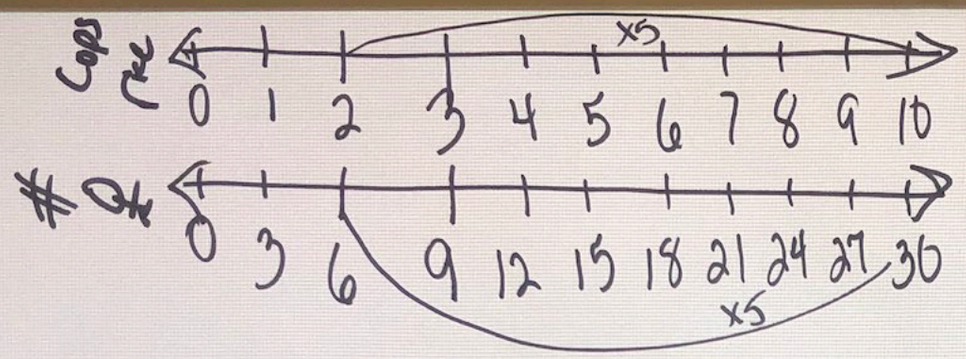
Act 2

Weight of a Brick


12.8 cm
4.4 cm

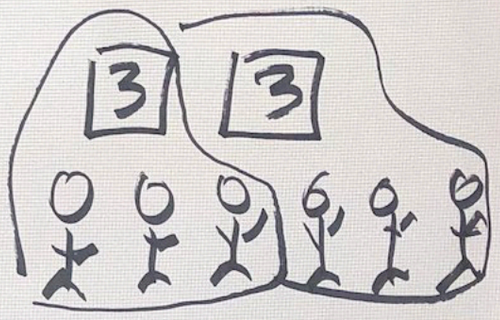


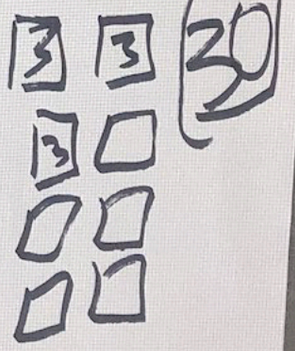
Marc Garneau (@314Piman)



$$\frac{6 \text{ people}}{2 \text{ cups}} \div \frac{2}{2} = \frac{3 \text{ people}}{1 \text{ cup}}$$

$$\frac{3 \text{ people}}{1 \text{ cup}} \times \frac{10}{10} = \frac{30}{10}$$





C	# of people
2	6
3	9
1	3
10	30
15	45

×3 ×3 ×3 ×3 ÷3

cups of rice	number of people
2	6
3	9
10	30
	45

×5 ×5

HANDOUT 3

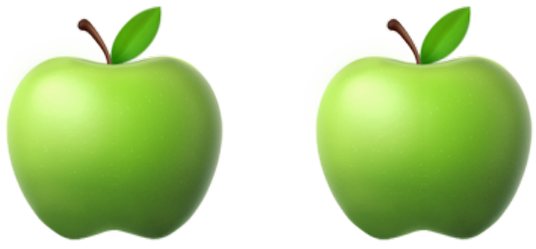
Subtraction: 5 – 2

take away

removal

Subtraction: 5 − 2

difference

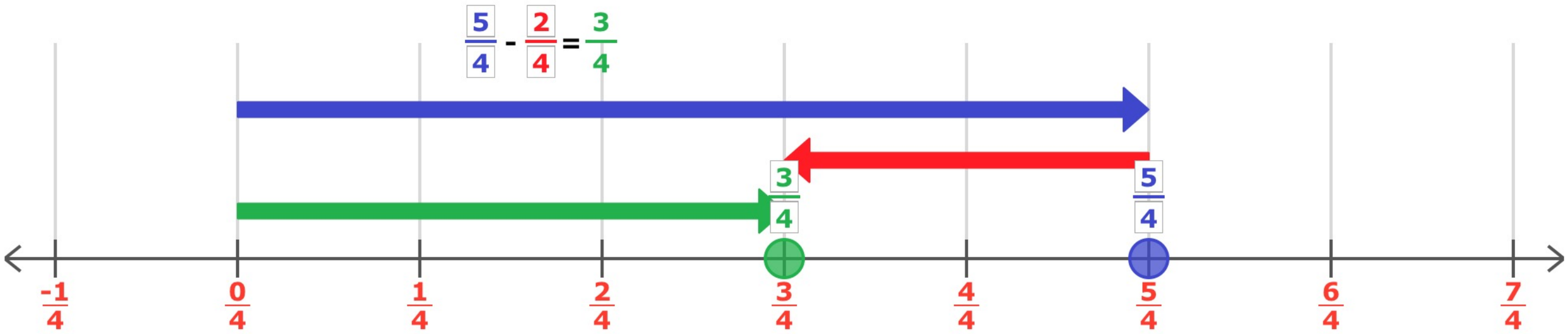


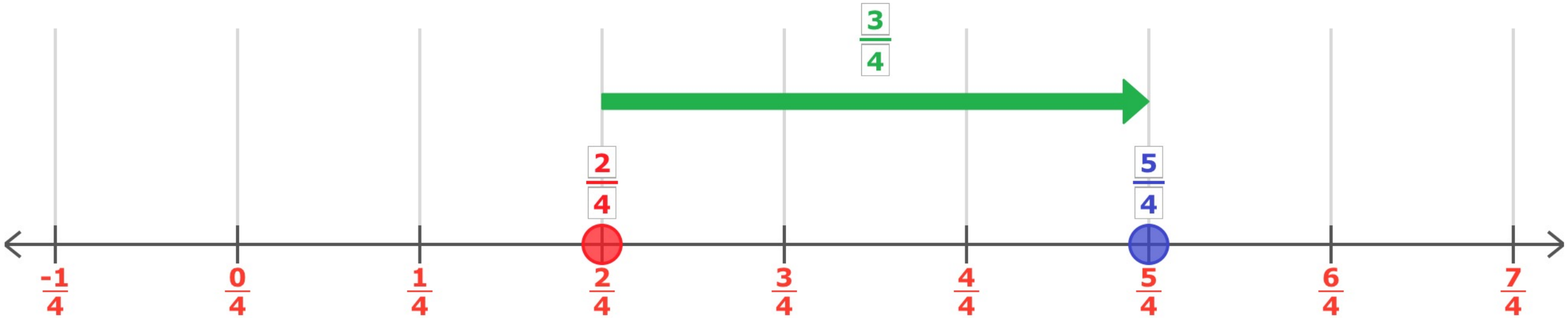
comparison

"The operations of addition, subtraction, multiplication, and division hold the same fundamental meanings no matter the domain in which they are applied."

–Marian Small

$$\frac{5}{4} - \frac{2}{4} = \frac{3}{4}$$



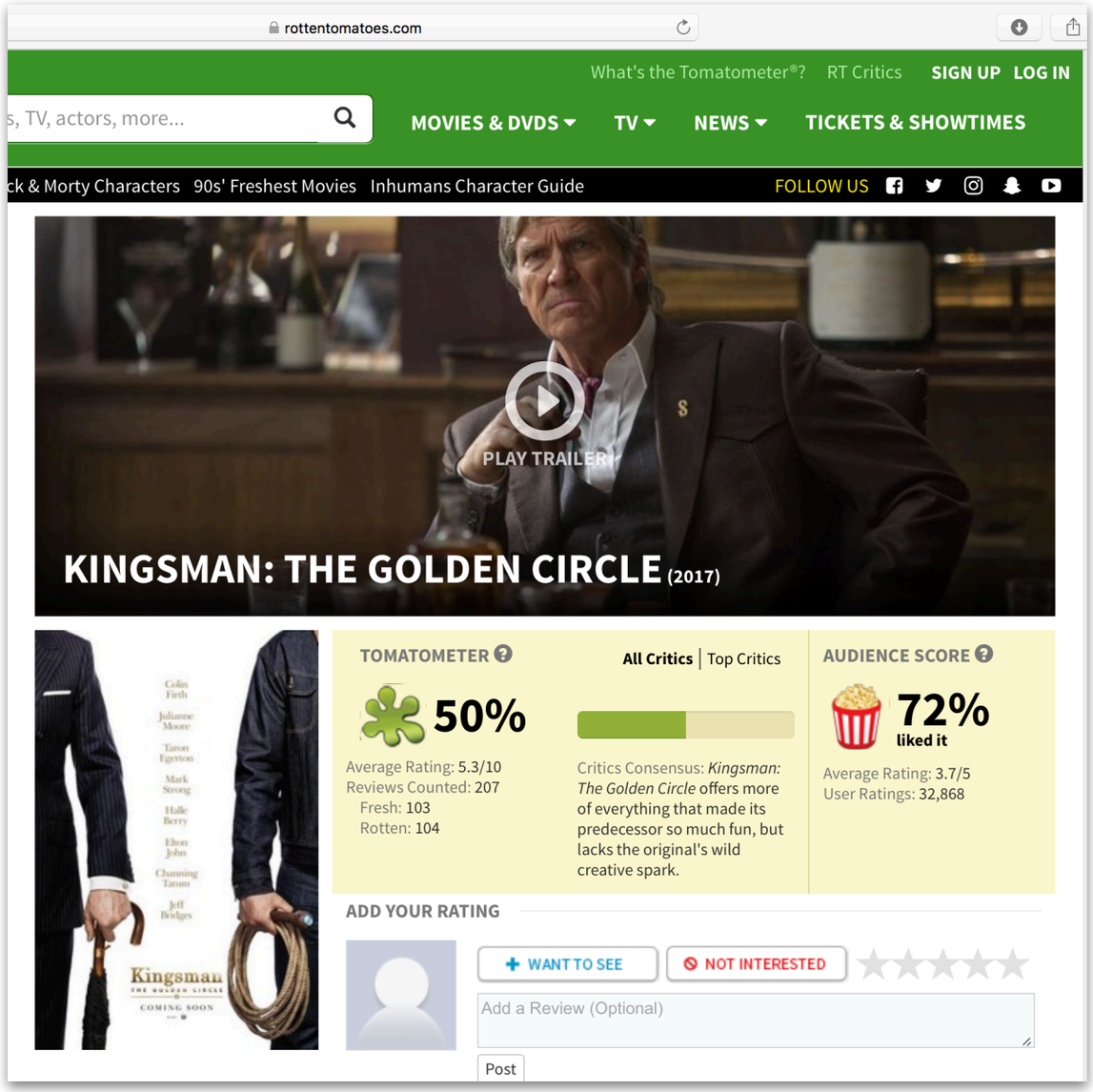

3/4
2/4
5/4
-1/4
0/4
1/4
2/4
3/4
4/4
5/4
6/4
7/4

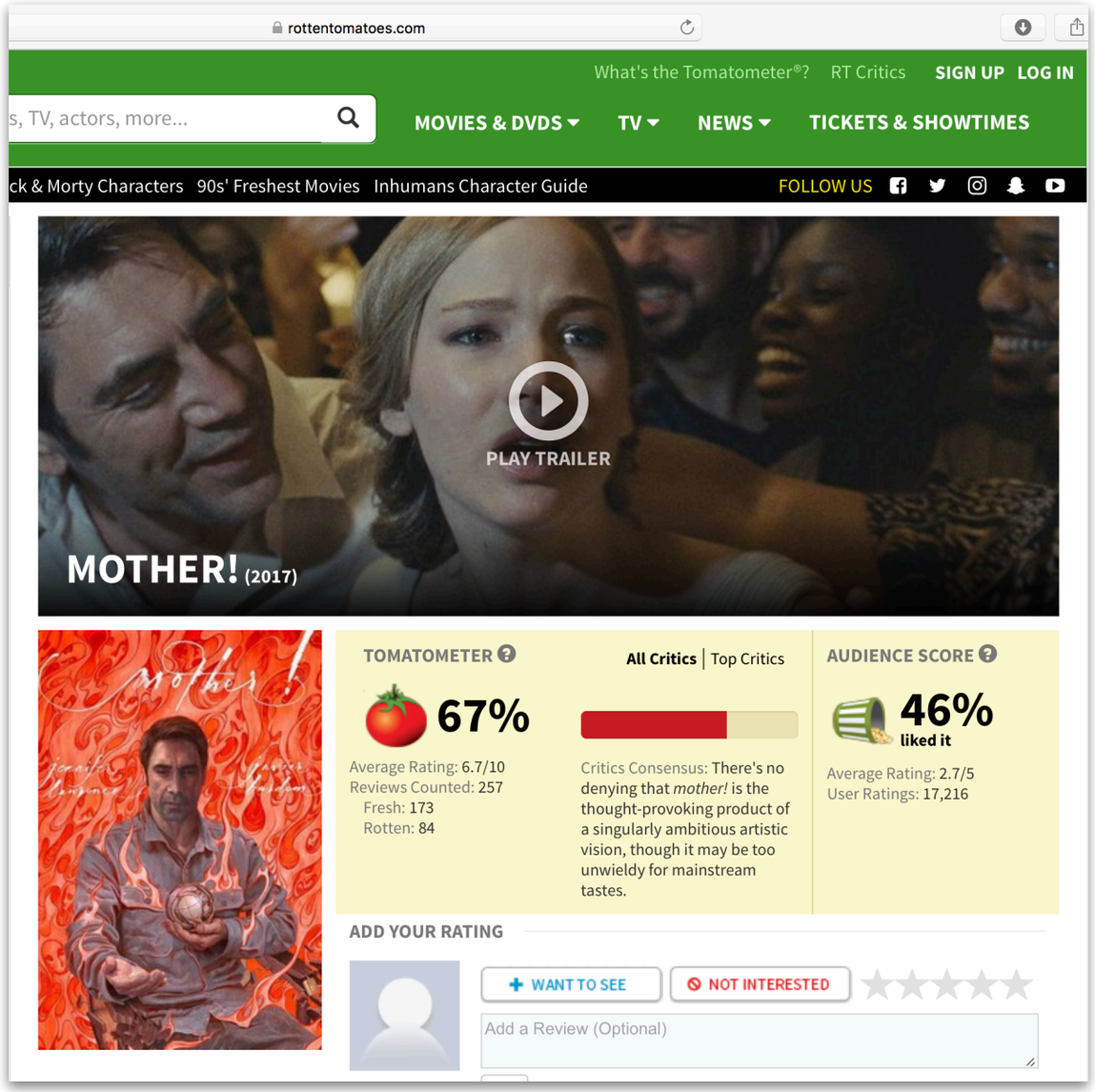
$$1001 - 2$$

$$1001 - 999$$

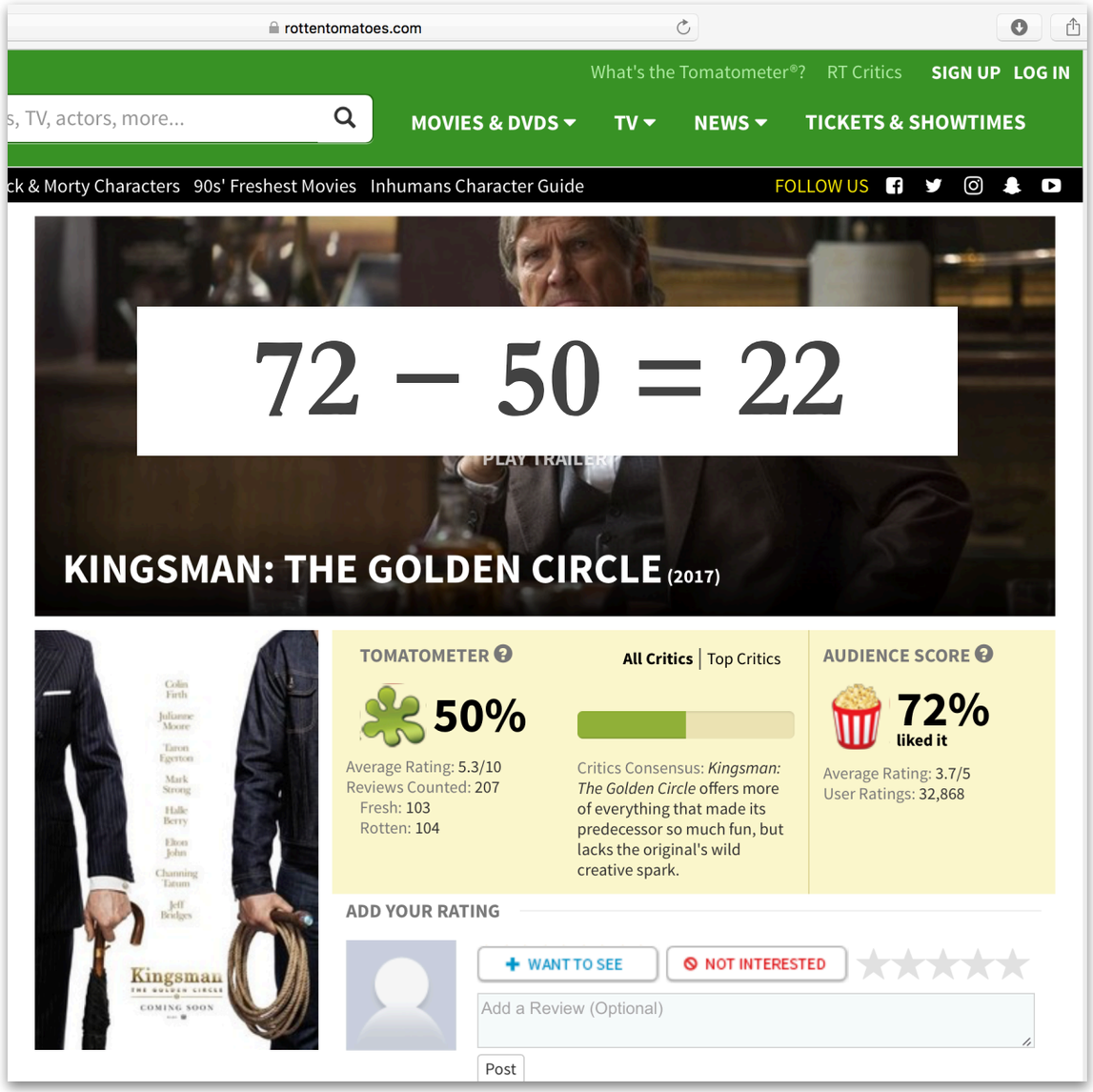
$$63 - 28$$

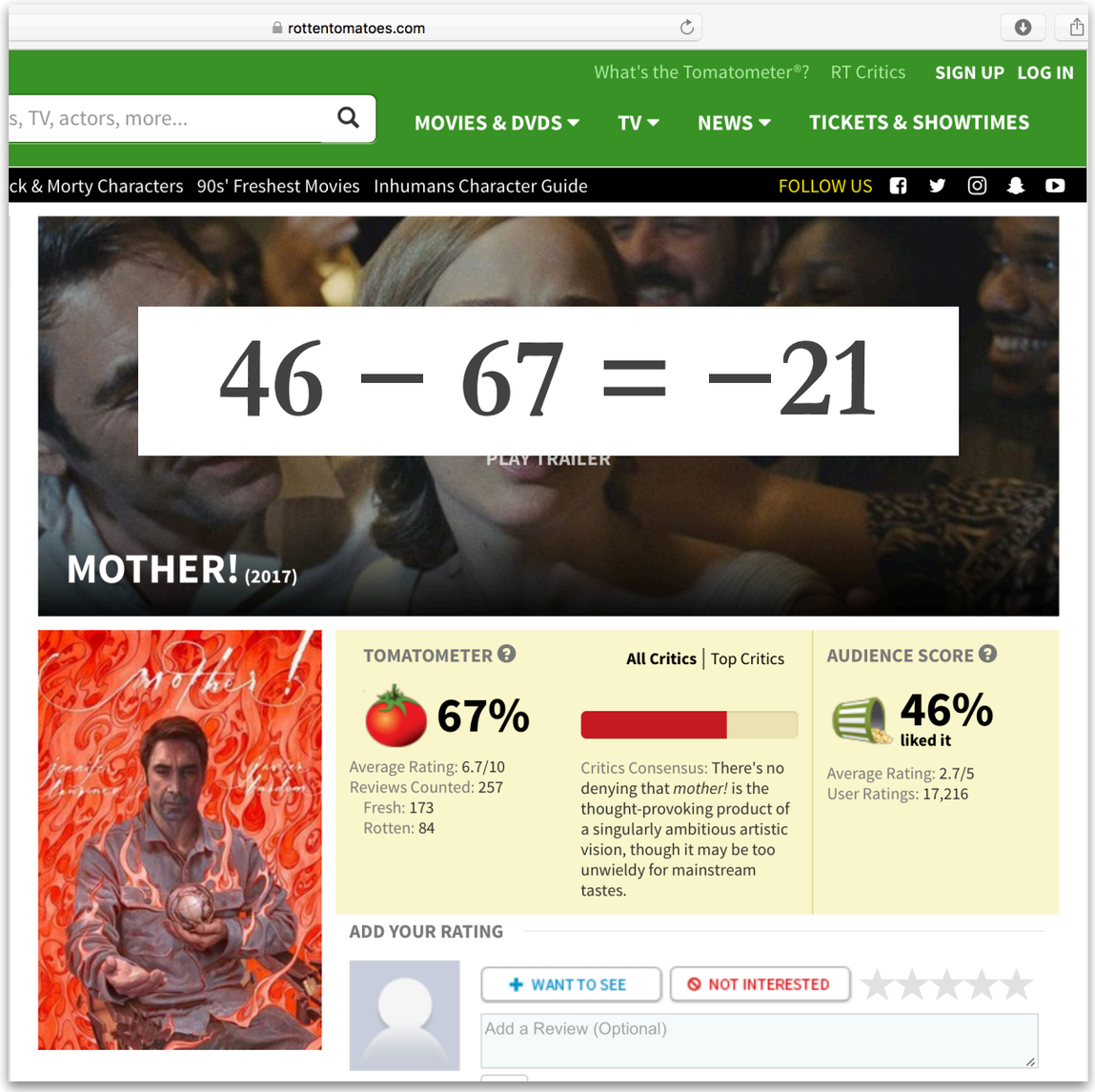
Rotten Tomatoes



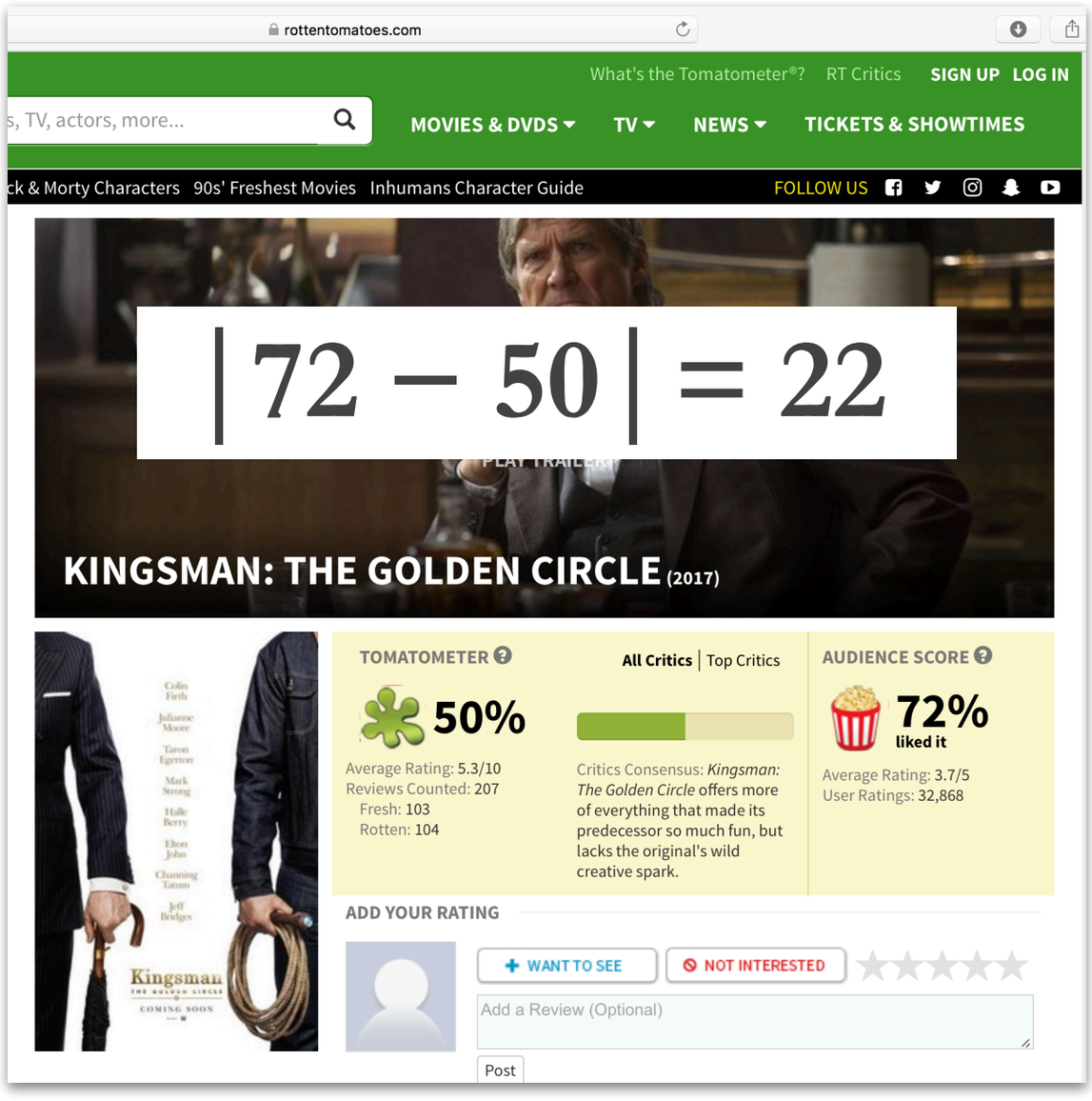


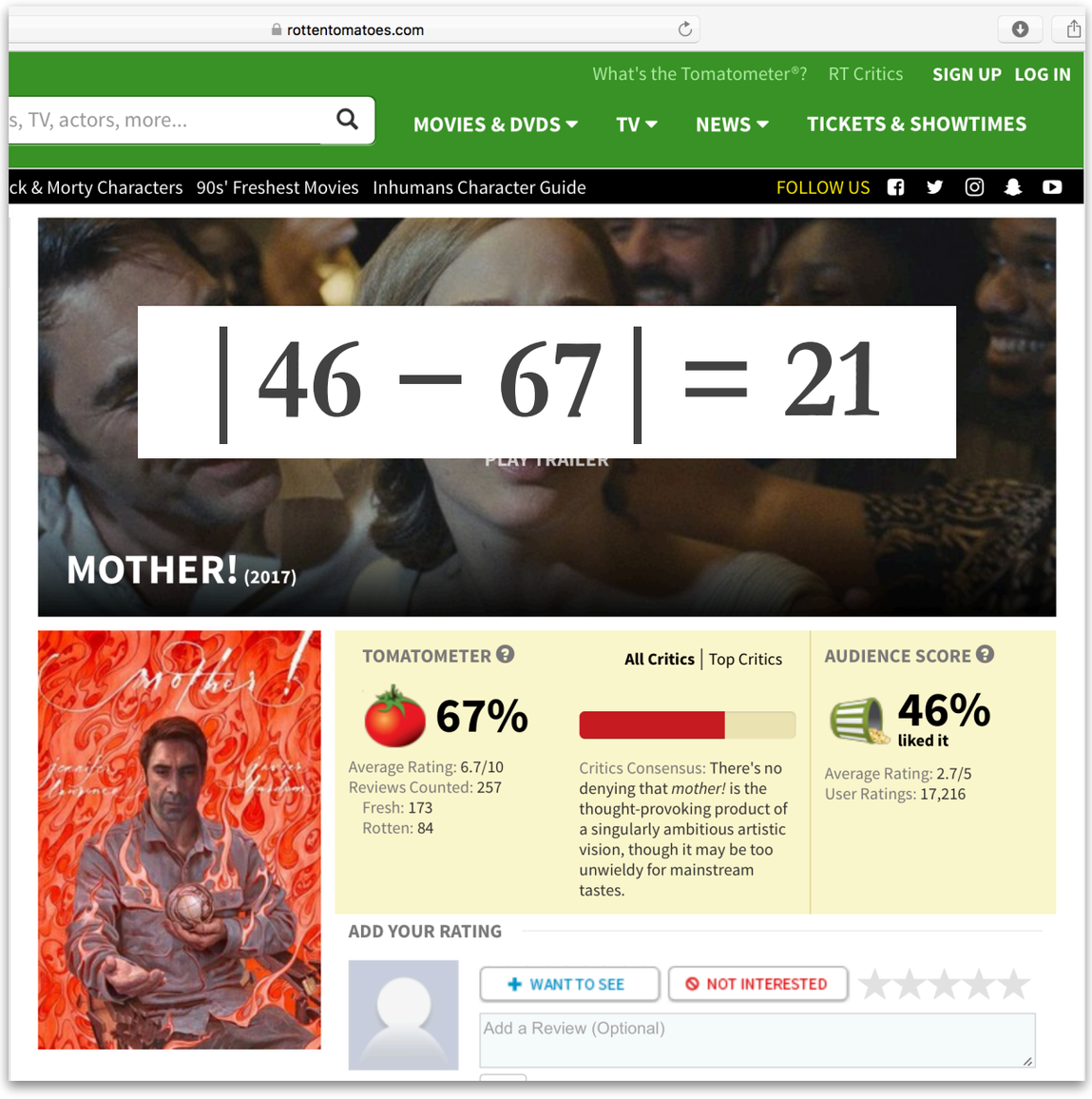
Rotten Tomatoes





Rotten Tomatoes



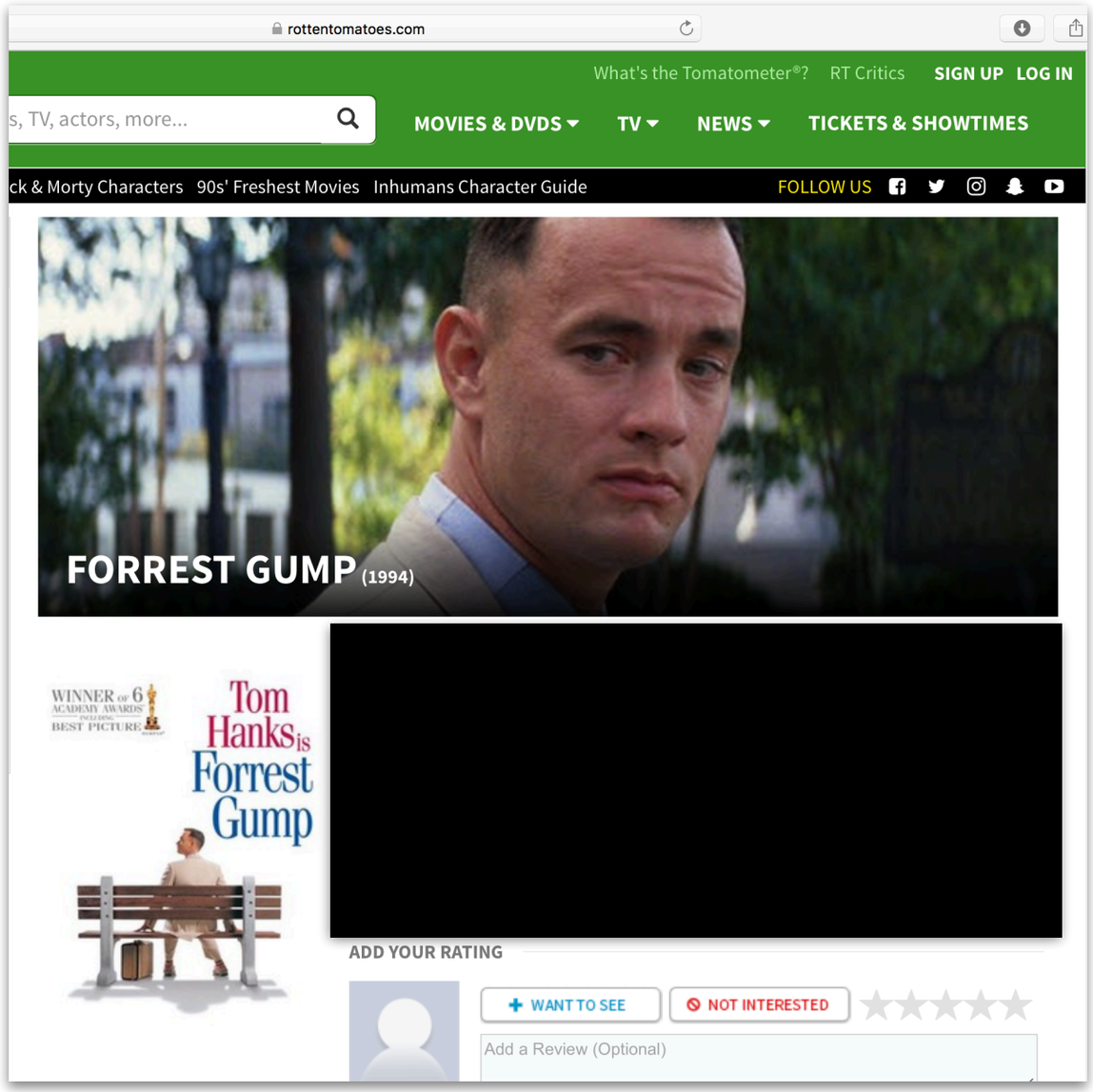


Rotten Tomatoes

Everyone's a critic.

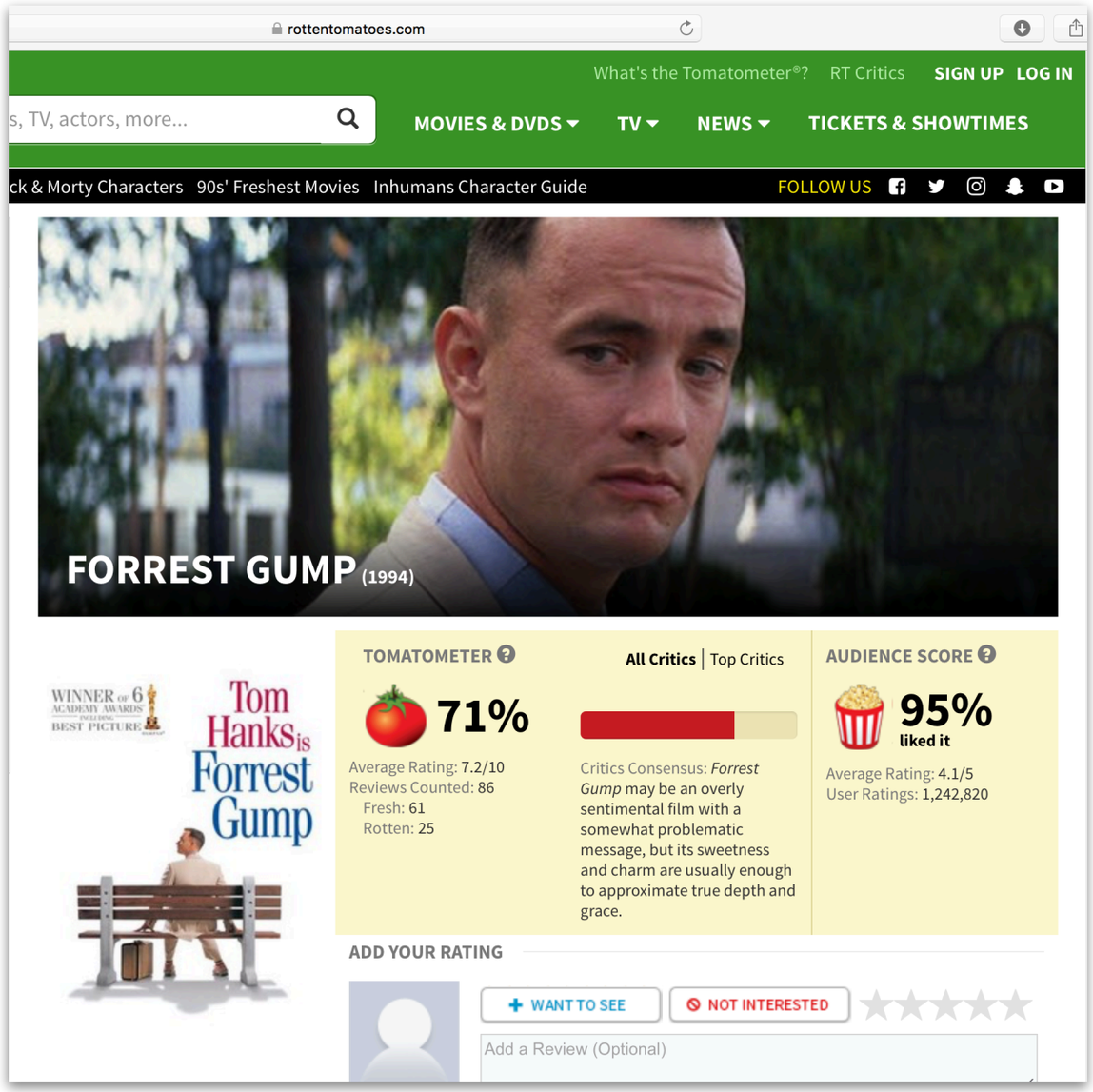
Add your rating.

Call it x.



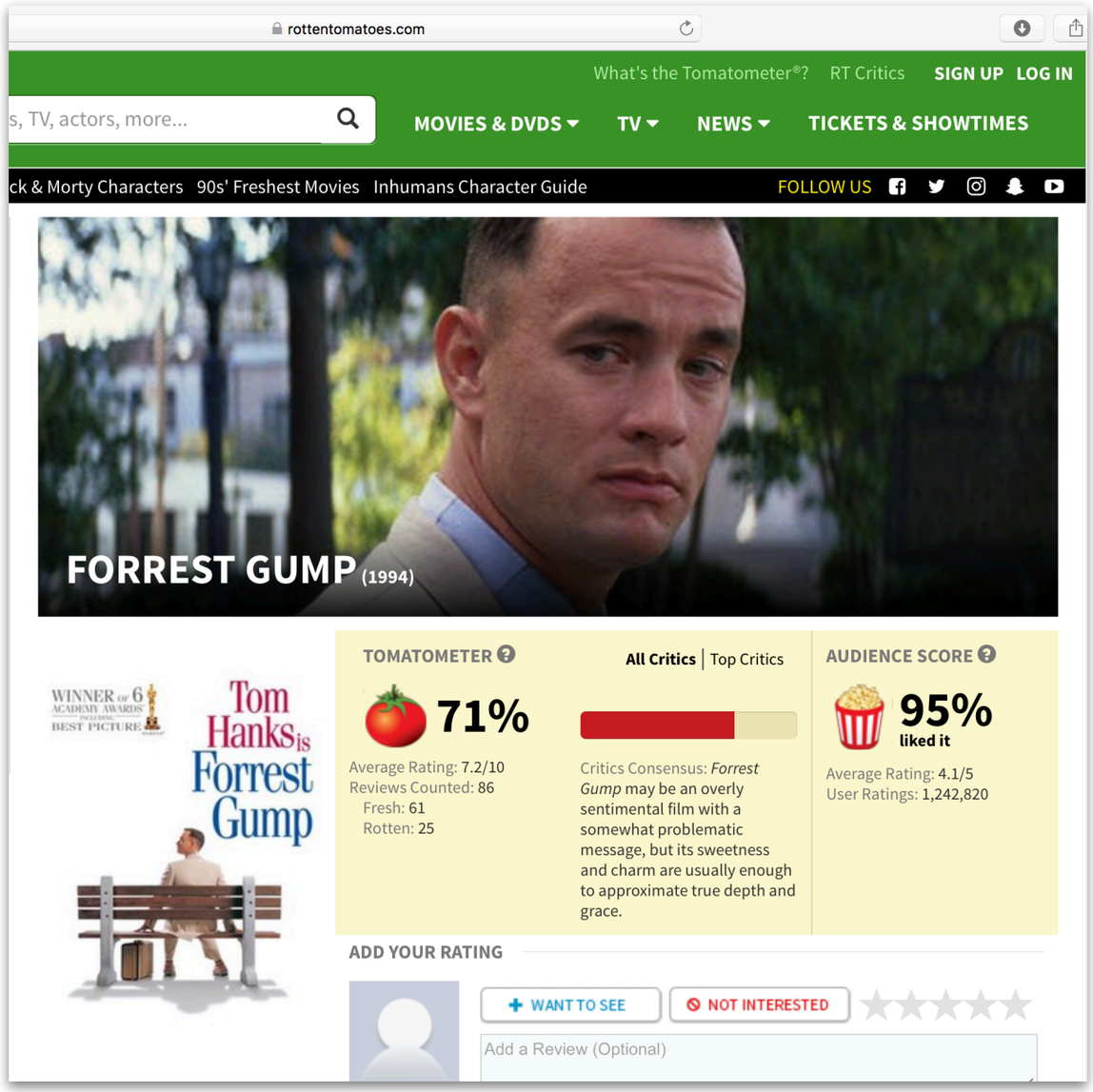
Rotten Tomatoes

$$x - 71$$



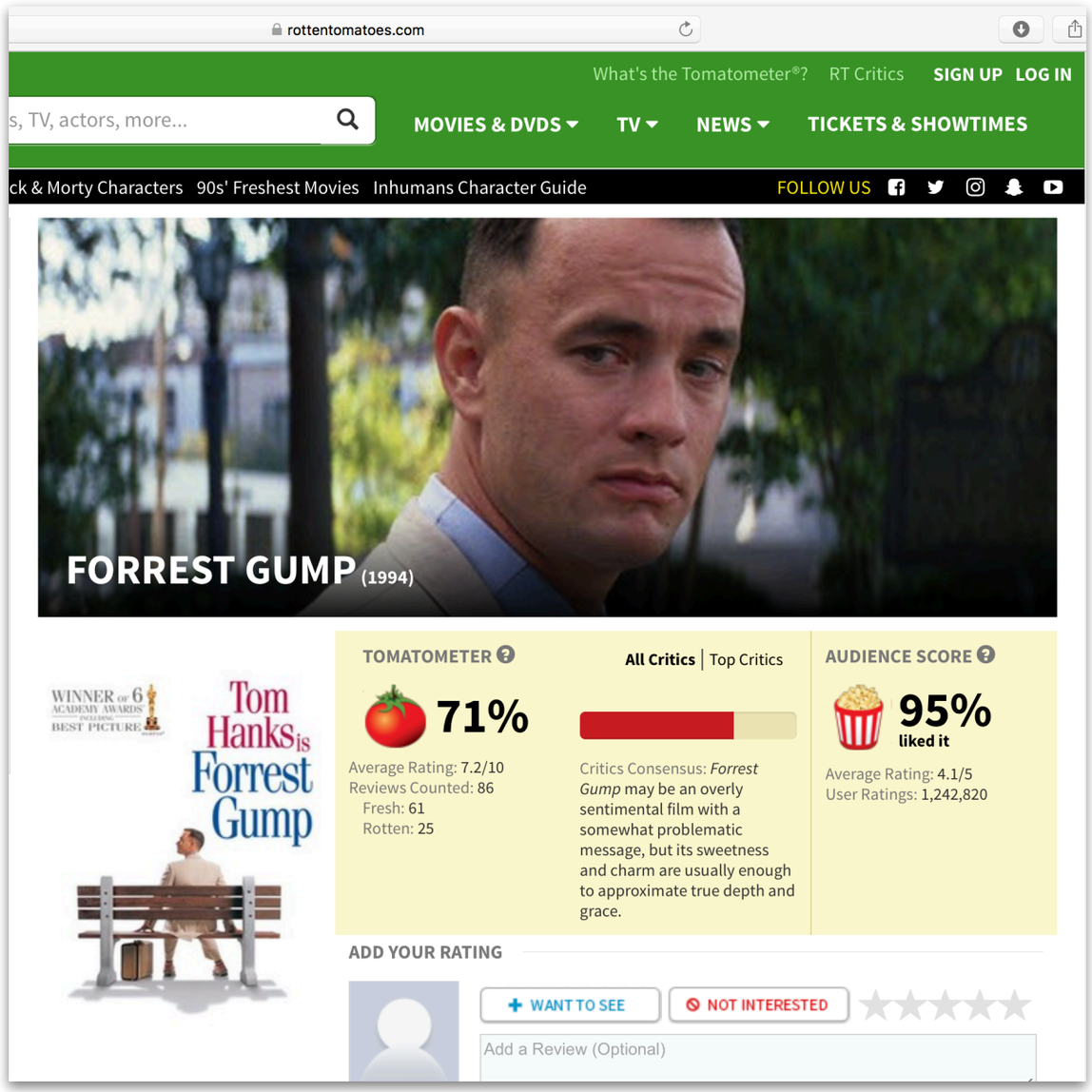
Rotten Tomatoes

$$|x - 71|$$



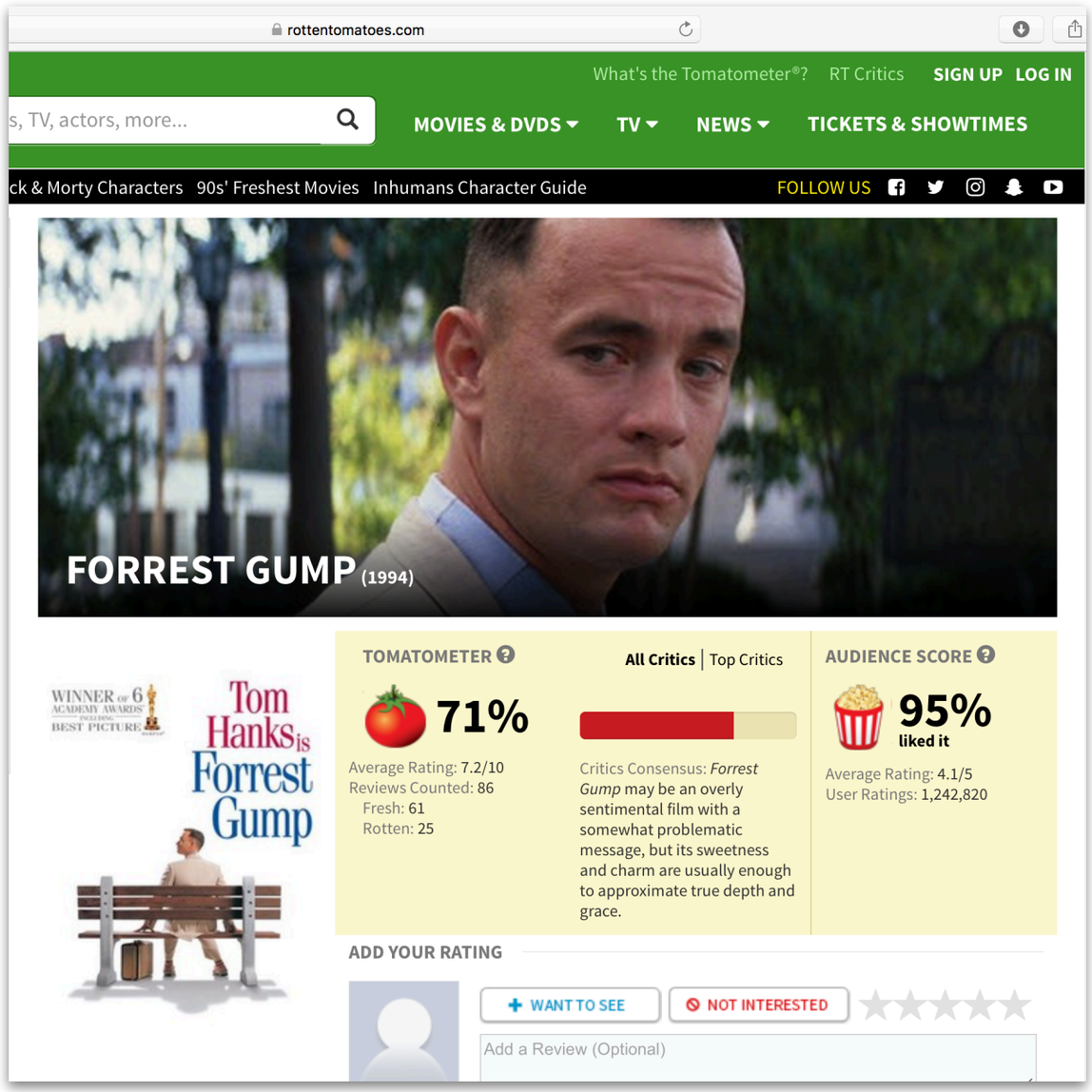
Rotten Tomatoes

$$|x - 71| = 4$$



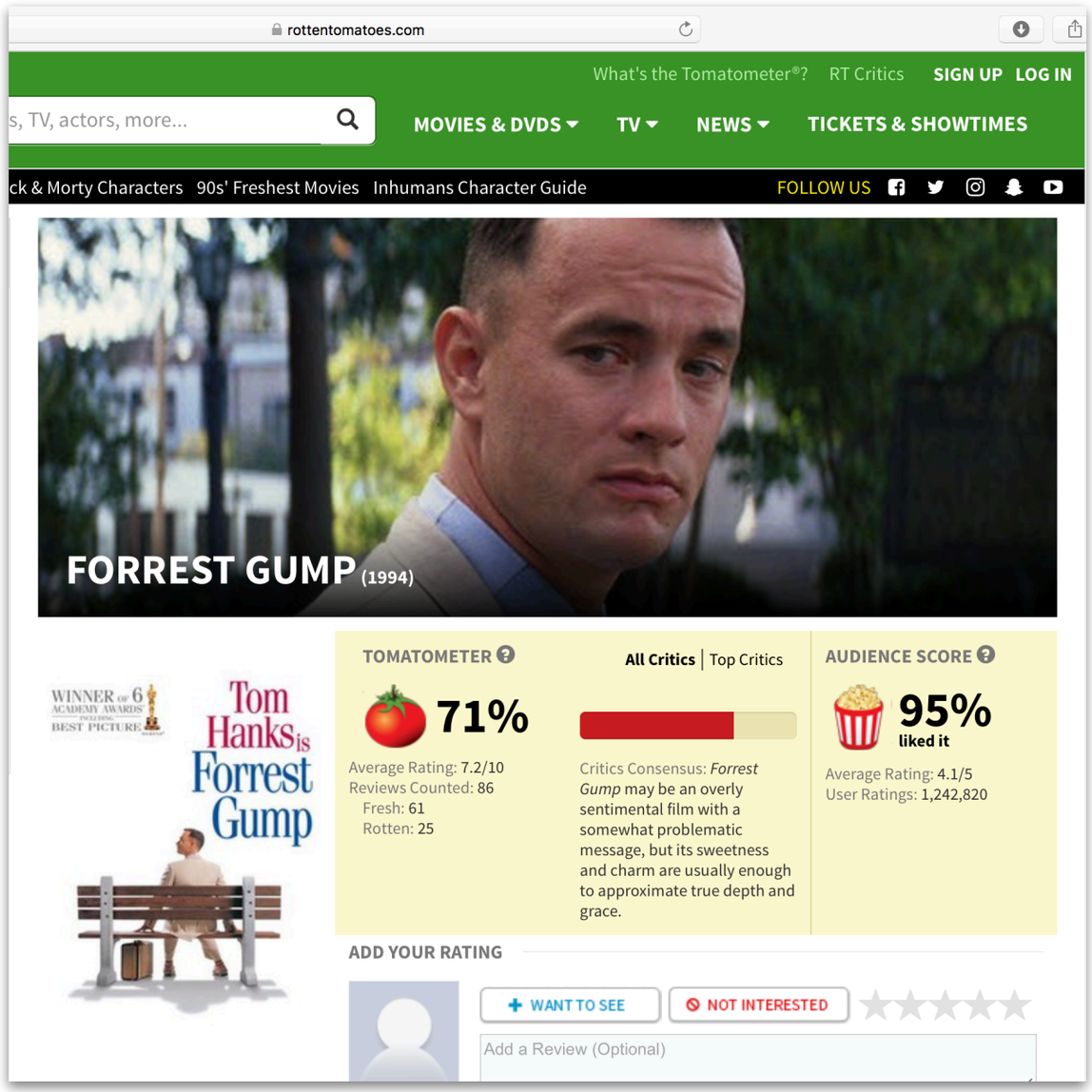
Rotten Tomatoes

$$|x - 71| < 10$$



Rotten Tomatoes

$$|x - 71| \geq 20$$



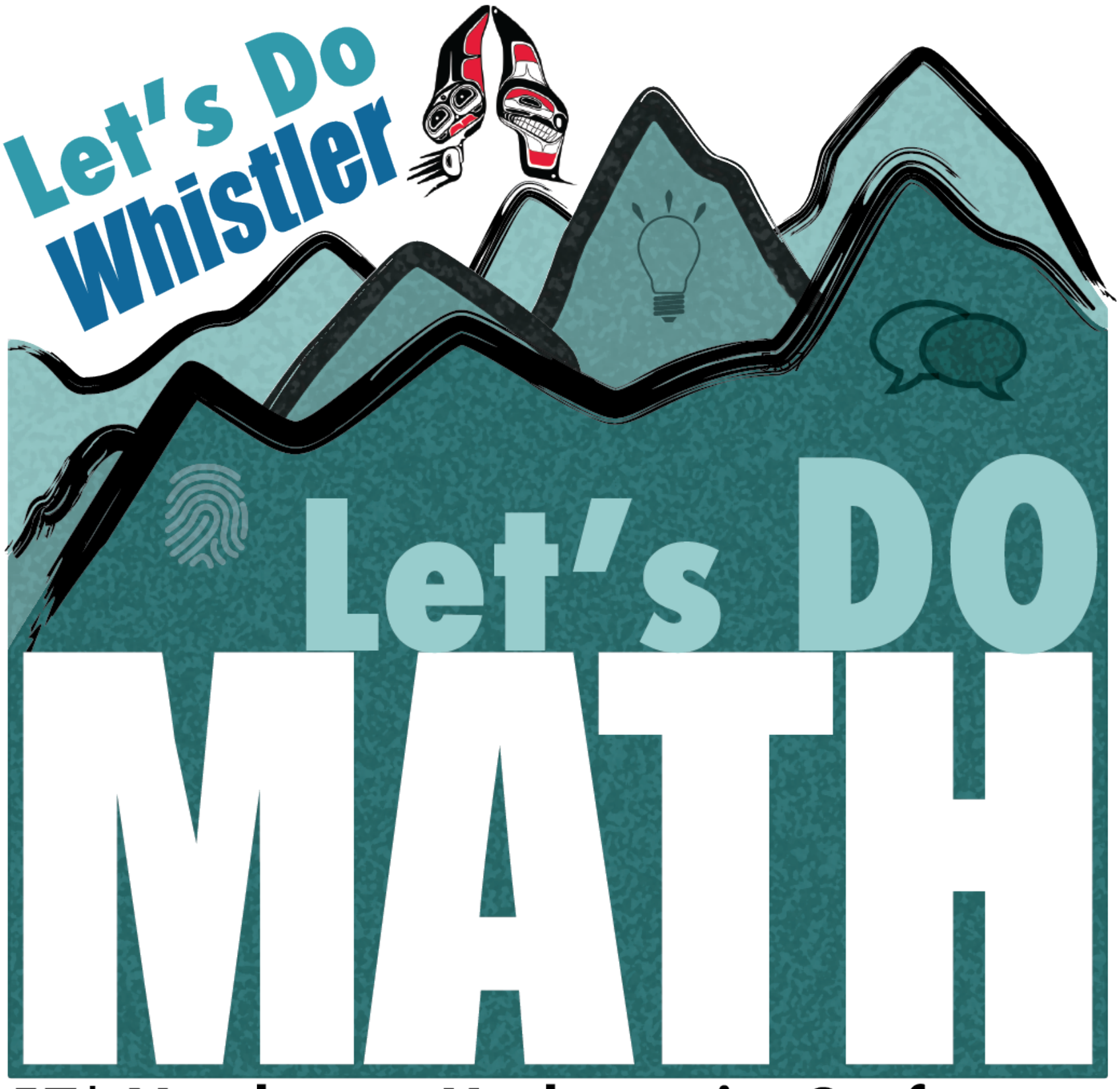
Subtraction: Across the Grades

Which meaning is more *meaningful*?

Solve for x: $|x - 5| = 2$

Simplify $(1.89t + 15) - (1.49t + 12)$, where t represents the number of pizza toppings.

Determine the slope of the line that passes through the points (2, 1) and (6, 4).



57th Northwest Mathematics Conference

October 18-20, 2018 • www.bcamt.ca/nw2018