

2^4

$6x$

2

$8 - x$

$x + 12 > 35$

2^4

On the Job

FIRST RESPONDERS

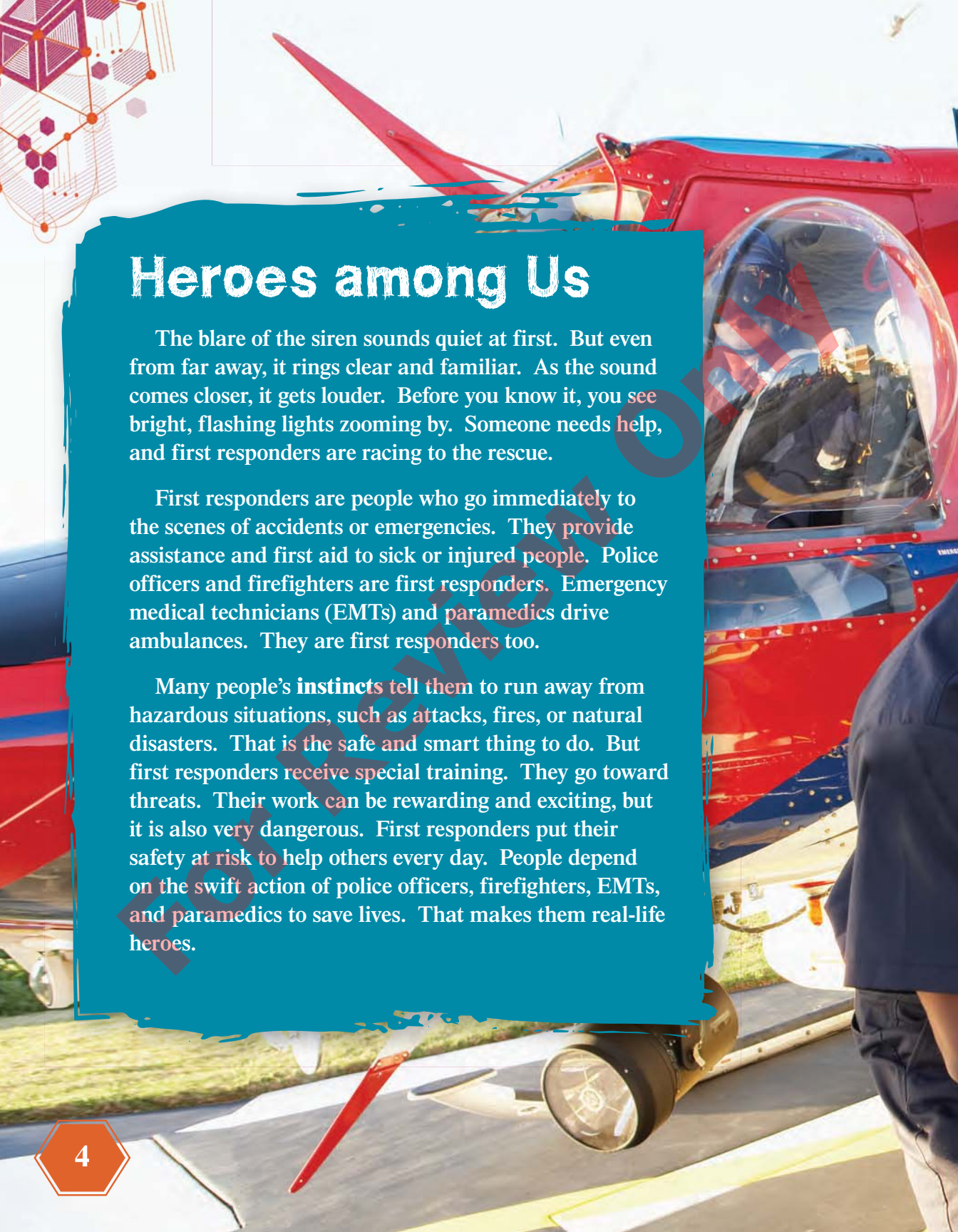
Expressions, Equations, and Inequalities



Vickie An

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Heroes among Us

The blare of the siren sounds quiet at first. But even from far away, it rings clear and familiar. As the sound comes closer, it gets louder. Before you know it, you see bright, flashing lights zooming by. Someone needs help, and first responders are racing to the rescue.

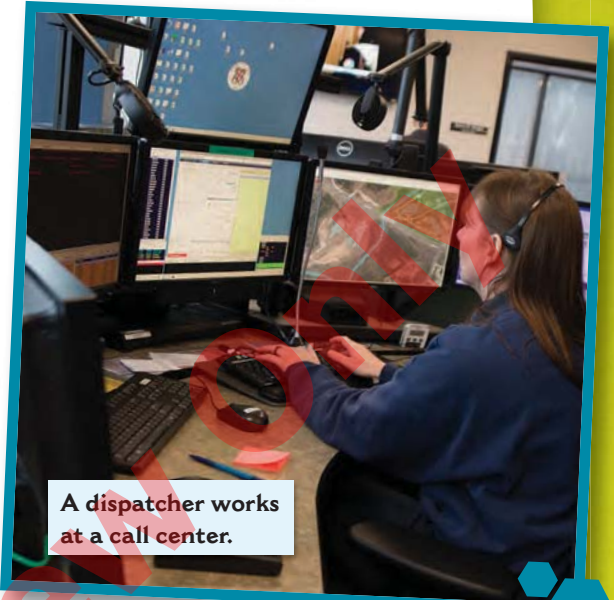
First responders are people who go immediately to the scenes of accidents or emergencies. They provide assistance and first aid to sick or injured people. Police officers and firefighters are first responders. Emergency medical technicians (EMTs) and paramedics drive ambulances. They are first responders too.

Many people's instincts tell them to run away from hazardous situations, such as attacks, fires, or natural disasters. That is the safe and smart thing to do. But first responders receive special training. They go toward threats. Their work can be rewarding and exciting, but it is also very dangerous. First responders put their safety at risk to help others every day. People depend on the swift action of police officers, firefighters, EMTs, and paramedics to save lives. That makes them real-life heroes.



Help!

First responders usually arrive at the scene of an accident or **crisis** within minutes of being alerted by a **dispatcher**. People who phone for help often reach emergency dispatchers first. Dispatchers work at call centers, police stations, and fire stations. They have to think fast. They must keep callers calm while gathering information so they know who to send for help. Many dispatchers have emergency medical training. This helps them guide callers on how to give aid until help arrives.



A dispatcher works at a call center.

Usually, the police respond to reports of a crime or accident. Firefighters battle blazes and inspect gas leaks. They conduct rescues during natural disasters as well. EMTs and paramedics rush in if someone needs medical attention. Police officers and firefighters are trained in basic first aid too. Sometimes, police officers, firefighters, EMTs, and paramedics will all show up to a scene together.



Trained for Traumas

On arrival, emergency responders quickly evaluate the situation. Is there still danger? Who's hurt? Do others need to be led to safety? Is the road clear for emergency vehicles to pass? When the scene is secure, they work to help victims.

Many times, first responders perform first aid on the spot. First aid is care given to a sick or injured person before advanced medical treatment can be obtained. It's meant to prevent the person's injury or illness from getting worse.

Paramedics perform first aid on an injured man.



LET'S EXPLORE MATH

Imagine that dispatchers write expressions to record how many emergency calls they receive each hour for four hours.

Dispatcher A: 4×4

Dispatcher B: 4^2

Dispatcher C: $4 + 4 + 4 + 4$

Draw diagrams to prove whether the dispatchers received the same number of calls.

People perform first aid every day. Have you ever had a deep cut that needed stitches? If so, a parent, teacher, or another adult probably used a clean towel to apply pressure on the wound or bandaged it before rushing you to the doctor. This not only helps stop the bleeding, but it also keeps bacteria out of the cut so it doesn't get infected.

That's just one example of first aid. Some injuries are far more serious. In those cases, being trained in first aid can determine the difference between life and death.



How to Save a Life

In any situation, emergency responders want to **stabilize** victims as soon as possible. They **evaluate** patients' needs in a number of ways. Two big things responders check for are if people suffered any injuries and if they are having trouble breathing. Responders might measure heart rate and blood pressure and examine skin too. Do the patients look pale? Are they burning up or freezing cold? Are their hearts beating faster than normal? The answers to these questions and more provide critical clues for the type of care the patients need.

First responders are also trained in **cardiopulmonary resuscitation** (kar-dee-oh-PUL-muh-nare-ee rih-suh-suh-TAY-shun), or CPR. *Cardio* means "heart." *Pulmonary* means "of the lungs." To *resuscitate* means "to bring someone back to life."

Emergency responders perform CPR on an injured woman.



LET'S EXPLORE MATH

A normal resting heart rate for an adult is between 60 and 100 beats per minute. Carla counts her heartbeats while finding her pulse for 20 seconds, or $\frac{1}{3}$ of a minute. She writes two inequalities, where b represents the number of beats she counts in 20 seconds.

$$3b \geq 60 \quad 3b \leq 100$$

1. Why is b multiplied by 3 in each inequality?

Use the set of possible heartbeat counts $\{18, 20, 31, 36\}$ to answer questions 2 and 3.

2. Which heartbeat counts from the set would make both inequalities true, representing healthy heart rates?
3. Which heartbeat counts from the set would make one inequality true but not the other, representing unhealthy heart rates?

