

Model the Match

Turn real comparisons into equations and inequalities.

GRADE 8 • TEKS 8.8.A

8.8.A "write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants;"

NAME _____

DATE _____

BUILD BOTH SIDES

Let x stand for the unknown amount. Write an expression for each quantity being compared, then use $=$ when they are equal, $<$ or $>$ for a strict comparison, and $\leq$ or $\geq$ when equality is included.

WORKED EXAMPLE

At two art-print shops, the total price is equal. Shop A costs $\frac{7}{13}x + 11$ dollars, and Shop B costs $\frac{2}{9}x + 17$ dollars. Write an equation.

1. Let x be the number of prints.
2. Shop A costs $\frac{7}{13}x + 11$.
3. Shop B costs $\frac{2}{9}x + 17$.
4. Set the equal prices equal: $\frac{7}{13}x + 11 = \frac{2}{9}x + 17$.

Answer: $\frac{7}{13}x + 11 = \frac{2}{9}x + 17$

PRACTICE 6 problems

- 1** Write an equation: Three fifths of a number, plus 4, is the same as one sixth of the number, plus 10.

ANSWER _____

- 2** Write an inequality: One fourth of x plus 12 is greater than three eighths of x plus 6.

ANSWER _____

- 3** Write an equation: A club's first fee is $\frac{5}{8}x + 14$ dollars. Its second fee is $\frac{1}{3}x + 20$ dollars. The fees are equal.

ANSWER _____

- 4** Write an inequality: Four fifths of x minus 16 is at most one third of x plus 24.

ANSWER _____

- 5** Write an equation: Three fourths of x plus 8 is equal to one fifth of x plus 18.

ANSWER _____

- 6** Write an inequality: Five sixths of x minus 14 is less than one fourth of x plus 30.

ANSWER _____

APPLY IT Show your work

1

At a school gaming event, Team A earns $\frac{5}{6}$ dollar from each ticket sold and starts with 24 dollars in donations. Team B earns $\frac{1}{3}$ dollar from each ticket sold and starts with 36 dollars in donations. Let x be the number of tickets sold by each team. Write an equation for when the teams have raised the same amount.

WORK SPACE

ANSWER _____

2

A music app has two download plans. Plan A costs $\frac{3}{5}$ dollar per album plus an 18-dollar fee. Plan B costs $\frac{1}{4}$ dollar per album plus a 42-dollar fee. Let x be the number of albums downloaded. Write an inequality showing when Plan A costs less than Plan B.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The school design club is choosing a custom-sticker package. Package A costs 28 dollars plus $\frac{5}{8}$ dollar per sticker. Package B costs 40 dollars plus $\frac{1}{6}$ dollar per sticker. Let x be the number of stickers. Write an inequality for when Package A costs no more than Package B. Then explain in one sentence why your inequality uses $\leq$.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Write an equation: Three fifths of a number, plus 4, is the same as one sixth of the number, plus 10.	$3/5x + 4 = 1/6x + 10$
2	Write an inequality: One fourth of x plus 12 is greater than three eighths of x plus 6.	$1/4x + 12 > 3/8x + 6$
3	Write an equation: A club's first fee is $5/8x + 14$ dollars. Its second fee is $1/3x + 20$ dollars. The fees are equal.	$5/8x + 14 = 1/3x + 20$
4	Write an inequality: Four fifths of x minus 16 is at most one third of x plus 24.	$4/5x - 16 \leq 1/3x + 24$
5	Write an equation: Three fourths of x plus 8 is equal to one fifth of x plus 18.	$3/4x + 8 = 1/5x + 18$
6	Write an inequality: Five sixths of x minus 14 is less than one fourth of x plus 30.	$5/6x - 14 < 1/4x + 30$

PART 2 • APPLY IT

1. $5/6x + 24 = 1/3x + 36$ Write each team's total as ticket earnings plus starting donations. Use = because the totals are the same.
2. $3/5x + 18 < 1/4x + 42$ Write the total cost for each plan. Use < because Plan A must cost less than Plan B.

CHALLENGE

$28 + 5/8x \leq 40 + 1/6x$. The $\leq$ sign includes a tie, so Package A may cost the same as Package B.

Accept equivalent expressions and equations with the two sides reversed. For inequalities, accept a reversed inequality only if the inequality symbol is reversed correctly.