Connecting Percents and Proportions

Spot mistakes, reason, and work backward

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. Repair $\frac{16}{3} = \frac{p}{100}$ when 3 is the part and 16 the whole. Solve for p.

2. An equivalent-ratio table has $(\text{part}, \text{whole}) = (7, 40)$. Find the part paired with 100 and show the scale factor.

3. Given $\frac{9}{w} = \frac{18}{100}$, recover the whole w using cross products.

4. Repair $\frac{100}{11} = \frac{p}{100}$ when 11 is the part and 100 the whole. Solve for p. Also write the complementary proportion for the part outside the group.

5. An equivalent-ratio table has $(\text{part}, \text{whole}) = (13, 40)$. Find the part paired with 100 and show the scale factor. Check the scale factor by applying it to the whole as well as the part.

6. Given $\frac{17}{w} = \frac{\frac{85}{4}}{100}$, recover the whole w using cross products.

7. Choir gets 30 of 50 votes in one poll; band gets 33 of 75 in another. Lee says band has the higher share. Compare using proportions.

8. A collection has 45 blue cards, which is 30% of all cards. Rae writes $45/w = 100/30$. Correct and solve the proportion.

9. A hall reserves 31 of 90 seats. The goal is at least 35%. Use a proportion to decide if enough are reserved and find any extra seats needed.

10. One batch has 26 of 40 items complete. A student writes $26/100 = 65/40$. Correct the proportion and find the complete count out of 60 at the same rate.

Answer Key

1. $\frac{3}{16} = \frac{\frac{75}{4}}{100}$; $\frac{75}{4}\%$.
2. $\frac{7}{40} = \frac{\frac{35}{2}}{100}$; $\frac{35}{2}\%$. Scale factor $\frac{5}{2}$.
3. $w = 50$.
4. $\frac{11}{100} = \frac{11}{100}$; 11%. Complement $(89)/100 = (89)/100$.
5. $\frac{13}{40} = \frac{\frac{65}{2}}{100}$; $\frac{65}{2}\%$. Scale factor $\frac{5}{2}$.
6. $w = 80$.
7. 60% and 44%. Choir has the higher share.
8. $45/w = 30/100$; 150 cards.
9. No; reserve 1 more seat.
10. $26/40 = 65/100$; 39 items.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Put the part above the whole. From $\frac{3}{16} = \frac{p}{100}$, cross products give $16p = 3(100) = 300$.
2. Divide by 16: $p = 300/16 = \frac{75}{4}$.
3. Check the equivalent ratios: $\frac{3}{16} = \frac{\frac{75}{4}}{100}$.

Problem 2

1. The scale factor from 40 to 100 is $100/40 = \frac{5}{2}$.
2. Scale the part: $7(\frac{5}{2}) = \frac{35}{2}$.
3. The equivalent proportion is $\frac{7}{40} = \frac{\frac{35}{2}}{100}$.

Problem 3

1. From $\frac{9}{w} = \frac{18}{100}$, cross products give $(18)w = 9(100) = 900$.
2. Divide by 18: $w = 900/(18) = 50$.
3. Check the equivalent ratios: $\frac{9}{50} = \frac{18}{100}$.

Problem 4

1. Put the part above the whole. From $\frac{11}{100} = \frac{p}{100}$, cross products give $100p = 11(100) = 1100$.
2. Divide by 100: $p = 1100/100 = 11$.
3. Check the equivalent ratios: $\frac{11}{100} = \frac{11}{100}$.
4. Remaining part $100 - 11 = 89$; complementary percent number $100 - 11 = 89$, so the share is 89%.

Problem 5

1. The scale factor from 40 to 100 is $100/40 = \frac{5}{2}$.
2. Scale the part: $13(\frac{5}{2}) = \frac{65}{2}$.
3. The equivalent proportion is $\frac{13}{40} = \frac{\frac{65}{2}}{100}$.
4. Whole check: $40(100/40) = 100$.

Problem 6

1. From $\frac{17}{w} = \frac{\frac{85}{4}}{100}$, cross products give $(\frac{85}{4})w = 17(100) = 1700$.
2. Divide by $\frac{85}{4}$: $w = 1700/(\frac{85}{4}) = 80$.
3. Check the equivalent ratios: $\frac{17}{80} = \frac{\frac{85}{4}}{100}$.

Problem 7

1. First: $\frac{30}{50} = \frac{p}{100}$ gives $50p = 3000$, so $p = 60$.
2. Second: $\frac{33}{75} = \frac{p}{100}$ gives $75p = 3300$, so $p = 44$.
3. Even though $33 > 30$, the shares satisfy $44\% < 60\%$.

Problem 8

1. From $\frac{45}{w} = \frac{30}{100}$, cross products give $(30)w = 45(100) = 4500$.
2. Divide by 30: $w = 4500/(30) = 150$.
3. Check the equivalent ratios: $\frac{45}{150} = \frac{30}{100}$.

Problem 9

1. Use $\frac{x}{90} = \frac{35}{100}$; cross products give $100x = 90(35) = 3150$.
2. The exact cutoff is $x = 3150/100 = 31.5$.
3. Since $31 < 31.5 \leq 32$, reserve 32 seats, or $32 - 31 = 1$ more.

Problem 10

1. Put the whole below the part: $26/40 = p/100$.
2. $40p = 2600$, so $p = 65$.
3. For the next batch, $x/60 = 65/100$ gives $100x = 3900$, so $x = 39$.

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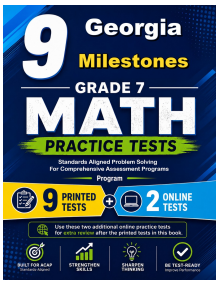

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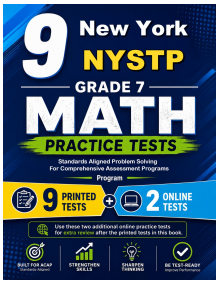

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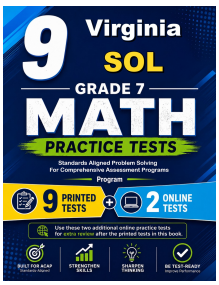

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