Connecting Percents and Proportions

Apply the skill to decisions and designs

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Write part/whole $= p/100$. Corresponding entries must keep the same order. For 9 out of 12, $9/12 = p/100$ gives $12p = 900$, so $p = 75$ and the proportion is $9/12 = 75/100$.

Worked example

Of 5 beads, 2 are blue. Use a proportion to find the blue percent.

1. From $\frac{2}{5} = \frac{p}{100}$, cross products give $5p = 2(100) = 200$.
2. Divide by 5: $p = 200/5 = 40$.
3. Check the equivalent ratios: $\frac{2}{5} = \frac{40}{100}$.
Answer: 40%.

Practice Problems

Show your thinking.

1. In a survey, 3 of 24 students walk. Write a proportion with denominator 100 and find the walking percent.

2. A trail mix has 7 oat scoops out of 60 equal scoops. Compare its percent of oats with 50% using a proportion.

3. A mosaic calls for 12% accent tiles. For 75 total tiles, find the accent and non-accent counts using a proportion.

4. In a survey, 11 of 150 students walk. Write a proportion with denominator 100 and find the walking percent. Also write the complementary proportion for the part outside the group.

5. A trail mix has 37 oat scoops out of 60 equal scoops. Compare its percent of oats with 50% using a proportion. Check the scale factor by applying it to the whole as well as the part.

6. A mosaic calls for $\frac{85}{6}\%$ accent tiles. For 120 total tiles, find the accent and non-accent counts using a proportion.

7. Bike rack A has 18 of 30 spaces filled and B has 33 of 60. Use proportions to decide which racks are at least 60% full.

8. At an event, 24 volunteers are 15% of attendees. The hall holds 170 people. Use a proportion to find attendance and open seats.

9. A club reserves at least 42% of 70 slots for new members. Use a proportion to find the fewest whole slots it can reserve.

10. A shelf has 14 nonfiction books out of 50. Compare adding one nonfiction book with swapping one fiction book for nonfiction. Which reaches 30%? Use proportions.

Answer Key

1. $\frac{3}{24} = \frac{\frac{25}{2}}{100}$; $\frac{25}{2}\%$.
2. $\frac{7}{60} = \frac{\frac{35}{3}}{100}$; $\frac{35}{3}\%$. The oat share is less than 50%.
3. Accent tiles 9; other tiles 66.
4. $\frac{11}{150} = \frac{\frac{22}{3}}{100}$; $\frac{22}{3}\%$. Complement $(139)/150 = (\frac{278}{3})/100$.
5. $\frac{37}{60} = \frac{\frac{185}{3}}{100}$; $\frac{185}{3}\%$. The oat share is greater than 50%.
6. Accent tiles 17; other tiles 103.
7. 60% and 55%. Only rack A meets the goal.
8. 160 attendees; 10 open seats.
9. 30 slots.
10. Only replacing: $15/50 = 30/100$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. From $\frac{3}{24} = \frac{p}{100}$, cross products give $24p = 3(100) = 300$.
2. Divide by 24: $p = 300/24 = \frac{25}{2}$.
3. Check the equivalent ratios: $\frac{3}{24} = \frac{\frac{25}{2}}{100}$.

Problem 2

1. The scale factor from 60 to 100 is $100/60 = \frac{5}{3}$.
2. Scale the part: $7(\frac{5}{3}) = \frac{35}{3}$.
3. The equivalent proportion is $\frac{7}{60} = \frac{\frac{35}{3}}{100}$. Compare $\frac{35}{3} < 50$.

Problem 3

1. From $\frac{x}{75} = \frac{12}{100}$, cross products give $100x = 75(12) = 900$.
2. Divide by 100: $x = 900/100 = 9$.
3. Check the equivalent ratios: $\frac{9}{75} = \frac{12}{100}$. The other tile count is $75 - 9 = 66$.

Problem 4

1. From $\frac{11}{150} = \frac{p}{100}$, cross products give $150p = 11(100) = 1100$.
2. Divide by 150: $p = 1100/150 = \frac{22}{3}$.
3. Check the equivalent ratios: $\frac{11}{150} = \frac{\frac{22}{3}}{100}$.
4. Remaining part $150 - 11 = 139$; complementary percent number $100 - \frac{22}{3} = \frac{278}{3}$, so the share is $\frac{278}{3}\%$.

Problem 5

1. The scale factor from 60 to 100 is $100/60 = \frac{5}{3}$.
2. Scale the part: $37(\frac{5}{3}) = \frac{185}{3}$.
3. The equivalent proportion is $\frac{37}{60} = \frac{\frac{185}{3}}{100}$. Compare $\frac{185}{3} > 50$.
4. Whole check: $60(100/60) = 100$.

Problem 6

1. From $\frac{x}{120} = \frac{\frac{85}{6}}{100}$, cross products give $100x = 120(\frac{85}{6}) = 1700$.
2. Divide by 100: $x = 1700/100 = 17$.
3. Check the equivalent ratios: $\frac{17}{120} = \frac{\frac{85}{6}}{100}$. The other tile count is $120 - 17 = 103$.

Problem 7

1. First: $\frac{18}{30} = \frac{p}{100}$ gives $30p = 1800$, so $p = 60$.
2. Second: $\frac{33}{60} = \frac{p}{100}$ gives $60p = 3300$, so $p = 55$.
3. Rack A is exactly 60% full and rack B is below it.

Problem 8

1. From $\frac{24}{w} = \frac{15}{100}$, cross products give $(15)w = 24(100) = 2400$.
2. Divide by 15: $w = 2400/(15) = 160$.
3. Check the equivalent ratios: $\frac{24}{160} = \frac{15}{100}$. Open seats: $170 - 160 = 10$.

Problem 9

1. Use $\frac{x}{70} = \frac{42}{100}$; cross products give $100x = 70(42) = 2940$.
2. The exact cutoff is $x = 2940/100 = 29.4$.
3. Since $29 < 29.4 \leq 30$, the fewest whole slots is 30.

Problem 10

1. Adding changes both counts: $15/51$. Replacing changes only the part: $15/50$.
2. For adding, $15(100) = 1500 < 1530 = 51(30)$, so the share is less than 30%.
3. For replacing, $15(100) = 1500 = 50(30)$, so the share is exactly 30%.

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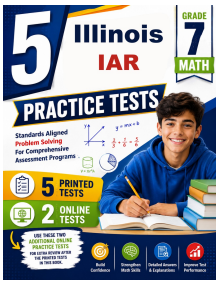

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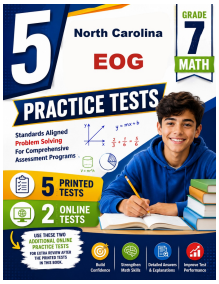

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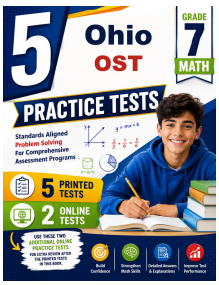

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