

MONEY FOR CAR SPEAKERS

- Focus:** Formulation and solution of equations and inequalities based on linear functions.
- Objective:** **Algebra I TEKS, Linear Functions #7**
The student formulates equations and inequalities based on linear functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.
- Terms:** Linear equation in one variable, linear inequality
- Set-Up:** Participants should be seated at tables in groups of 3-4.
- Materials:** Transparencies #27-28, Activities #28-31, graphing calculators, blank transparencies, overhead pens (1 per group)
- Prerequisites:** Table building and graphing capabilities of calculator
- Procedure:** **Transparency #28: Money for Car Speakers**
Give participants ample time to work in small cooperative groups and to answer the questions. Provide each group with a blank transparency on which to record their solution approach. Allow participants to present their solution approaches.

Number of Hours Worked	Wages Earned Job Offer #1	Wages Earned Job Offer #2
0 (0 wks)	-45	0
20 (1 wk)	+45	70
40 (2 wks)	135	140
60 (3 wks)	225	210
80 (4 wks)	315	280
100 (5 wks)	405	350
120 (6 wks)	*495	420
140 (7 wks)	585	490
160 (8 wks)	675	*560
n	$4.5n - 45$	$3.5n$

Transparency #29-31: Solution Strategies

The purpose of these transparencies is to illustrate several solution strategies that might be used to solve this problem. They can be used when summarizing the activity.

Emphasize Algebra I TEKS, Linear Functions #5

5.c. The student translates among algebraic, tabular, graphical, or verbal descriptions of linear functions.

Emphasize Algebra I TEKS, Linear Functions #6

6.g. The student interprets and predicts the effects of changing slope and y-intercept in applied situations.

Emphasize Algebra I TEKS, Linear Functions #7

7.a. The student analyzes situations involving linear functions and formulates linear equations or inequalities to solve problems.

7.c. For given contexts, the student interprets and determines the reasonableness of solutions to equations and inequalities.

Activity #27 - Money for Car Speakers

This activity offers an alternative approach to the problem. In this case the problem is posed, the table is built, and the student is left with the task of interpreting the data.

Activity #28 - Money for Car Speakers

This activity also offers an alternative approach to the problem. In this case the problem is posed and several algebraic rules are posed. The student is left with the task of determining which rules and their corresponding graphs will provide the necessary information for answering the questions. This activity provides two experiences similar to those on the Algebra End-of-Course Exam: (a) select the appropriate graph and (b) interpret the graph.

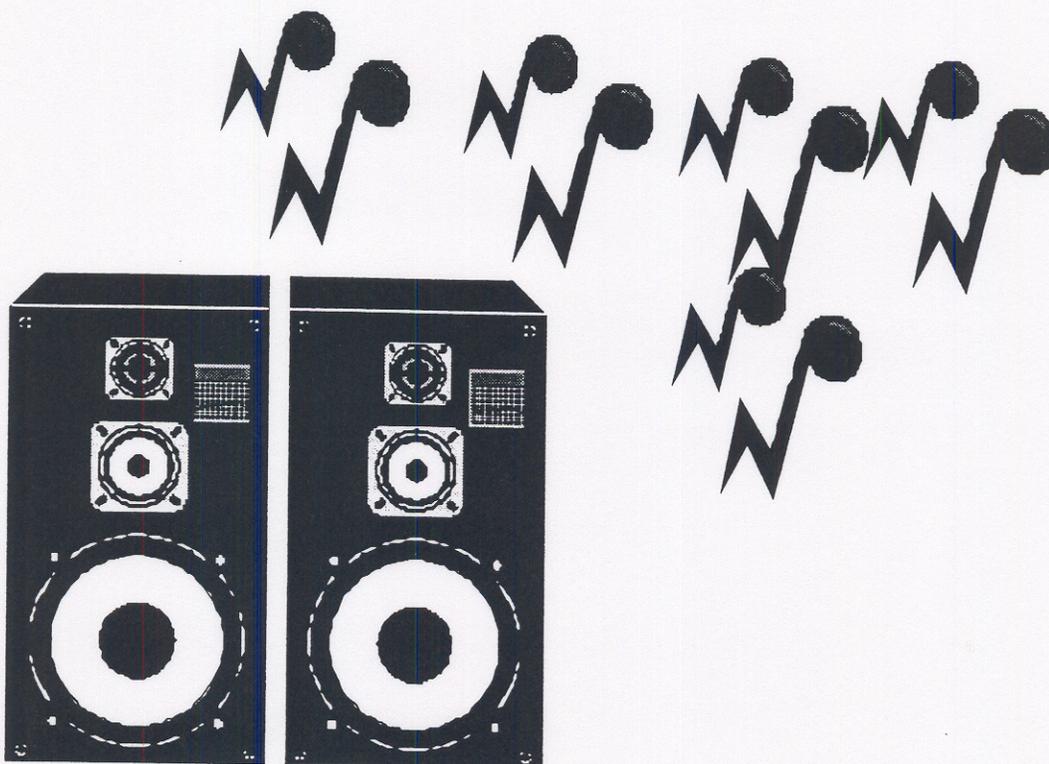
COMPUTING WAGES

Use the table building capabilities of your graphing calculator to complete the table.

# of Hours Worked	Amt. Earned Job #1	Amt. Earned Job #2
0	- 45	0
20	+45	70
40	135	140
60	225	210
80	315	280
100	405	350
120	495	420
140	585	490
160	675	560
180	765	630
200	855	700
n	$4.5n - 45$	$3.5n$

MONEY FOR CAR SPEAKERS

Johnny wants to buy speakers for his car which will go on sale for \$495.00 at the end of the summer. In the previous activity, Better Paying Summer Job, Johnny received two summer job offers. Which job should Johnny accept in order to be able to buy his speakers? Why?



MONEY FOR CAR SPEAKERS SOLUTION STRATEGIES

“Build an Organized Table” Method:

This group determined 2 one-variable rules, built an organized table, and checked amount earned to find the solution.

Guess # of Hours	Job Offer #1 $4.5x - 45$	Earned \$495?	Job Offer #2 $3.5x$	Earned \$495?
20 (1 wk)	$4.5(20) - 45$ \$45	no	$3.5(20)$ \$70	no
40 (2 wk)	$4.5(40) - 45$ \$135	no	$3.5(40)$ \$140	no
60 (3 wk)	$4.5(60) - 45$ \$225	no	$3.5(60)$ \$210	no
80 (4 wk)	$4.5(80) - 45$ \$315	no	$3.5(80)$ \$280	no
100 (5 wk)	$4.5(100) - 45$ \$405	no	$3.5(100)$ \$350	no
120 (6 wk)	$4.5(120) - 45$ \$495	yes	$3.5(120)$ \$420	no
140 (7 wk)	$4.5(140) - 45$ \$585	yes	$3.5(140)$ \$490	no
160 (8 wk)	$4.5(160) - 45$ \$675	yes	$3.5(160)$ \$560	yes

MONEY FOR CAR SPEAKERS

Use the table to answer the following questions.

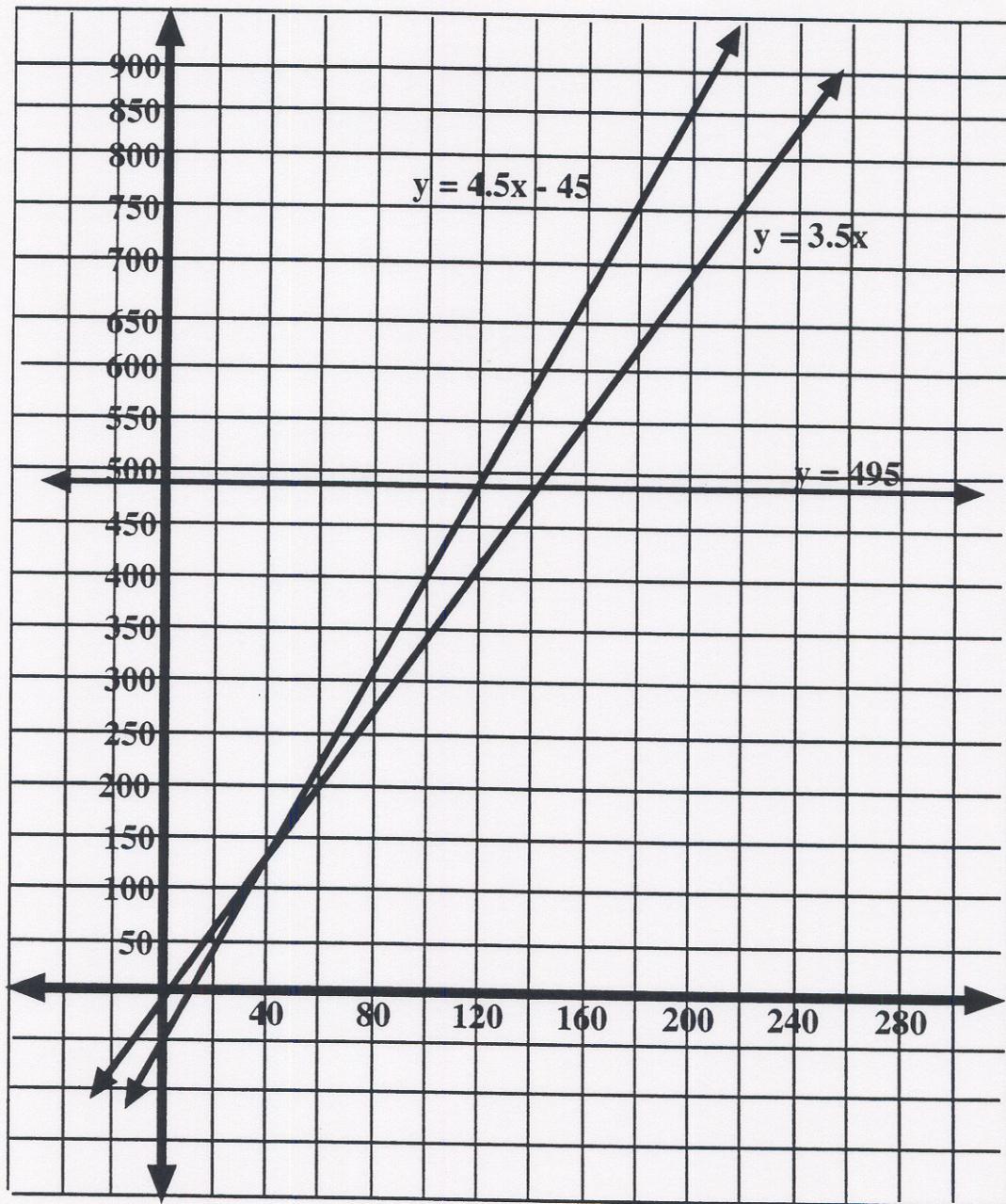
1. How many weeks must Johnny work at job #1 in order to earn \$495?
2. How many weeks must Johnny work at job #2 in order to earn \$495?

Guess # of Hours	Job Offer #1 $4.5x - 45$	Earned \$495?	Job Offer #2 $3.5x$	Earned \$495?
20	\$45	no	\$70	no
40	\$135	no	\$140	no
60	\$225	no	\$210	no
80	\$315	no	\$280	no
100	\$405	no	\$350	no
120	\$495	yes	\$420	no
140	\$585	yes	\$490	no
160	\$675	yes	\$560	yes

MONEY FOR CAR SPEAKERS SOLUTION STRATEGIES

“Graphing” Method:

This group determined 2 one-variable functions, graphed each function, and determined values for x when $y = 495$.



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MONEY FOR CAR SPEAKERS SOLUTION STRATEGIES

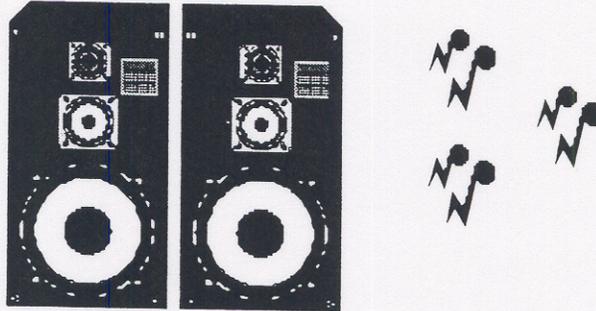
“Equation Solving” Method:

This group determined 2 one-variable equations and solved.

Job Offer #1	Job Offer #2
$4.50x - 45 = 495$ $\quad \underline{+45 = +45}$ $4.50x = 540$ $\frac{4.50x}{4.50} = \frac{540}{4.50}$ $1x = 120 \text{ hrs}$ $1x = 6 \text{ wks}$	$3.50x = 495$ $\frac{3.50x}{3.50} = \frac{495}{3.50}$ $1x = 141+ \text{ hrs}$ $1x = 8 \text{ wks}$

MONEY FOR CAR SPEAKERS

Johnny wants to buy speakers for his car which will go on sale for \$495.00 at the end of the summer. In the previous activity, Better Paying Summer Job, Johnny received two summer job offers.



Use the table to answer the following questions.

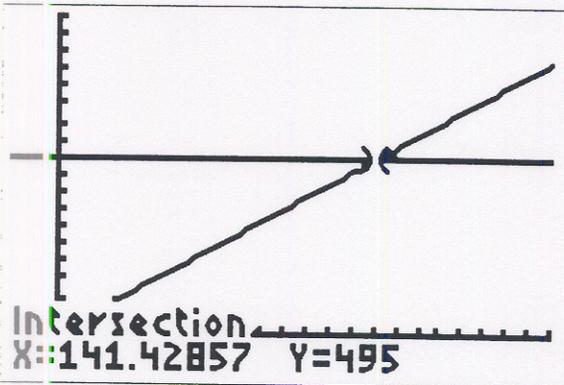
1. Which job should Johnny accept in order to be able to buy his speakers? Why?
2. How many weeks must Johnny work at job #1 in order to earn \$495?
3. How many weeks must Johnny work at job #2 in order to earn \$495?

Guess # of Hours	Job Offer #1 $4.5x - 45$	Earned \$495?	Job Offer #2 $3.5x$	Earned \$495?
20	\$45	no	\$70	no
40	\$135	no	\$140	no
60	\$225	no	\$210	no
80	\$315	no	\$280	no
100	\$405	no	\$350	no
120	\$495	yes	\$420	no
140	\$585	yes	\$490	no
160	\$675	yes	\$560	yes

MONEY FOR CAR SPEAKERS

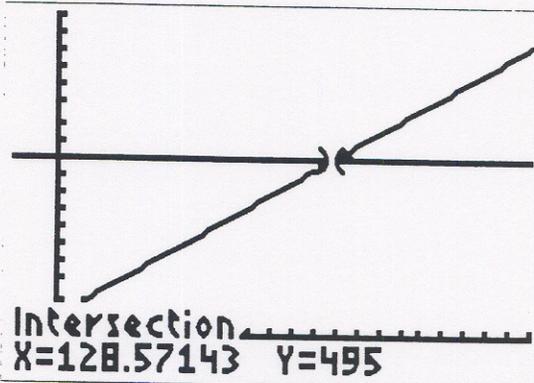
Select the two graphs from the four shown below that will assist Johnny in making an informed decision about which job to accept. How many weeks must Johnny work at job #1 in order to earn \$495? at job #2?

a.



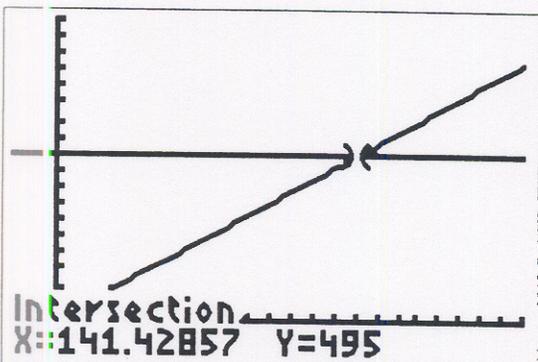
(-20, 220, 10, -100, 900, 50)
 $y = \$4.50x$ and $y = \$495$

b.



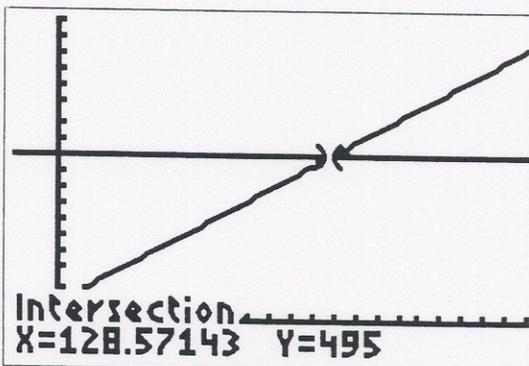
(-20, 220, 10, -100, 900, 50)
 $y = \$4.50x - \45 and $y = \$495$

c.



(-20, 220, 10, -100, 900, 50)
 $y = \$3.50x$ and $y = \$495$

d.



(-20, 220, 10, -100, 900, 50)
 $y = \$3.50x + \45 and $y = \$495$