JACKIE'S ADVENTURES WITH RATIOS

1.   WHAT TO DO: Use the information in the story to answer the questions.

Section: feature: ratios and proportions
Discover how animators of Jackie Chan Adventurer and X-Men: Evolution use ratios and proportions to keep the action moving!
Martial arts star Jackie Chan does all his own stunts, right? Not quite! A team of directors, artists, and animators create Jackie's skillful moves for the cartoon series Jackie Chan Adventures. It takes lots of work--and lots of ratios.

An animated TV show can take six months to make. Each show is made up of thousands of individual drawings, or frames. In each frame, the characters are in a slightly different position than in the previous frame. When all of the frames are shown very quickly, one after another, the characters look like they're moving--or punching and kicking, in Jackie's case!

Each second of an animated show contains 24 frames. Animators use a ***ratio*** to express that speed. They say the ***ratio*** of frames to seconds is 24 to 1, also written as 24:1. Animators measure frames in feet as well as in seconds. In a cartoon, each foot of film contains 16 frames. So the ***ratio*** of frames to feet is 16:1.

Jackie Chan producer Therese Trujillo told MATH, "The artists have to understand 16 frames per foot and 24 frames per second." For example, suppose Trujillo is working with 180 feet of film. She needs to know how many seconds the film will take up. To find out, she first figures the number of frames in 180 feet of film by working with the frames-to-feet ***ratio***. She sets up a proportion (two equivalent ratios):

16 frames /1 foot = x frames/180 feet

By solving this proportion, Trujillo finds that 180 feet of film contain 2,880 frames. She can use that number, along with the ***ratio*** of frames to seconds, to set up another proportion. That one will tell her how many seconds 2,880 frames will take up:

24 frames/1 second = 2,880 frames/x seconds

When Trujillo solves this proportion, she finds that 180 feet of film equal 120 seconds, or 2 minutes, of screen time.

Who knew there were so many numbers in the cartoon business? "I wasn't very good at math," Jackie Chan supervising director Jane Wu-Soriano told us. "But now, as an artist, I deal with math every day."

WHAT TO DO: Use the information in the story to answer the questions.
1. Trujillo told us that all her show's directors practice martial arts! "They have to understand how much time a move is going to take," she said. Say the artists decide it will take Jackie 6 seconds to jump over some bad guys from the "Dark Hand" organization.

a. What proportion should they use to figure out how many frames are in the scene ?

b. How many frames does the scene contain?

2. X-Men: Evolution producer Boyd Kirkland told us their episodes are usually 1,980 feet long.

a. How many frames are in an episode?

b. How long, in seconds, is an episode?

c. How long, in minutes, is an episode?

- ·   3. The usual length of a Jackie Chan Adventures episode is 21 minutes, or 1,260 seconds. Say an episode is 1,830 feet long. How many seconds must be added to the episode to reach the usual length?

- 4. Say in a Jackie Chan Adventures episode, Jackie's niece Jade saves him from the evil Valmont. The whole scene lasts 20 seconds.

a. How many frames are in the scene?

b. How long, in feet, is the scene?

c. Say 4 seconds need to be cut from the scene. How many frames must be cut?

5. When might animators want to measure film in seconds? When might they want to measure film in feet? Explain your answer on separate paper.

PHOTO (COLOR): Jackie and his cartoon niece Jade

PHOTOS (COLOR): (Left to right:) Good guys Uncle, Jackie, and Jade, and bad guys Tohru and Valmont. (Inset:) The real Jackie with some real fans!

PHOTO (COLOR): X-Men's Cyclops

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