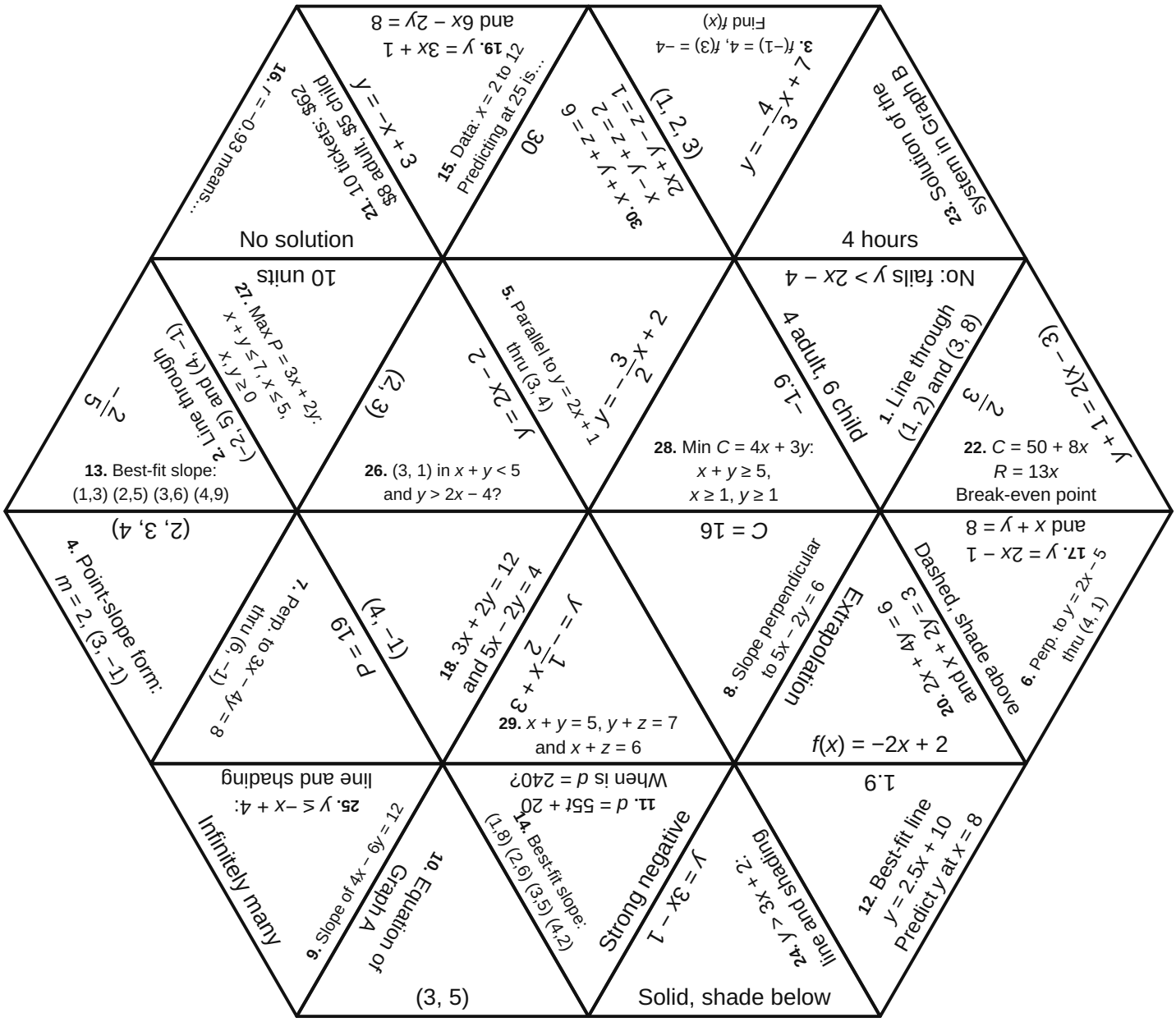
Linear Functions & Systems Tarsia

Mr. K’s Classroom · Hexagon of 24 triangles, 30 matches

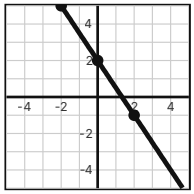
Name: _____

Directions: Write equations of lines, work with linear models and lines of best fit, solve systems of equations and inequalities (including linear programming and three variables). Answers that are points are written (x, y) or (x, y, z). Problems 10 and 23 use graphs shown on the work pages. Cut out the 24 triangles. Match each problem to its answer so that touching edges fit, and build a **hexagon**. Glue it on a sheet of paper. Show your work for every problem on the work pages (the number before each problem tells you where).



Show Your Work

Linear Functions & Systems Tarsia · Problems 1–15 Name: _____

1. Write the equation of the line through (1, 2) and (3, 8) in slope-intercept form.	**2.** Write the equation of the line through (−2, 5) and (4, −1) in slope-intercept form.	**3.** A linear function has $f(-1) = 4$ and $f(3) = -4$. Write $f(x)$ in slope-intercept form.
4. Write the equation of the line with slope $m = 2$ through (3, −1) in point-slope form.	**5.** Write the equation of the line parallel to $y = 2x + 1$ through (3, 4) in slope-intercept form.	**6.** Write the equation of the line perpendicular to $y = 2x - 5$ through (4, 1) in slope-intercept form.
7. Write the equation of the line perpendicular to $3x - 4y = 8$ through (6, −1) in slope-intercept form.	**8.** Find the slope of any line perpendicular to $5x - 2y = 6$.	**9.** Find the slope of the line $4x - 6y = 12$.
10. Write the equation of the line in Graph A in slope-intercept form. 	**11.** A car is 20 miles from home and drives away at 55 miles per hour, so $d = 55t + 20$ (t in hours). When is $d = 240$ miles?	**12.** A line of best fit is $y = 2.5x + 10$. Predict y when $x = 8$.
13. Find the slope of the least-squares line of best fit for the data (1,3) (2,5) (3,6) (4,9).	**14.** Find the slope of the least-squares line of best fit for the data (1,8) (2,6) (3,5) (4,2).	**15.** Your data cover $x = 2$ to $x = 12$. Is predicting y at $x = 25$ interpolation or extrapolation?

Show Your Work

Linear Functions & Systems Tarsia · Problems 16–30 Name: _____

16.
A scatter plot has correlation coefficient $r = -0.93$. Describe the correlation.

17.
Solve by substitution:
$y = 2x - 1$ and $x + y = 8$.

18.
Solve by elimination:
$3x + 2y = 12$ and $5x - 2y = 4$.

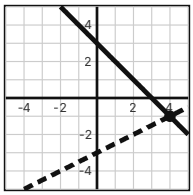
19.
How many solutions does the system $y = 3x + 1$ and $6x - 2y = 8$ have? Explain how you know.

20.
How many solutions does the system $2x + 4y = 6$ and $x + 2y = 3$ have? Explain how you know.

21.
Adult tickets cost \$8 and child tickets cost \$5. A group buys 10 tickets for \$62 total. How many of each?

22.
Cost is $C = 50 + 8x$ and revenue is $R = 13x$ (x = units sold). How many units give break-even?

23.
Graph B shows two lines (one solid, one dashed). Find the solution of the system.



24.
Graph $y > 3x + 2$. Is the boundary line solid or dashed, and which side is shaded? Check with a test point.

25.
Graph $y \le -x + 4$. Is the boundary line solid or dashed, and which side is shaded? Check with a test point.

26.
Is (3, 1) a solution of the system $x + y < 5$ and $y > 2x - 4$? Test it in both inequalities.

27.
Maximize $P = 3x + 2y$ subject to $x + y \le 7$, $x \le 5$, $x \ge 0$, $y \ge 0$. Find the vertices of the feasible region and test each one.

28.
Minimize $C = 4x + 3y$ subject to $x + y \ge 5$, $x \ge 1$, $y \ge 1$. Find the vertices of the feasible region and test each one.

29.
Solve the system:
$x + y = 5$, $y + z = 7$, $x + z = 6$.
Write the solution as (x, y, z).

30.
Solve the system:
$x + y + z = 6$, $x - y + z = 2$, $2x + y - z = 1$. Write the solution as (x, y, z).