Equations Inequalities and Relationships

Lesson 10 Dependent and Independent Variables

Standards 6.EE.C.9

Learning target I can identify quantities that change together and write a rule.

Materials Balance models, number lines, coordinate grids, rulers.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about dependent and independent variables. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. The independent variable is the input you choose; the dependent variable changes with it. Define both and write the output in terms of the input. A table and graph must show the same rule and units. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: A shop charges $4 for each of n notebooks plus a single $5 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model? Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch inverse operations, equality on both sides, open versus closed endpoints, and input/output order.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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Learning target I can identify quantities that change together and write a rule.

Learn and Discuss

The independent variable is the input you choose; the dependent variable changes with it. Define both and write the output in terms of the input. A table and graph must show the same rule and units.

Example 1 A shop charges $5 for each of n notebooks. Name the independent and dependent variables and write a cost rule.
Solution Independent n = notebooks; dependent C = cost; C = 5n. The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.
Example 2 A shop charges $3 for each of n notebooks plus a single $6 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?
Solution Independent n = notebooks; dependent C = cost; C = 3n + 6; C(0) = $6, the fee. The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Dependent and Independent Variables

Name _____ Show calculations, models, and units.

1. A shop charges $6 for each of n notebooks. Name the independent and dependent variables and write a cost rule.

2. A shop charges $2 for each of n notebooks. Name the independent and dependent variables and write a cost rule.

3. A shop charges $8 for each of n notebooks. Name the independent and dependent variables and write a cost rule.

4. A shop charges $4 for each of n notebooks plus a single $3 delivery fee. Name the independent and dependent variables and write a cost rule.

5. A shop charges $5 for each of n notebooks plus a single $3 delivery fee. Name the independent and dependent variables and write a cost rule.

6. A shop charges $3 for each of n notebooks plus a single $4 delivery fee. Name the independent and dependent variables and write a cost rule.

7. A shop charges $2 for each of n notebooks plus a single $5 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

8. A shop charges $3 for each of n notebooks plus a single $5 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

9. A shop charges $2 for each of n notebooks plus a single $2 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

10. A shop charges $4 for each of n notebooks plus a single $5 delivery fee. Name the independent and dependent variables and write a cost rule. What does the cost at n = 0 mean in this model?

Dependent and Independent Variables

Equations Inequalities and Relationships

1. Independent n = notebooks; dependent C = cost; C = 6n
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

2. Independent n = notebooks; dependent C = cost; C = 2n
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

3. Independent n = notebooks; dependent C = cost; C = 8n
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

4. Independent n = notebooks; dependent C = cost; C = 4n + 3
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

5. Independent n = notebooks; dependent C = cost; C = 5n + 3
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

6. Independent n = notebooks; dependent C = cost; C = 3n + 4
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

7. Independent n = notebooks; dependent C = cost; C = 2n + 5; C(0) = $5, the fee
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

8. Independent n = notebooks; dependent C = cost; C = 3n + 5; C(0) = $5, the fee
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

9. Independent n = notebooks; dependent C = cost; C = 2n + 2; C(0) = $2, the fee
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.

10. Independent n = notebooks; dependent C = cost; C = 4n + 5; C(0) = $5, the fee
Reasoning The chosen notebook count is the input; multiply it by price and add any fixed fee to get the cost.