Percent Detective

Sort percentages by the group they describe.

8A.DSP.C.39.b "Interpret relative frequencies in the context of categorical data (including joint, marginal, and conditional relative frequencies)."

NAME _____ DATE _____

OVERALL (MARGINAL)

An overall relative frequency describes one category out of everything counted. The full set is 100%.

Among all 50 garden plants, 20 are tulips, so 40% are tulips.

WITHIN-GROUP (CONDITIONAL)

A within-group relative frequency describes one category inside a named subgroup. That subgroup is 100%.

Among 30 red marbles, 12 are striped, so 40% of the red marbles are striped.

1 SORT

8 items

For each item, circle OVERALL or WITHIN, then choose two items and explain which group was used to find each percent.

1. Of 20 students who chose art, 5 take the bus. That is 25% of art students. OVERALL WITHIN

2. Of 40 rainy days, 10 had strong winds. That is 25% of rainy days. OVERALL WITHIN

3. Of all 80 meals sold, 20 were tacos. That is 25% of meals. OVERALL WITHIN

4. Of 30 people who swim, 18 also bike. That is 60% of swimmers. OVERALL WITHIN

5. Of 50 paperback novels, 15 are mysteries. That is 30% of paperbacks. OVERALL WITHIN

6. Of all 60 pets at a shelter, 24 are cats. That is 40% of pets. OVERALL WITHIN

7. Of 16 morning flights, 12 arrived on time. That is 75% of morning flights. OVERALL WITHIN

8. Of all 90 votes, 27 chose jazz. That is 30% of votes. OVERALL WITHIN

2 PROVE IT

Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write one new OVERALL example and one new WITHIN example. For each, name the group, give a count, and state the matching percent.

OVERALL _____

WITHIN _____

CHALLENGE

Of 30 cyclists, 12 use lights. Of all 60 commuters, 18 use lights. Find the WITHIN percent for cyclists and the OVERALL percent for commuters, then explain why they differ.

ANSWER KEY # Percent Detective

GRADE 8 · 8A.DSP.C.39.b

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	Of 20 students who chose art, 5 take the bus. That is 25% of art students.	**WITHIN**	The denominator is the 20 students who chose art, a named subgroup.
2	Of 40 rainy days, 10 had strong winds. That is 25% of rainy days.	**WITHIN**	The denominator is the 40 rainy days, a named subgroup of days.
3	Of all 80 meals sold, 20 were tacos. That is 25% of meals.	**OVERALL**	The denominator is all 80 meals sold.
4	Of 30 people who swim, 18 also bike. That is 60% of swimmers.	**WITHIN**	The denominator is the 30 swimmers, a named subgroup.
5	Of 50 paperback novels, 15 are mysteries. That is 30% of paperbacks.	**WITHIN**	The denominator is the 50 paperbacks, a named subgroup of novels.
6	Of all 60 pets at a shelter, 24 are cats. That is 40% of pets.	**OVERALL**	The denominator is all 60 shelter pets.
7	Of 16 morning flights, 12 arrived on time. That is 75% of morning flights.	**WITHIN**	The denominator is the 16 morning flights, a named subgroup of flights.
8	Of all 90 votes, 27 chose jazz. That is 30% of votes.	**OVERALL**	The denominator is all 90 votes.

PART 2 · PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **OVERALL**: Of all 40 library books counted, 10 are mysteries, so 25% are mysteries.
- **WITHIN**: Of 20 blue shirts in a store, 5 are large, so 25% of the blue shirts are large.

Challenge: The WITHIN percent is 12 ÷ 30 = 40%. The OVERALL percent is 18 ÷ 60 = 30%. They differ because the first uses only cyclists as its group, while the second uses all commuters.

For Part 2, look for explanations that identify the full set or the named subgroup used as the denominator. For Part 3, check that each percent matches its count and group size.