Grade 6 TEKS Companion Guide

A review guide for the Grade 6 Mathematics Texas Essential Knowledge and Skills
Student Edition

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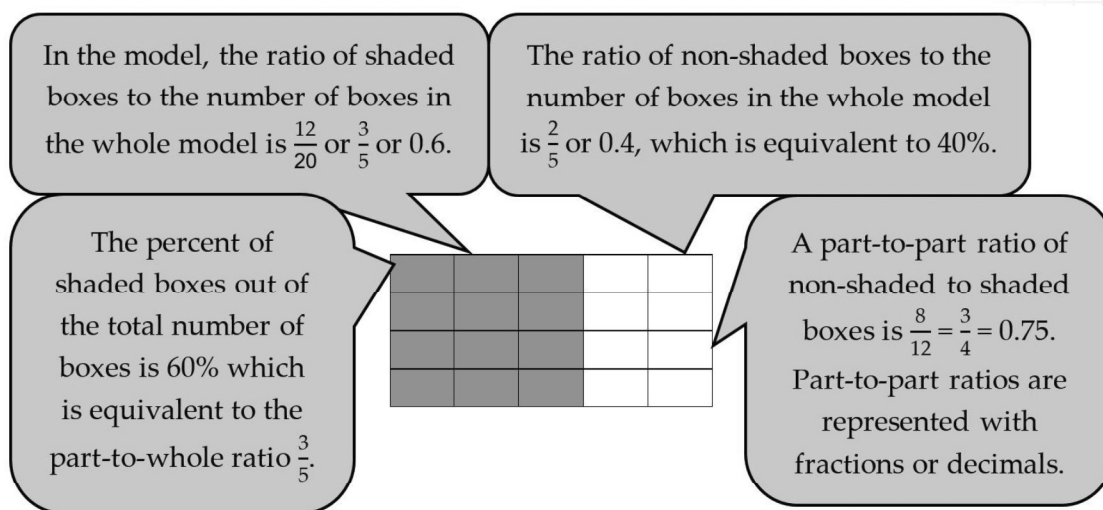
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6.4E The student is expected to represent ratios and percents with concrete models, fractions, and decimals.

TELL ME MORE...

A **ratio** represents a relationship between of two numbers and is used to describe comparisons. Ratios can be part-to-whole, comparing the parts of a whole to the whole itself, or part-to-part, comparing different parts of the same whole. Ratios are often represented in fraction form in simplest terms, but can also be shown as a decimal.

> In the model, the ratio of shaded boxes to the number of boxes in the whole model is $\frac{12}{20}$ or $\frac{3}{5}$ or 0.6.

> The ratio of non-shaded boxes to the number of boxes in the whole model is $\frac{2}{5}$ or 0.4, which is equivalent to 40%.

> The percent of shaded boxes out of the total number of boxes is 60% which is equivalent to the part-to-whole ratio $\frac{3}{5}$.

> A part-to-part ratio of non-shaded to shaded boxes is $\frac{8}{12} = \frac{3}{4} = 0.75$. Part-to-part ratios are represented with fractions or decimals.

Part-to-whole ratios can also be shown in percent form. If the whole is divided into 100 equal-sized pieces, a **percent** is number of those 100 pieces representing the part of the whole. The whole amount in a percent is 100%, representing <u>all</u> of something.

- This means a percent is a ratio of a part out of 100.
- A percent that is larger than 100% represents a ratio larger than 1 whole.
- A percent between 0 and 100% represents a ratio that is between 0 and 1 whole.
- Percents have a fraction and decimal equivalent form.

✓ EXAMPLES

EXAMPLE 1: The shaded area on the grid represents the part of a rectangular garden that is planted with tomato plants. Each small square in the garden has the same dimensions. Determine the ratio of the area planted with tomatoes to the area of the entire garden and the percent of the garden that is planted with tomatoes. Use a model to support your solution.

STEP 1 Determine the number of squares that make up the whole garden area.

- The grid has 6 squares across and 6 squares down.

The whole area is 36 square units.
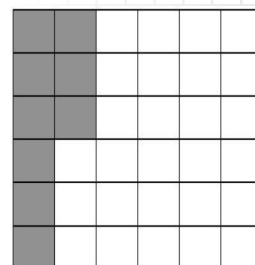
STEP 2 Determine the number of squares that make up the tomato section.

There are 9 square units of tomatoes.

The tomato area (shaded region) is 9 squares.

STEP 3 Write the ratio of tomato area to total area.

■ $\dfrac{\text{Tomato Area}}{\text{Total Area}} = \dfrac{9}{36} = \dfrac{9 \div 9}{36 \div 9} = \dfrac{1}{4}$
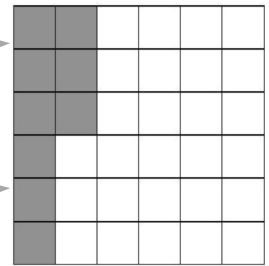
The total area is 36 squares.

The portion of the garden used for tomatoes is $\frac{1}{4}$.

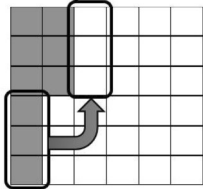**STEP 4** Write the ratio of tomato area to total area as a percent.

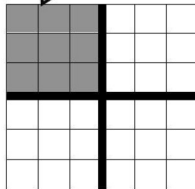■ $\dfrac{1 \times 25}{4 \times 25} = \dfrac{25}{100} = 25\%$

Move 3 shaded squares here.

$\dfrac{1}{4} = 25\%$ of the grid is shaded.

The tomato plants use 25% of the garden area.

EXAMPLE 2: The shaded area on the diagram represents the part of a chocolate bar that Ivy shared with her friends at lunch. Each section of the chocolate bar has the same dimensions. Write a fraction, percent and decimal to show the portion of the chocolate bar that Ivy kept.

**STEP 1** Determine the number of sections of the whole chocolate bar and the portion that Ivy kept.

■ The model shows 8 squares, so the whole chocolate bar has 8 sections.

■ There are 5 shaded sections which Ivy shared with her friends.

■ Ivy kept the 3 non-shaded sections.
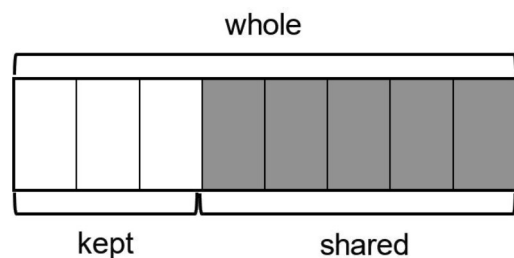
Ivy kept 3 out of 8 pieces of the bar.

YOU TRY IT!

Robin has mowed 45% of the back yard. What percent and decimal represent the portion of the yard that was not mowed?

• Shade the 10 × 10 grid model to represent 45%.
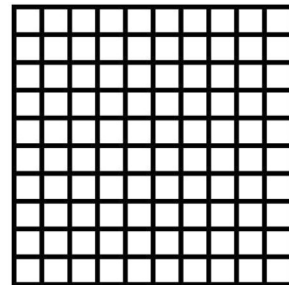
• $\dfrac{\text{Yard Not Mowed}}{\text{Total Yard}} = \underline{\hspace{2cm}}$

• Percent of yard not mowed: _____

• Decimal representing the portion of the yard that is NOT mowed:

_____

whole

kept   shared

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STEP 2 Write the ratio of the number of sections Ivy kept to the number of sections in the whole chocolate bar as a fraction.

- ■ 3 out of 8 can be written with 3 in the numerator (part) and 8 in the denominator (whole).

  $\frac{3}{8}$

STEP 3 Write the ratio as a percent.

- ■ 100% represents the length of the whole chocolate bar which is divided into 8 equal-sized sections.

- ■ $100 \div 8 = 12.5$, so each section is 12.5% of the whole chocolate bar.

Whole bar = 100%

12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5% | 12.5%

37.5%

- ■ 3 sections of the chocolate bar is 3 times the percent for one section. You can use partial products for this multiplication.

- ■ $12.5 \times 3 = (12 \times 3) + (0.5 \times 3) = 36 + 1.5 = 37.5$
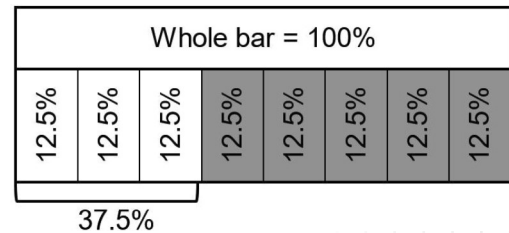
Ivy kept 37.5% of the chocolate bar for herself.

STEP 4 Write the ratio as a decimal.

- ■ A percent is a value out of 100.

- ■ Divide 37.5 by 100 to find its decimal equivalent.

- ■ Dividing by a power of 10 moves the decimal to the left the number of place values represented by the power of 10.

  $\frac{37.5}{100} = 37.5 \div 100$

  $\frac{37.5}{100} = 0.375$

Ivy kept 0.375 of the chocolate bar for herself.

EXAMPLE 3: 40 people attended a family reunion. 25 of the people at the reunion are adults. What fraction best represents the ratio of children to adults at the family reunion?

STEP 1 Determine the number of children at the reunion.

- ■ 40 total people attended the reunion.

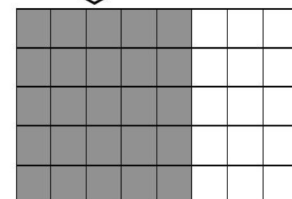- ■ 25 of the people were adults.

- ■ Subtract 25 from 40.

There are 15 children at the reunion.

STEP 2 Write a part-to-part ratio of children to adults as a fraction in lowest terms.

- ■ 15 children

- ■ 25 adults

- ■ $\frac{children}{adults} = \frac{15}{25} = \frac{15 \div 5}{25 \div 5} = \frac{3}{5}$

There ratio of children to adults is $\frac{3}{5}$.

40 total boxes = all the attendees
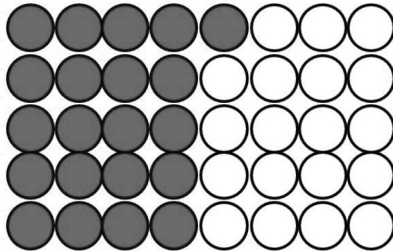25 shaded boxes = adults
15 unshaded = children

Children = **3 groups** of 5
Adults = **5 groups** of 5

*Use the following information for questions 1-3.*

In the model, the shaded circles represent adults surveyed that report being a registered organ donor.


1. What fraction of surveyed adults are registered organ donors?

2. What percent of surveyed adults are registered organ donors?

3. What decimal value represents the portion of surveyed adults who are NOT registered organ donors?

4. The diagram represents a strip of sidewalk being constructed. The shaded boxes represent the percent of the sidewalk that has just been paved with cement. What decimal also represents the value?

5. Mark has completed 1 out of 5 of the levels in his new video game since he started playing yesterday. Use the grid below to represent the percent of the game levels Mark has NOT completed.
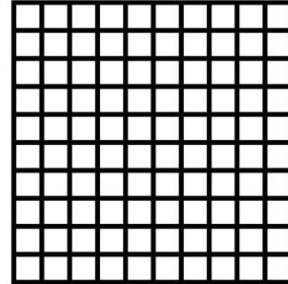
6. The shaded area on the grid represents the portion of people surveyed who like chocolate.
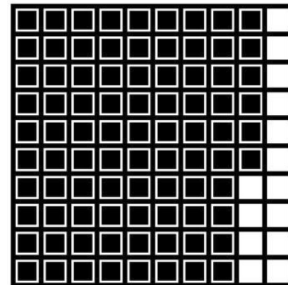
What decimal represents the portion of people surveyed who do NOT like chocolate? Record your answer and fill in the bubbles. Be sure to use the correct place value.

7. Marsha is reading a novel that contains 440 pages. So far she has read 242 pages in the book. What fraction represents the portion of the book that she has read?

8. A farmer owns 25 acres of land, but only 30% of his land is suitable for farming. What fraction can be used to represent the portion of his land that is unavailable for farming?

A $\frac{3}{10}$

B $\frac{5}{14}$

C $\frac{3}{7}$

D $\frac{7}{10}$

9. Allison has a collection of colored gel pens. Of the 15 pens, 6 are either pink or purple. What decimal can be used to describe the ratio of pink and purple pens to all the gel pens?

F 0.6

G 0.4

H 0.9

J 0.06

10. The diagram below represents the tasks that Samantha has to complete in order to earn her next scouting badge. The shaded boxes represent the completed tasks.
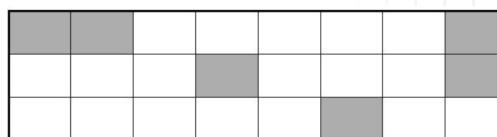
What percent of the badge requirements has Samantha completed?

A 6%

B $33\frac{1}{3}$%

C 25%

D 75%

11. A football team won $66\frac{2}{3}$% of their games in the season. Which model can be used to express the relationship of wins to the number of games played by using shading to represent games won?

F

G

H

I