Lesson 7-1 Ratios and Proportions

The aspect ratio of a television or computer screen is the screen's width divided by its height. A standard television screen has an aspect ratio of $\frac{4}{3}$ or 4:3, while a high definition television screen (HDTV) has an aspect ratio of 16:9.

CCSS

You will write Ratios

You will write and solve proportions

Ratio - a comparison of 2 #'s
using division

$$\frac{4}{3}$$ 4:3   4 to 3

SCHOOL The number of students who participate in sports programs at Central High School is 520. The total number of students in the school is 1850. Find the athlete-to-student ratio to the nearest tenth.

Athletes
to Non

$\dfrac{520}{1330}$

$\dfrac{520}{1850} = \dfrac{52}{185} = .3$

Non-Athletes

$\begin{array}{r} 1850 \\ -520 \\ \hline 1330 \end{array}$

$\dfrac{1330}{1850} = .7$

The country with the longest school year is China, with 251 days. Find the ratio of school days to total days in a year for China to the nearest tenth. (Use 365 as the number of days in a year.)

$$\frac{-104}{261}$$

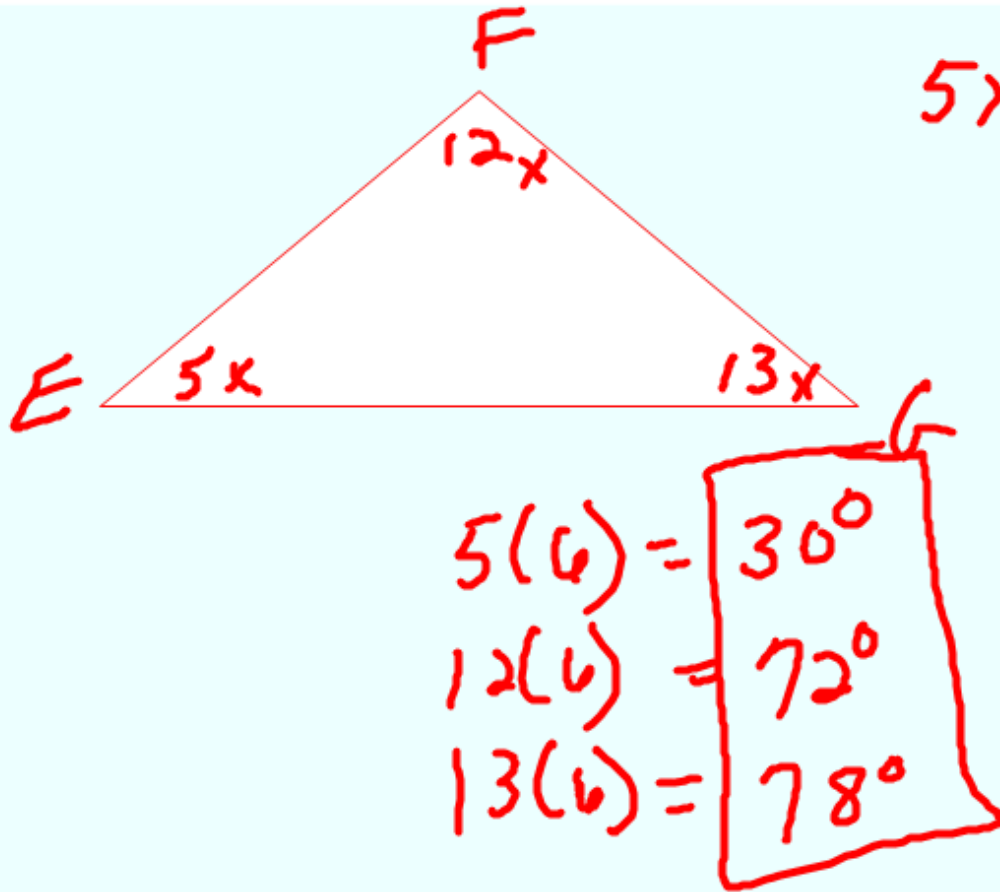$$\frac{251}{365} = .7$$

$$\frac{180}{365} = .5$$

Extended Ratio a comparison of 3 or more

2 : 4 : 9

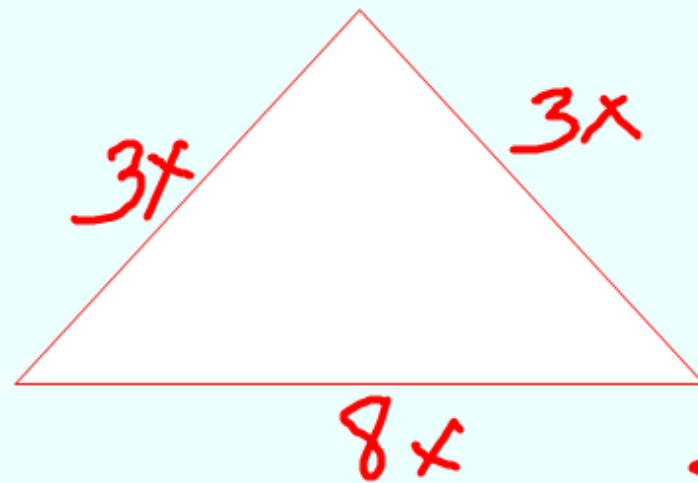In **ΔEFG**, the ratio of the measures of the angles is 5:12:13. Find the measures of the angles.

F

12x

E   5x   13x   G

$$5x + 12x + 13x = 180$$

$$\frac{30x}{30} = \frac{180}{30}$$

$$x = 6$$

$$5(6) = \boxed{30°}$$

$$12(6) = \boxed{72°}$$

$$13(6) = \boxed{78°}$$

In a triangle, the ratio of the measures of the sides is 3:3:8 and the perimeter is 392 inches. Find the length of the longest side of the triangle.

$$3x + 3x + 8x = 392$$

$3x$

$3x$

$8x$

$$x = 28$$

$$8(28) = 224 \text{ in}$$

Proportion Equation setting 2 Ratios equal to each other

$$\frac{4}{3} \diagdown \frac{8}{6}$$

Cross Product $4(6) = 3(8)$

$24 = 24 \checkmark$

Solve $\dfrac{6}{18.2} = \dfrac{9}{y}$.

1) Cross product $6y = 18.2(9)$

$$\frac{6y}{6} = \frac{163.8}{6}$$

$$y = 27.3$$

Solve $\dfrac{(4x-5)}{3} = \dfrac{-26}{6}$.

$$(4x-5)(6) = 3(-26)$$

$$24x - 30 = -78$$

$$\; +30 \qquad\quad +36$$

$$\frac{24x}{24} = \frac{-48}{24}$$

$$x = -2$$

PETS Monique randomly surveyed 30 students from her class and found that 18 had a dog or a cat for a pet. If there are <u>870</u> students in Monique's school, predict the total number of students with a dog or a cat.

1) Write Proportional

$$\text{Dogs/Cats} \Rightarrow \frac{18}{30} = \frac{x}{870} \quad \text{students}$$

$$\frac{30x}{30} = \frac{18(870)}{30}$$

$$x = 522$$

$$\frac{30}{18} = \frac{870}{x}$$

A worker at an automobile assembly plant checks new cars for defects. Of the first 280 cars he checks, 4 have defects. If 10,500 cars will be checked this month, predict the total number of cars that will have defects.

Sample

$$\text{Defect} \rightarrow \frac{4}{280} = \frac{x}{10,500}$$

Cars

$$\frac{4(10,500)}{280} = \frac{280x}{280}$$

$$150 \text{ cars.} = x$$