

# St. Jude MATH-A-THON



St. Jude patient  
Lilly

**LEVEL 8**  
FUNBOOK

# Welcome to the St. Jude Math-A-Thon!

Thank you for supporting St. Jude Children's Research Hospital®. Because of fundraising programs like St. Jude Math-A-Thon and supporters like you, St. Jude is leading the way the world understands, treats and defeats childhood cancer and other life-threatening diseases. You're an important part of making this fundraiser a success and participation is easy:

- 1** Raise money online using the tools available at **stjude.org/math**
- 2** Complete the math worksheets in this workbook
- 3** Earn cool prizes!

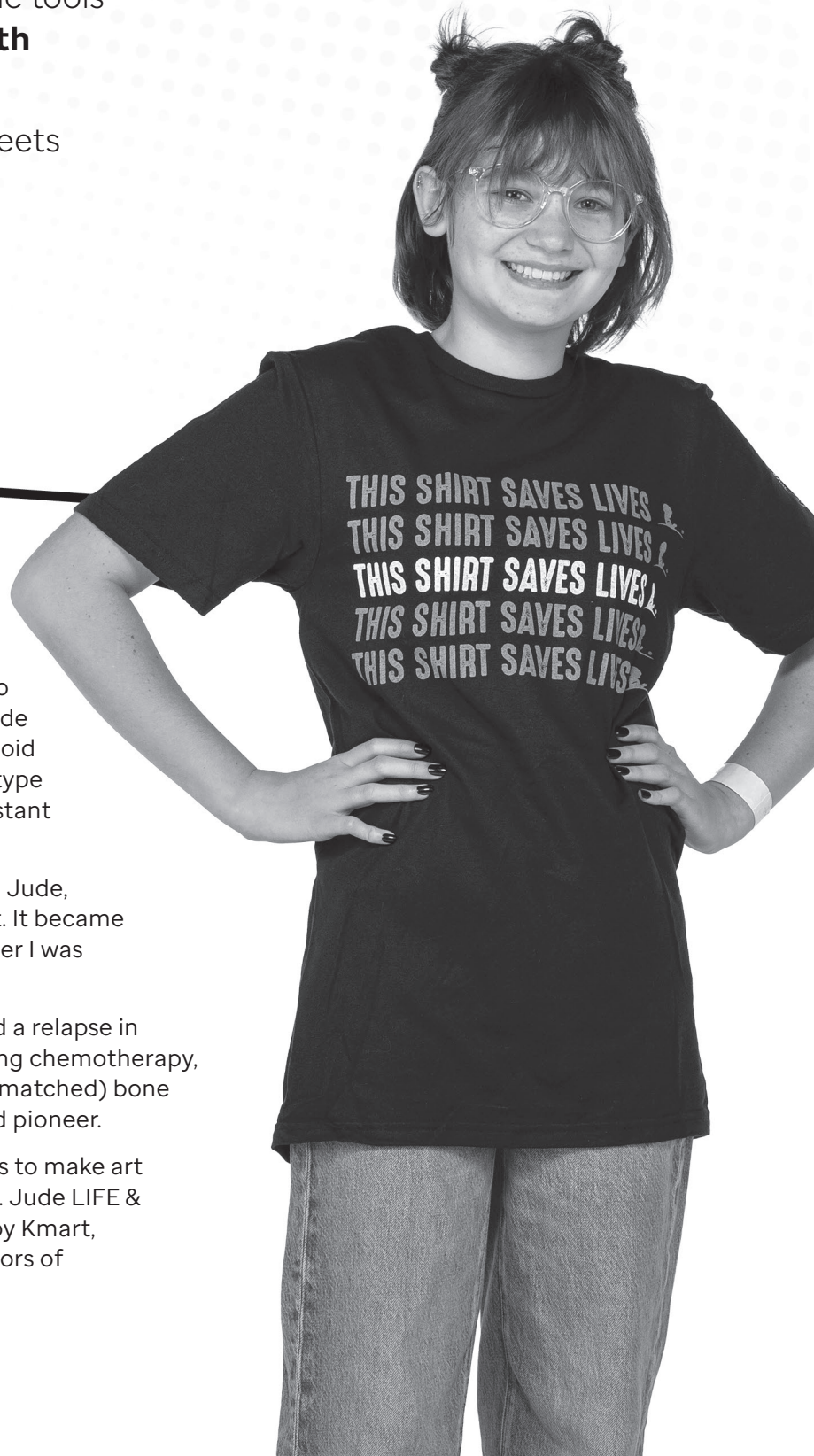
## Meet Lilly

At the age of 5, Lilly was referred and airlifted to St. Jude with a diagnosis of blood cancer. St. Jude doctors pinpointed the diagnosis as acute myeloid leukemia (AML), and worse, Lilly had a rare subtype that made her AML more aggressive, more resistant to treatment and more likely to relapse.

Lilly underwent months of chemotherapy at St. Jude, during which time she became interested in art. It became "kind of a coping mechanism," she said. "However I was feeling I could put into my art."

After going home cancer-free, Lilly experienced a relapse in 2016. She returned to St. Jude, this time receiving chemotherapy, radiation therapy and a haploidentical (or half-matched) bone marrow transplant, a procedure St. Jude helped pioneer.

Today, Lilly is a creative teenager who continues to make art and enjoys theater. She gets checkups at the St. Jude LIFE & After Completion of Therapy Clinic Presented by Kmart, which is specially designed for long-term survivors of childhood cancer who were treated at St. Jude.



# How Math Helps St. Jude

Math is used every day on the St. Jude campus. From careful measurements for patient medicine to the complex mathematics needed in our state-of-the-art research facilities, numbers play an important role in helping our patients. As you complete each worksheet, know that you're sharpening important skills that are used every day to help the kids of St. Jude.



- The St. Jude campus is always expanding to further our scientific research and create more cures. Math plays an important role in our fundraising efforts.
- Did you know treatment can cost on average \$450,000 for a family to fight childhood cancer? Your Math-A-Thon fundraising efforts transform that big number into zero! Families never receive a bill from St. Jude for treatment, travel, housing or food – so they can focus on helping their child live.
- Scientists at St. Jude research facilities use math to plan their experiments and figure out how many samples they need. They also use math to look at the data they collect, find patterns and understand how well treatments work. This helps them make sure their results are accurate and useful.

## Ready to Sign Up?

St. Jude relies on the power in numbers. Math plays a vital role in nearly every aspect of our campus, but the strength in numbers is never more powerful than when it helps our patients. That's where you come in – turn to the back page of your funbook to start the sign-up process. You can even have your parents scan the QR code and sign up online.

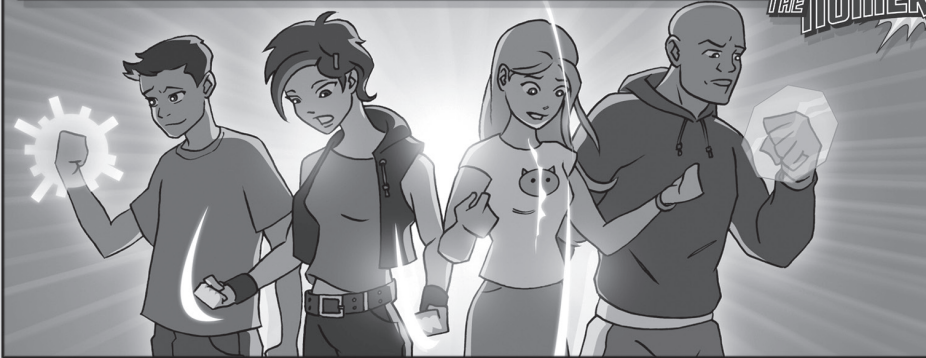


St. Jude patient  
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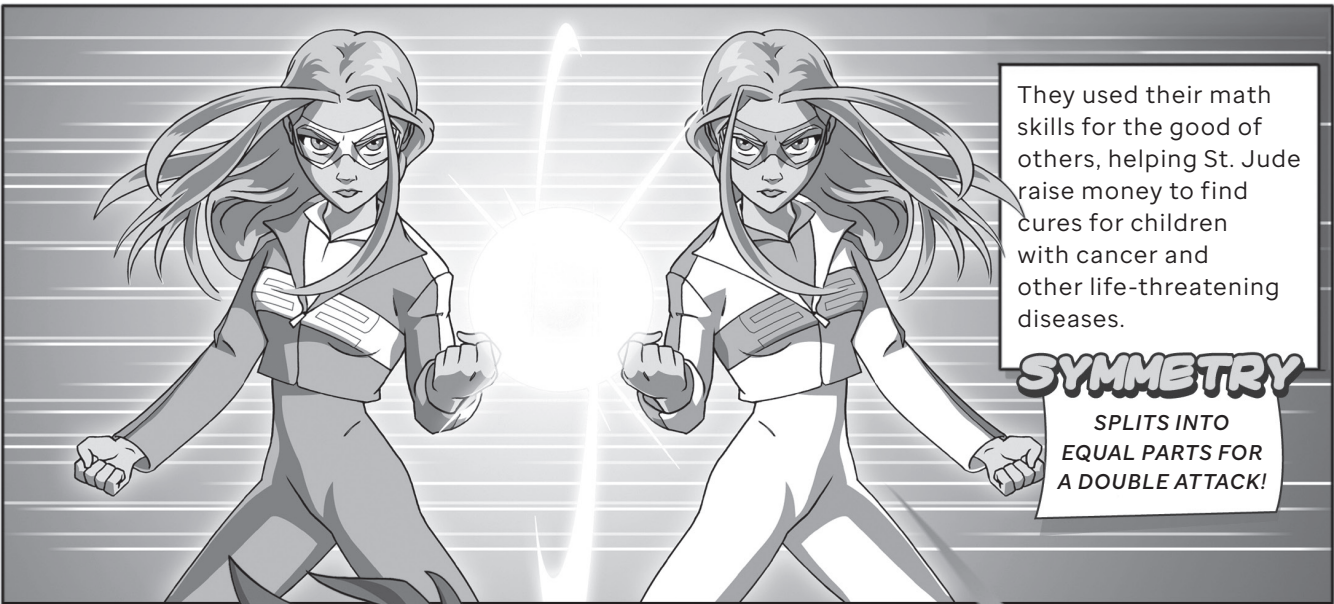
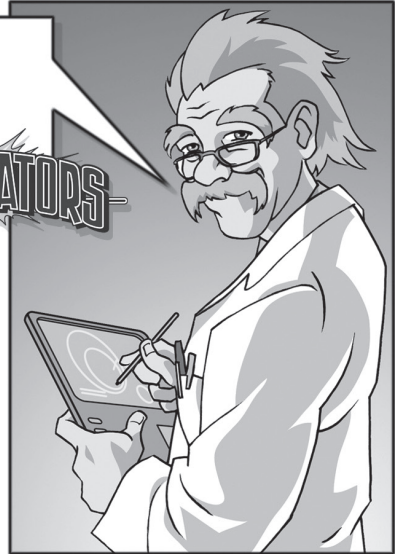
# MEET

# THE NUMERATORS

My name is Dr. Jax. Not long ago, four ordinary students discovered they had extraordinary mathematical abilities. Under my guidance, they learned to harness their skills into incredible powers – powers that can be used to help those less fortunate than themselves. Armed with superpowers, these once ordinary students became ...



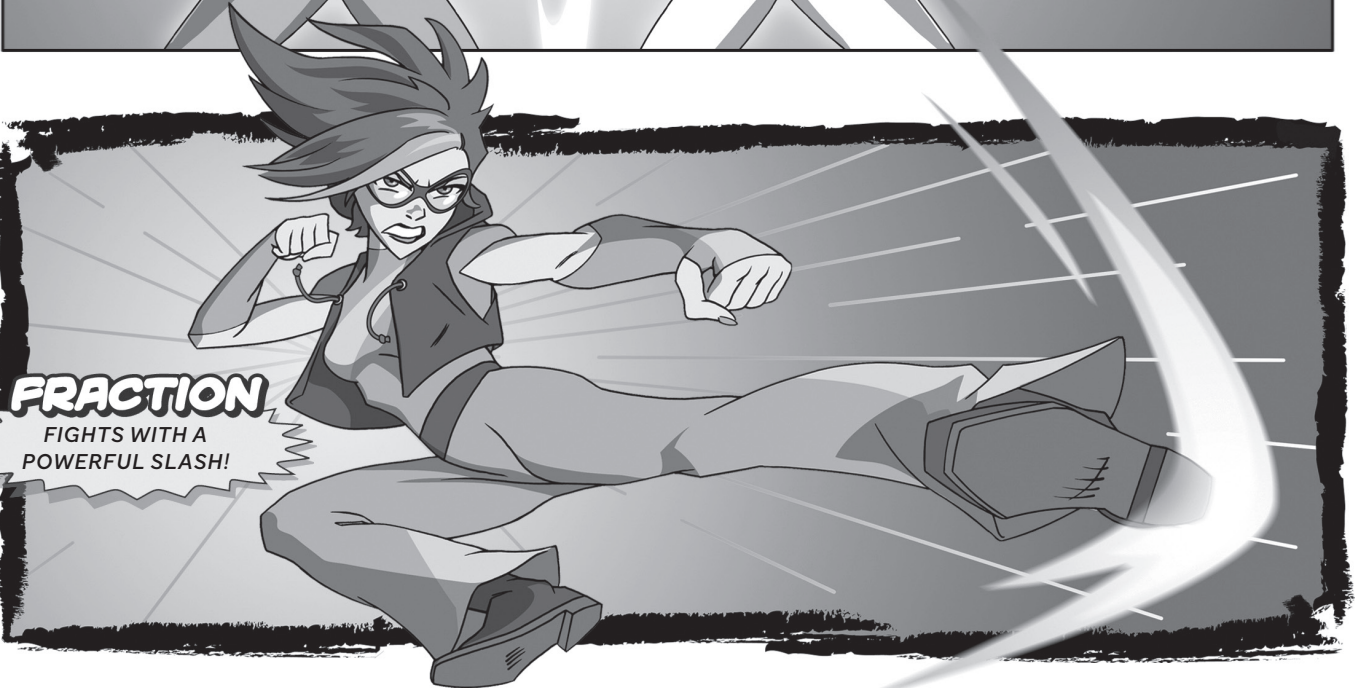
THE NUMERATORS



They used their math skills for the good of others, helping St. Jude raise money to find cures for children with cancer and other life-threatening diseases.

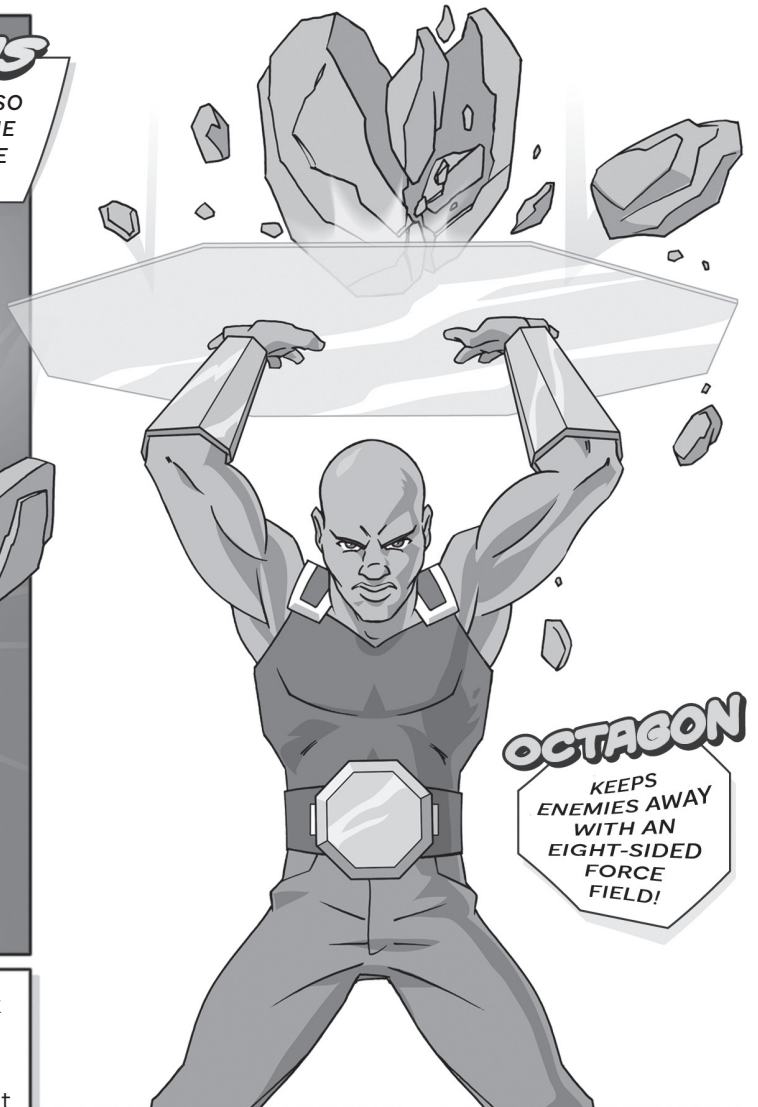
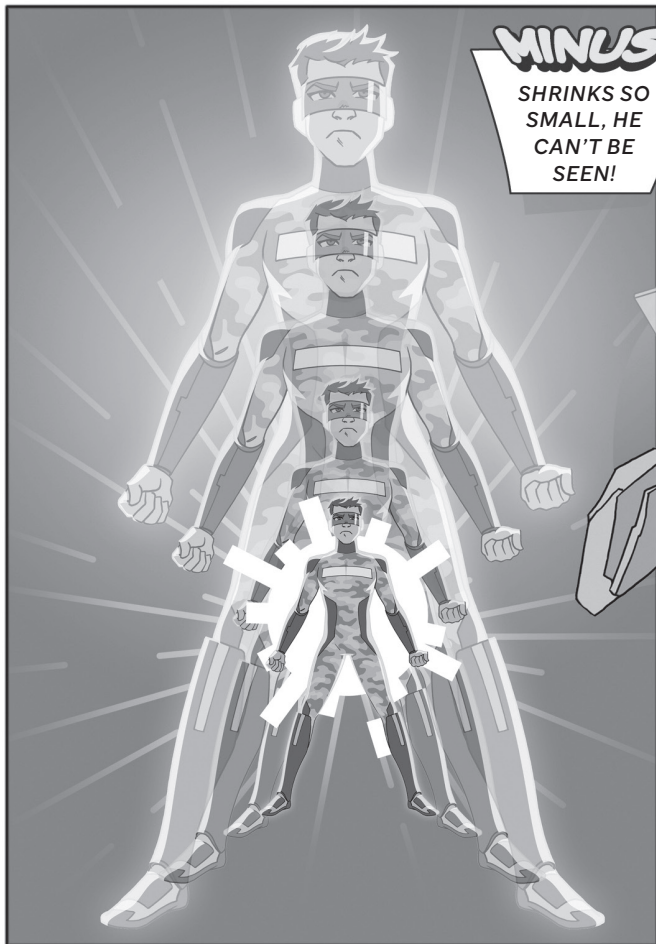
## SYMMETRY

SPLITS INTO  
EQUAL PARTS FOR  
A DOUBLE ATTACK!

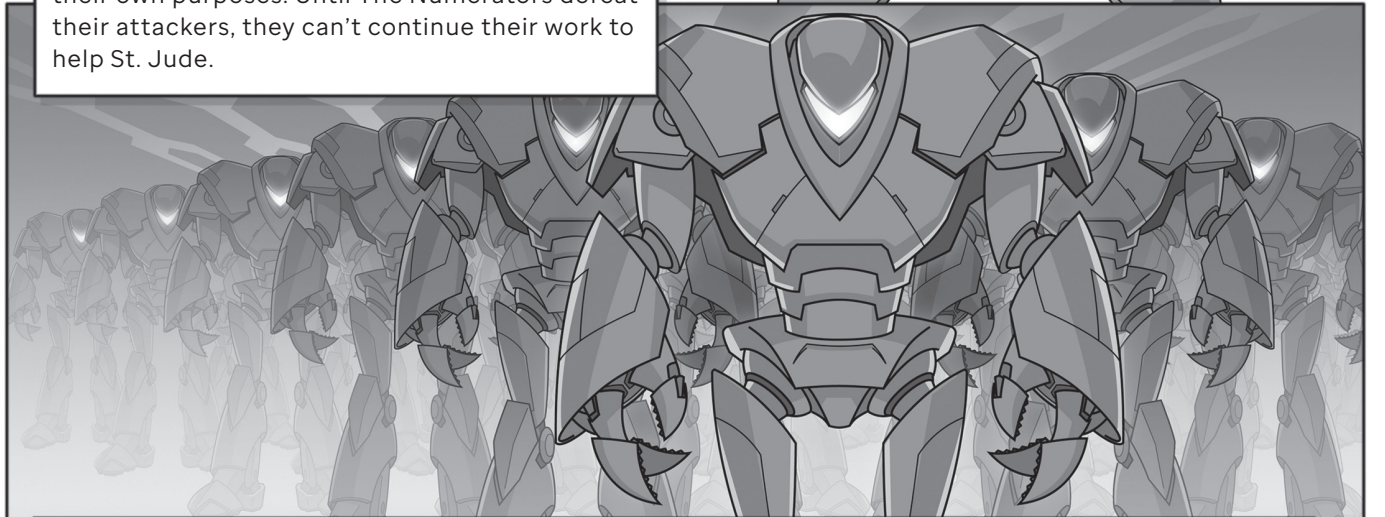


## FRACTION

FIGHTS WITH A  
POWERFUL SLASH!



But nothing prepared them for a surprise attack by armored droids sent from the future. These robots want to use The Numerators' powers for their own purposes. Until The Numerators defeat their attackers, they can't continue their work to help St. Jude.



By harnessing your own math skills in this funbook, you can help The Numerators deprogram the robots. By participating in the St. Jude Math-A-Thon, you'll raise money to help kids at St. Jude. Just like The Numerators, you can use math to help fund research and find cures for kids. Help The Numerators while helping St. Jude, and begin your own adventure today!

# Code Break

Dr. Jax and The Numerators have been preparing for their upcoming battle with the droids, and they need to figure out the most important thing that needs to be done. Compare each fraction. Match the fraction with the greater value to its corresponding letter. Then write the letter on top of the matching number at the bottom of the page to discover the most important thing.

1.  $4/5$    $2/9$   **$4/5 = H$**       2.  $3/14$    $2/43$       3.  $2/9$    $1/4$
4.  $1/6$    $4/7$       5.  $5/7$    $9/14$       6.  $1/4$    $1/7$
7.  $1/3$    $2/3$       8.  $1/3$    $1/2$       9.  $1/10$    $2/9$
10.  $3/4$    $5/8$       11.  $2/5$    $1/2$       12.  $3/14$    $1/7$
13.  $1/3$    $4/5$       14.  $1/5$    $1/3$       15.  $2/9$    $2/10$
16.  $1/9$    $4/7$       17.  $1/2$    $1/4$       18.  $3/28$    $3/14$
19.  $1/3$    $7/12$       20.  $1/14$    $1/16$       21.  $5/8$    $3/4$
22.  $2/11$    $1/4$       23.  $5/7$    $2/3$       24.  $2/7$    $3/14$
25.  $3/14$    $1/6$

A =  $1/4$       R =  $5/7$       G =  $7/12$       M =  $3/14$       I =  $2/9$       H =  $4/5$       L =  $2/7$   
 N =  $4/7$       O =  $1/3$       K =  $2/3$       S =  $3/4$       T =  $1/2$       U =  $1/14$

$\frac{21}{1}$     $\frac{8}{1}$     $\frac{23}{1}$     $\frac{14}{1}$     $\frac{16}{1}$     $\frac{19}{1}$   
 $\frac{25}{1}$     $\frac{22}{1}$     $\frac{17}{1}$     **$\frac{H}{1}$**     $\frac{10}{1}$     $\frac{7}{1}$     $\frac{15}{1}$     $\frac{24}{1}$     $\frac{24}{1}$     $\frac{10}{1}$  !

# Surprise Attack

Dr. Jax has discovered a plan for a surprise attack. He needs The Numerators to come together to prepare. Each one of them is in a different location. Their secret hideout is located at (0,0). Use your super math skills to locate each of them.

1. Dr. Jax

x	$y = 3x$	y
0	$3 \cdot 0$	0
1	$3 \cdot 1$	_____
2	_____	_____
3	_____	_____
4	_____	_____

2. Symmetry

x	$y = 7x$	y
0	_____	_____
2	_____	_____
5	_____	_____
8	_____	_____
10	_____	_____

3. Fraction

x	$y = -2x$	y
2	_____	_____
3	_____	_____
5	_____	_____
9	_____	_____
11	_____	_____

4. Minus

x	$y = (1/3)x$	y
3	_____	_____
9	_____	_____
15	_____	_____
21	_____	_____
28	_____	_____

5. Octagon

x	$y = (-2/5)x$	y
10	_____	_____
15	_____	_____
25	_____	_____
29	_____	_____
32	_____	_____

6. Droid

x	$y = (7/4)x$	y
8	_____	_____
16	_____	_____
20	_____	_____
22	_____	_____
$25 \frac{6}{7}$	_____	_____

7. Which two began at the secret hideout?

\_\_\_\_\_

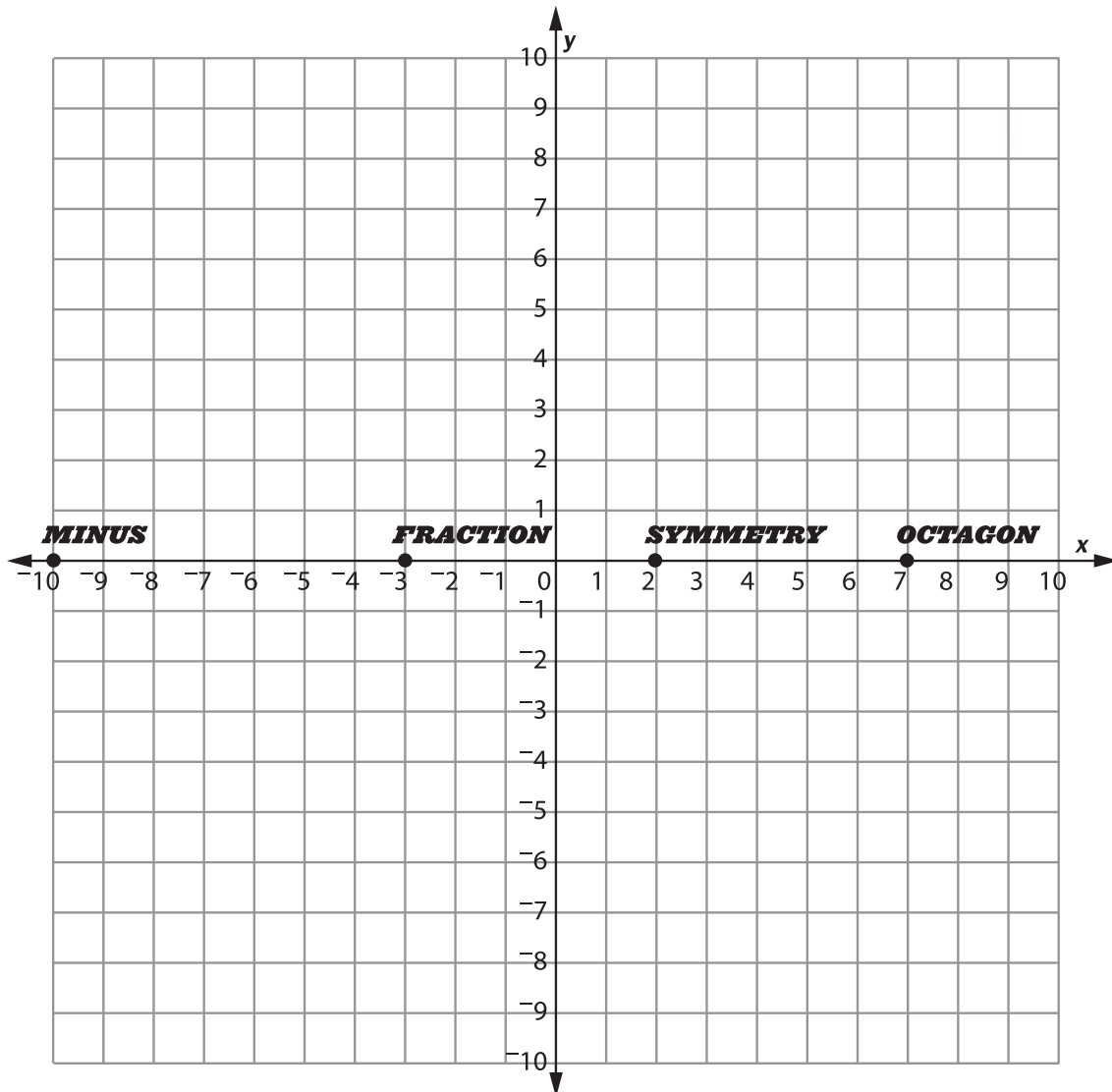
8. Symmetry is coming close to someone who is at (8, 14). Who is she about to catch up to?

\_\_\_\_\_



# Graphing Guardians

Dr. Jax has just discovered that the droids have found a way back to Earth. Each equation shows a droid's path toward Earth. Graph each equation on the grid. Then write the name of the Numerator who is closest to where that droid will intercept the x-axis. This will be the Numerator who battles and defeats that droid. Locate them all to deactivate each one.



1.  $y = 8 - 2x$

Closest Numerator: \_\_\_\_\_

2.  $y = -5 - x$

Closest Numerator: \_\_\_\_\_

3.  $y = (5/2)x + 5$

Closest Numerator: \_\_\_\_\_

4.  $y = (1/3)x - 2$

Closest Numerator: \_\_\_\_\_

5.  $y = 5x + 45$

Closest Numerator: \_\_\_\_\_

6.  $y = 2 - (3/7)x$

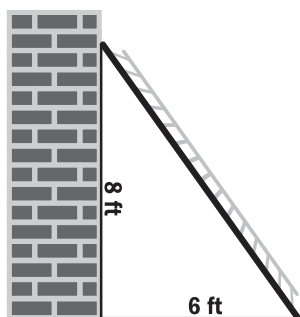
Closest Numerator: \_\_\_\_\_



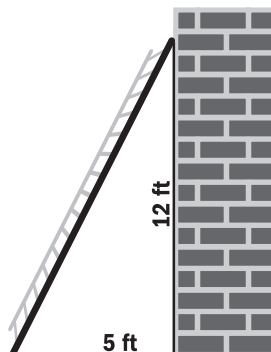
# Climb Time

The droids have climbed to the top of nearby buildings to launch an attack from above. The Numerators have found several ladders to use to climb up to them to defeat the droids, but they need your help to figure out which ladder is the correct height to reach each one. Use the Pythagorean theorem to figure out the answers.

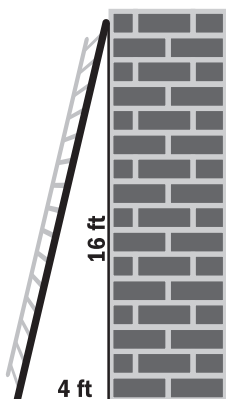
1. Ladder length = \_\_\_\_\_



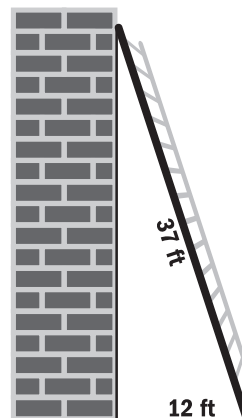
2. Ladder length = \_\_\_\_\_



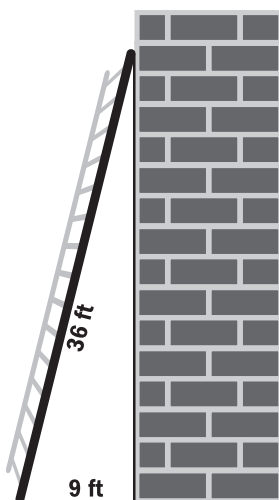
3. Ladder length = \_\_\_\_\_



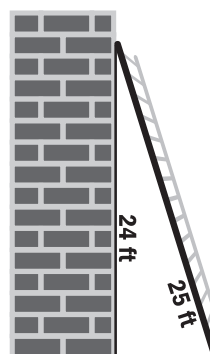
4. Wall height = \_\_\_\_\_



5. Wall height = \_\_\_\_\_



6. Distance to wall = \_\_\_\_\_



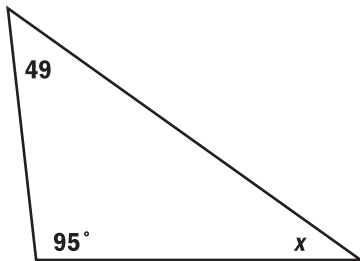
Great job! You followed our instructions to the "ladder"!



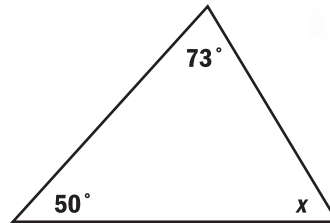
# Triangular Tactics

The droids have set up triangular force fields around their base. Dr. Jax and The Numerators must deactivate these fields by calculating the missing angles. Each correct answer brings them one step closer to victory. Can you help them solve the puzzle?

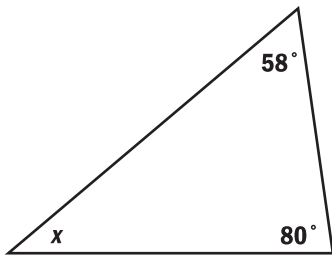
1.  $x =$  \_\_\_\_\_



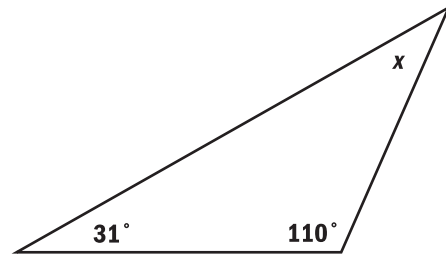
2.  $x =$  \_\_\_\_\_



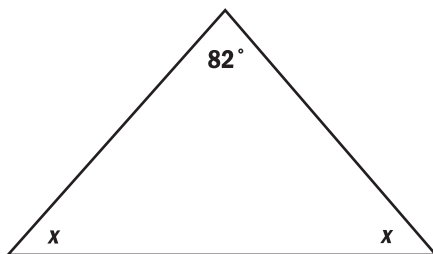
3.  $x =$  \_\_\_\_\_



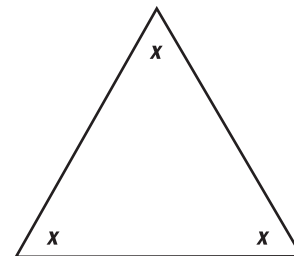
4.  $x =$  \_\_\_\_\_



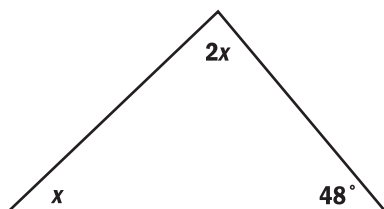
5.  $x =$  \_\_\_\_\_



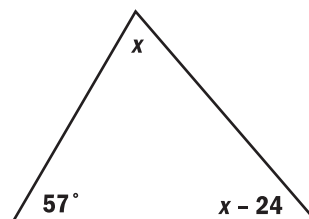
6.  $x =$  \_\_\_\_\_



7.  $x =$  \_\_\_\_\_



8.  $x =$  \_\_\_\_\_



Whew! Thanks for helping us take care of those droids!

# Equation Express

Dr. Jax has received intel that the droids are hiding in the subway tunnels. The Numerators need your help finding them so they can defeat them once and for all. The linear equations below show the path for each line. Use the equations to answer the questions. (Try to figure them out without plotting the lines on a coordinate grid.)

1. On the E line, when  $x = 8$ , what does  $y$  equal?

\_\_\_\_\_

2. Which subway line will run parallel to the B line?

\_\_\_\_\_

3. Which subway line will run parallel to the F line?

\_\_\_\_\_

4. Which subway line runs on the same exact path as the G line?

\_\_\_\_\_

5. Which subway line runs on the same exact path as the C line?

\_\_\_\_\_

6. Which subway line will meet the A line at  $(3, 13)$ ?

\_\_\_\_\_

7. Which line will intersect with the C and I lines at  $(2, 5)$ ?

\_\_\_\_\_

8. How many subway lines will pass through the point  $(1/2, 1/2)$ ?

What lines are they? \_\_\_\_\_

\_\_\_\_\_

## Subway Routes

**A** line:  $y = 2x + 7$

**B** line:  $y = 4 + 5x$

**C** line:  $y = (1/2)x + 4$

**D** line:  $y = -3x + 2$

**E** line:  $y = 6 - (1/2)x$

**F** line:  $y = -1 + 2x$

**G** line:  $y = 2 - 3x$

**H** line:  $y = 5x - 2$

**I** line:  $y = 4 + (1/2)x$



Check out [stjude.org/math](https://stjude.org/math) to start fundraising online today!

St. Jude patient  
**Jeriel**

Packed with tools to help you manage your fundraising efforts, raise more money and save time, [stjude.org/math](https://stjude.org/math) includes tools to help you:

- Find your school
- Create your own fundraising webpage and set your goal
- Accept online donations
- Integrate with Facebook fundraising



Scan to find your school and sign up!



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