LESSON MAKER PRO

# Which Plan Wins?

*Compare costs shown in tables, equations, words, and graphs.*

**GRADE 8 · 8.AF.B.10**

**8.AF.B.10** "Compare proportional and non-proportional linear relationships represented in different ways (algebraically, graphically, numerically in tables, or by verbal descriptions) to solve real-world problems."

NAME _____ DATE _____

## THE BIG IDEA

A proportional relationship has the form y = kx, so its cost is $0 when x is 0. A non-proportional linear relationship has a starting cost. To compare plans, find each cost for the same value of x.

## WORKED EXAMPLE

Plan A has the costs shown. Plan B costs $13 per visit. At 3 visits, which plan costs less? Which plan is proportional?

**PLAN A**

| Visits | Cost ($) |
|---|---|
| 1 | 17 |
| 3 | 31 |

1. (31 - 17)/(3 - 1) = 7 dollars per visit for A.
2. 17 - 7(1) = 10, so A costs 7x + 10.
3. At 3 visits, A costs $31 and B costs 13(3) = $39.

**Answer: Plan A costs $8 less. Plan B is proportional.**

## PRACTICE 4 problems

**1** A: y = 4x. B: y = 4x + 18. Which is proportional? Which costs less at x = 6?

**ANSWER** _____

**2** Plan A costs $15 plus $2 per movie. Plan B costs $5 per movie. Which costs less for 6 movies?

**ANSWER** _____

**3** A: y = 9x. B: y = 3x + 24. For what value of x do the costs match?

**ANSWER** _____

**4** A: y = 8x + 16. B: y = 12x. At x = 5, which is cheaper, and by how much?

**ANSWER** _____

## APPLY IT Show your work

**1** A skate park offers the pass shown. Paying at the door costs $9 per visit. Which option is proportional? Which costs less for 5 visits?

**SKATE PARK PASS**

| Visits | Cost ($) |
|---|---|
| 0 | 14 |
| 2 | 22 |
| 5 | 34 |

**ANSWER** _____

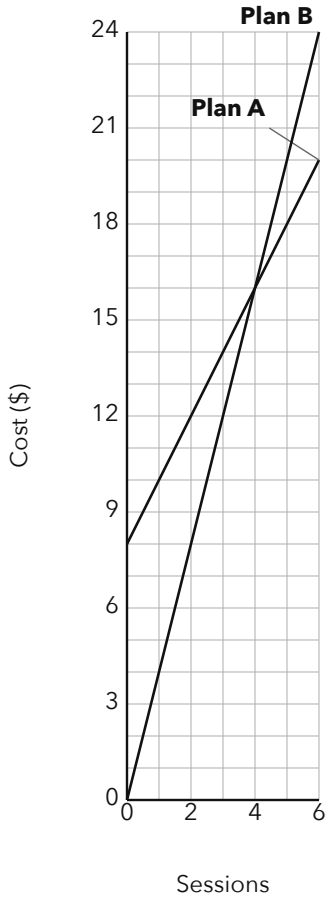
**2** Gaming Club A charges $18 to join plus $2 per match. Club B charges $5 per match. For 8 matches, which club costs less, and by how much?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

The graph shows two plans. Which plan is proportional? At what whole-number values of x from 0 through 6 is the non-proportional plan cheaper? Explain using the graph.




WORK SPACE AND ANSWER

**ANSWER KEY**

# Which Plan Wins?

**GRADE 8 · 8.AF.B.10**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | A: y = 4x. B: y = 4x + 18. Which is proportional? Which costs less at x = 6? | **A is proportional. A costs less: $24 versus $42.** |
| 2 | Plan A costs $15 plus $2 per movie. Plan B costs $5 per movie. Which costs less for 6 movies? | **Plan A, $27 versus $30.** |
| 3 | A: y = 9x. B: y = 3x + 24. For what value of x do the costs match? | **x = 4.** |
| 4 | A: y = 8x + 16. B: y = 12x. At x = 5, which is cheaper, and by how much? | **A is cheaper by $4: $56 versus $60.** |

## PART 2 · APPLY IT

1. **Paying at the door is proportional. The pass costs $11 less for 5 visits.** The pass costs $34 for 5 visits. Paying at the door costs 9(5) = $45.
2. **Club A costs $6 less.** Club A costs 18 + 2(8) = $34. Club B costs 5(8) = $40.

## CHALLENGE

**Plan B is proportional because its line passes through (0, 0). Plan A is cheaper at x = 5 and x = 6. The lines meet at x = 4, and Plan A's line is lower after that.**

Accept equivalent comparisons that give the correct costs. For the challenge, accept an explanation using either the graph or the equations.