

# Proportional Relationships Later Transfer

## 1 A new measured quantity setting

Try this on a later occasion. These are constructed models, not measured product data. Ribbon has a stated uniform mass of 3 grams per meter. The model allows ribbon lengths from 0 to 8 meters. Ignore every other mass.

Model A counts ribbon mass only. Model B counts ribbon plus one 4-gram bag; the bag is included even at zero ribbon length. Let  $x$  be ribbon length in meters and  $y$  be the stated total mass in grams.

| x (meters) | A: ribbon only (grams) | B: ribbon and bag (grams) |
|------------|------------------------|---------------------------|
| 0          |                        |                           |
| 1          |                        |                           |
| 2.5        |                        |                           |
| 6          |                        |                           |

- Complete both columns and write both rules. Which mass is proportional to ribbon length? Use positive-input quotients and zero-input meanings.
- Explain each model's point at one meter. Find both masses at 8 meters.
- Is a result at 10 meters guaranteed by this stated domain? Give a qualified conclusion.

### Evidence, rules, points and limits

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## 2 Origin alone is not enough

For squares with side length from 0 to 4 centimeters, area equals side length multiplied by itself. A zero side is the limiting zero-area case in this mathematical model. The table is constructed.

| Side length (centimeters) | Area (square centimeters) |
|---------------------------|---------------------------|
| 0                         | 0                         |
| 1                         | 1                         |
| 2                         | 4                         |
| 3                         | 9                         |

Fictional learner Jo says, “The graph includes (0, 0), so area is proportional to side length.” Evaluate that claim using at least two positive-side quotients. Test Jo’s proposed rule  $A = 3 \times s$  at a different displayed pair. Then find the area of a square with side length 4 centimeters using the supplied area rule. Explain why a zero pair alone cannot decide proportionality.

Ratios, counterexample, area and conclusion