

# How Much Will I Earn?



## Facilitation Questions

- Who currently has a job or has had a job in the past?
- What is the basic minimum wage rate in Texas?
- Do all states have the same minimum wage amount?
- How much would a person making minimum wage in Texas earn in a 40-hour work week?
- How much would someone earn per year if he works 52 weeks a year assuming that he works 40 hours each week?
- What do you think is the average income in the United States?

### Activity 1: Translations

1. Quadrilateral ABCD has coordinates (1, 1), (2, 6), (4, 4), and (4, 2). On graph paper, draw Quadrilateral ABCD.
2. Place a sheet of patty paper (tracing paper) over the grid.
3. Trace the quadrilateral and the axes. Label the quadrilateral A'B'C'D'.
4. Translate the quadrilateral five units to the left by sliding the patty paper. Record the vertices of quadrilateral A'B'C'D' in Table 1.

Table 1:

Original Figure	Original Image Translated Horizontally 5 units left
A ( , )	A' ( , )
B ( , )	B' ( , )
C ( , )	C' ( , )
D ( , )	D' ( , )
(x, y)	( , )

5. What happened to the x-coordinates under the horizontal translation?
6. What happened to the y-coordinates under the horizontal translation?
7. What rule describes your horizontal translation?

8. Find the slopes of the sides of the original quadrilateral and the slopes of the sides of the translated image. Record the slopes in the table below:

	Original Image	Original Image Translated 5 units left
Slope AB		
Slope BC		
Slope CD		
Slope DA		
Any	m	

9. Make a general statement that describes the effect on slope when an image is translated left.

10. Return the quadrilateral to its original position.

11. Translate the quadrilateral three units down by sliding the patty paper. Record the vertices of quadrilateral ABCD and A'B'C'D' in Table 2.

Table 2:

Original Figure	Original Image Translated Vertically 3 units down
A ( , )	A' ( , )
B ( , )	B' ( , )
C ( , )	C' ( , )
D ( , )	D' ( , )
(x, y)	( , )

12. What happened to the x-coordinates under the vertical translation?

13. What happened to the y-coordinates under the vertical translation?

14. What rule describes your vertical translation?

15. Find the slopes of the sides of the original quadrilateral and the slopes of the sides of the translated image. Record the slopes in the table below:

	Original Image	Original Image Translated vertically 3 units down
Slope AB		
Slope BC		
Slope CD		
Slope DA		
Any	m	

16. Make a general statement that describes the effect on slope when an image is translated vertically 3 units down.

## Translations on the Coordinate Plane

1. Display **Transparency 1** and model entering the data into list 1 and list 2 in a graphing calculator. Have students copy the data from the transparency into L1 and L2 on the **What's My Transformation I** activity sheet.
2. Have students set the window, select a connected line graph, and then graph the points.
3. Allow time for students to complete this procedure and compare graphs as you model with the overhead calculator.
4. Repeat the process with lists 3 and 4.
5. Have students answer the questions on the activity sheet.

The teacher should monitor the students to be sure all students have the correct graph. When every student has had the opportunity to complete the activity, use the **Facilitation Questions** below to guide the class discussion.

### Facilitation Questions

- How is the second figure like the first figure? It has the same shape, size and orientation.
- What is the difference? The second figure is in a different location.
- What do you think caused the figure to be in a different location? The coordinates were different.
- How were the coordinates changed? 4 was subtracted from each x-value and 5 was subtracted from each y-value.
- Can you create a new table of values that will keep the shape the same and move it to a different location? Answers will vary; have students share their solutions with their group and the class.

**A.1B: gather and record data and use data sets to determine functional relationships between quantities.**

1. Which equation best describes the relationship between  $x$  and  $y$  in this table?

$x$	$y$
-4	-11
-1	-2
2	7
5	16

A  $y = \frac{1}{3}x + 1$

B  $y = \frac{1}{3}x - 1$

C  $y = 3x - 1$

D  $y = 3x + 1$

**A.1B: gather and record data and use data sets to determine functional relationships between quantities.**

2. The table shows the number of slices of pepperoni placed on each size of pizza at Pepe's Pizza Shop.

Size of Pizza	Radius of Pizza (inches)	Number of Pepperoni Slices
Single	2	5
Small	4	17
Medium	5	26
Large	8	65
Extra Large	10	101

Let  $r$  represent the radius of the pizza and let  $n$  represent the number of slices of pepperoni. Identify the equation that best represents the relationship between the radius and the number of slices of pepperoni.

A  $r = 2n + 1$

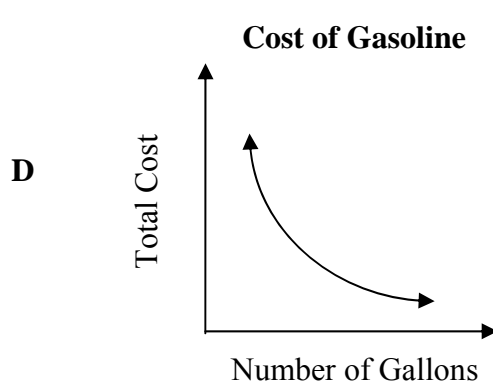
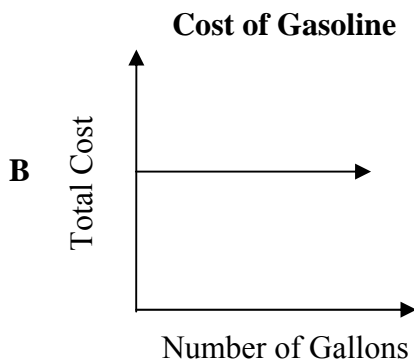
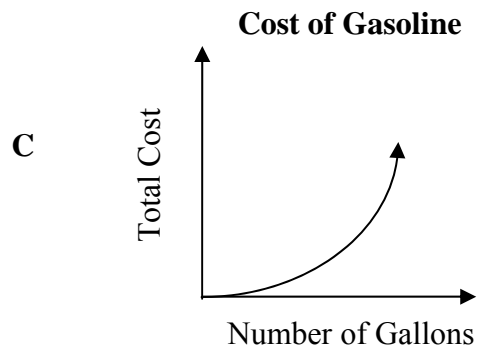
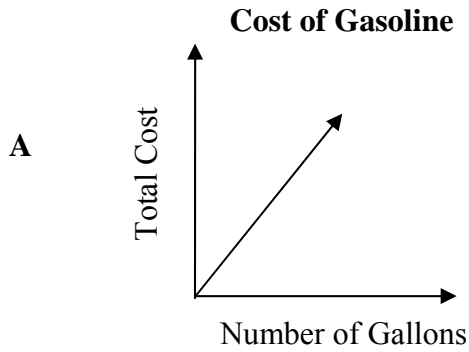
B  $r = 2r + 1$

C  $r = n^2 + 1$

D  $n = r^2 + 1$

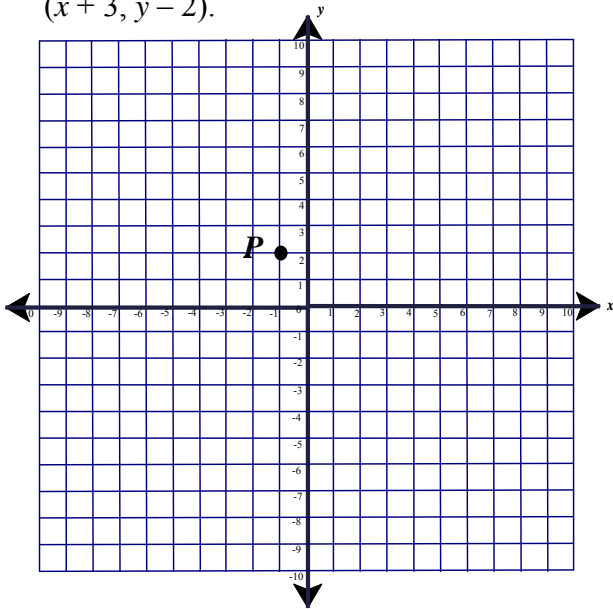
**A.2C: interpret situations in terms of given graphs or create situations that fit given graphs.**

3. Identify the graph that best represents the relationship between the number of gallons of gasoline Mr. Johnson purchased at \$1.49 a gallon and the total cost of his gasoline.



**8.6B: graph dilations, reflections, and translations on a coordinate plane.**

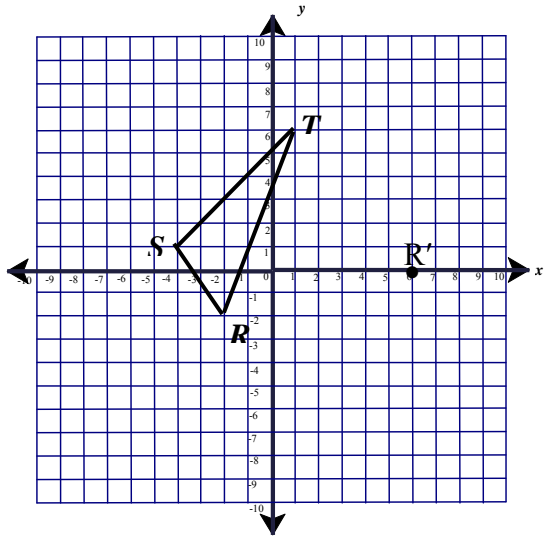
4. Identify the location of point P under translation  $(x + 3, y - 2)$ .



- A  $(3, -2)$
- B  $(2, 3)$
- C  $(-1, 0)$
- D  $(2, 0)$

**8.6B: graph dilations, reflections, and translations on a coordinate plane.**

5.  $\triangle RST$  is translated so that  $R$  is mapped to  $R'$ .



Which set of ordered pairs best identifies points  $S'$  and  $T'$ ?

- A  $S'(8, 3), T'(3, 8)$
- B  $S'(4, 3), T'(9, 8)$
- C  $S'(10, -1), T'(12, -9)$
- D  $S'(10, 3), T'(5, 4)$

## **What is the Meaning of This?**

Answer the question or questions on the cards in the spaces provided.

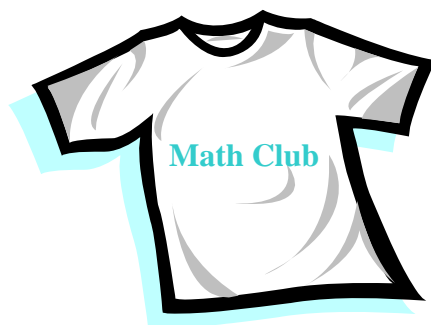
**Card 1**

**Card 2**

**Card 3**

**Card 4**

## Performance Assessment



**The Math Club has decided to sell t-shirts to raise money. They are purchasing shirts that have their school's name and mascot on them. The cost includes a one-time design fee (for the design of the school's name and mascot) of \$40 and then \$5.00 per shirt. They will be selling the shirts at their school for \$8.00 each. How many shirts must they sell before they start to make a profit?**

## Performance Assessment



A video game designer is creating a new computer game. Before writing the program, she maps out one of the figures on grid paper. The vertices of the figure are  $(2, 3)$ ,  $(2, -5)$ , and  $(-3, -5)$ . During the game, the figure will move left 5 units and up 4 units. This figure also enlarges by a scale factor of 3 with the origin as the point of dilation to make another new figure. What are the coordinates of the new image? Justify your answer.

## Resources Used



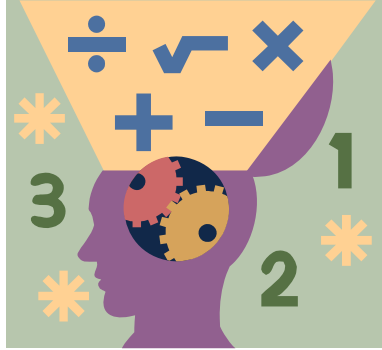
“Accelerated Curriculum for Mathematics Exit TAKS”. Region IV Education Service Center (2005).

“TAKS Mathematics Preparation”. Region IV Education Service Center (2004).

[www.tea.state.tx.us](http://www.tea.state.tx.us)

<http://template.aea267.iowapages.org/lessonplan/>

## Warm-Up Activity



Felipe's school is hosting a math competition against other schools in the same district. Each school can only allow 10 students to compete. Felipe and his classmates are taking tests to determine the 10 best math students to send. Felipe did well, but tied with John Roy for the last spot. His teacher decided to set-up a one-problem challenge, whoever got it right the fastest would win.

Knowing that "H" is equal to 10, and T is half of M, how could MATH be 42, TEAM be 40, and MEET be 37?