Rate of Change Activity

Objective
Students will find the slope of a line, given two points.

Materials
- Chart paper   - Graph paper   - Markers   - Rulers   "Internet Quote" resource sheets (one per pair)   "Finding the Slope Using Ordered Pairs" resource sheets (one per group)   "Finding the Slope Using a Graph" resource sheets (one per student)   - Whiteboards or sheet protectors with white paper   - Dry-erase markers

Opener (10 minutes)
"Your school's chorus is planning a trip to Disney World to celebrate the end of a successful year. You have been asked to investigate the purchase of group t-shirts."   As a class, start a KWLS chart for this topic. Complete the K (know) and W (want to know) of the chart on the board or on chart paper.

Internet Quote Activity (15 minutes)
Assign students to pairs and have them examine the quote from *Kayne's T-shirts* and complete the "Internet Quote" resource sheet. Circulate and monitor the pairs in order to ensure student understanding of the concept.   Have pairs share answers to the activity in a whole class discussion. (Note: Be sure that the rate of change for this scenario is identified.)   Answers: 1. 8   2. Yes, there is a constant increase of 8 shirts.   3. 42   4. There is a constant increase of \$42.   5. $\dfrac{42}{8}$, The cost increases by \$42 for each additional 8 shirts.   6. Answers will vary.

Finding Slope Activity (20 minutes)

Ask students to share what they remember about rate of change. *(Possible Answer: rise over run, slope, change in y over change in x, vertical change and horizontal change, etc.)*

Ask students how slope can be found using any two ordered pairs from the table? First, have students generate ideas in a small group, then have groups share ideas with the class. *(Possible answers: graph and find horizontal change and vertical change, find differences in y-values and x-values)*

Have groups investigate their strategy, using the table or graph paper if needed. Circulate around room to determine which groups have found the correct solution. Have these groups present solutions to the class and explain the method they used to determine the slope.

(Note: If possible have multiple groups present if they used different strategies or different sets of ordered pairs. If all groups used the same ordered pairs, once the solution is found, challenge groups to find the slope using other ordered pairs.)

Finding the Slope Using Ordered Pairs Activity (20 minutes)

Assign students to four groups. Have each group work together to complete "Finding the Slope Using Ordered Pairs" resource sheet. The teacher should call on groups to share the slope they found for one of the problems (#1 - 4). Each group should be prepared to give the slope they found for any of the problems. As a class, discuss Part 2 of "Finding the Slope Using Ordered Pairs" resource sheet.

Answers:
1. slope is 6
2. slope is 7
3. slope is 4
4. slope is 6
Part 2 answers may vary.

Finding the Slope Using a Graph Activity (20 minutes)

Ask students how they can find the slope of an equation of a line when given a graph. *(Possible answers: find two points and build a table, find the vertical and horizontal change between two points.)*

Using a transparency graph paper or graph paper under the document camera, draw a line and label some points. Call on students to come up and show their strategy for finding slope. Ask students to give thumbs up/down if they agree or disagree. Make sure students understand how to find slope given a graph.

Give each student the "Finding the Slope Using a Graph" resource sheet. Allow a few minutes for students to find the slope of each line. One at a time, have students use whiteboards to show the slope that they have found using the graphs.

Answers: a. –2   b. 2   c. $\frac{2}{3}$ d. $-\frac{1}{2}$ e. 1   f. 0

Closure (5 minutes)

As a class, complete the KWLS chart, emphasizing L (learned) and S (still want to know).

Internet Quote

Kayne's T-shirts, an online t-shirt company, has sent you a quote for their t-shirts. The table below shows the cost for the number of shirts ordered.

Number of t-shirts	Cost (in dollars)
t	c
8	102
16	154
24	206
32	258
40	310
48	362
56	414
64	466

1. Using the table above, find the differences in the Number of t-shirts ordered.

2. Is there a pattern? If so, describe it.

3. Using the table above, find the differences in the Cost.

4. Is there a pattern? If so, describe it.

5. Write a ratio that shows the change (differences) in cost to the change (differences) in the number of t-shirts (rate of change). What does this represent?

6. Record anything you have learned or observed.

Finding the Slope Using Ordered Pairs

Part 1 For each t-shirt company:

- Plot the ordered pairs on the grid that is on the right of the table.

- Find the slope for this t-shirt company using the values in the table

1.

Number of t-shirts	Cost (in dollars)
x	*y*
2	87
4	99
6	111

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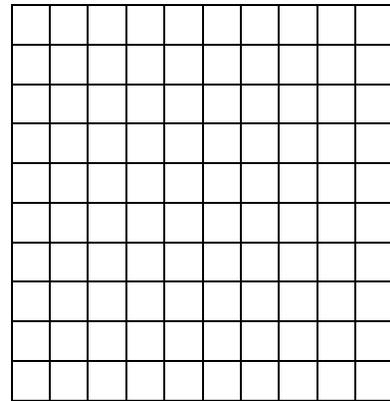
2.

Number of t-shirts	Cost (in dollars)
x	*y*
5	35
11	77
19	133
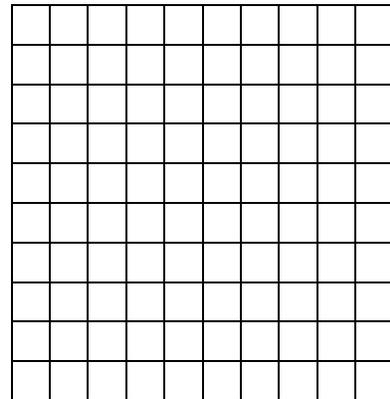
3.

x	5	10	15
y	23	43	63
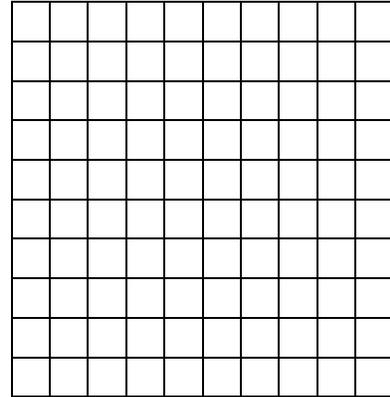
4.

x	4	10	17
y	22	58	100
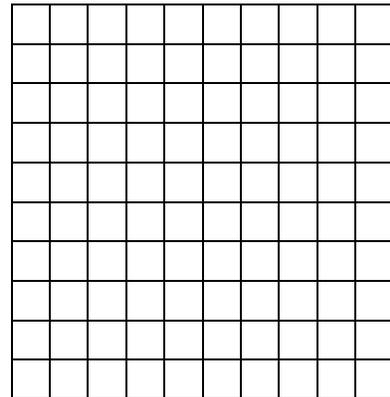
Part 2 Answer the following questions:

1. How did you determine the slope?

2. What did you notice about each graph?

Name _____

Finding the Slope Using a Graph
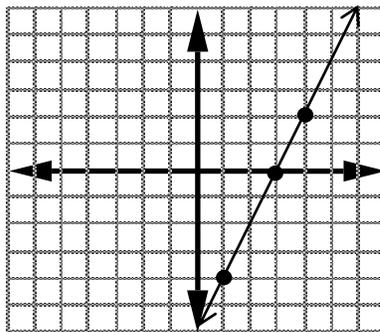
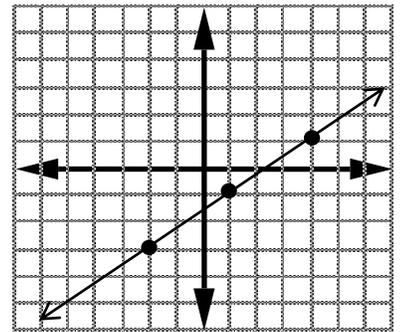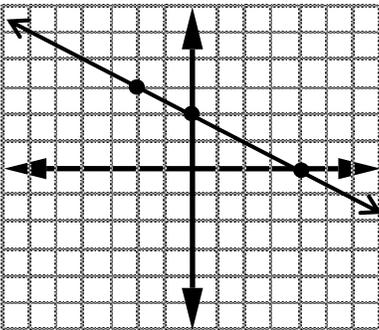Find the slope of each from the graph:
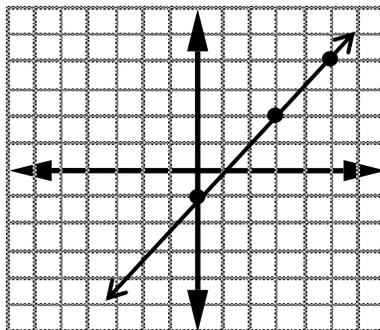
a.
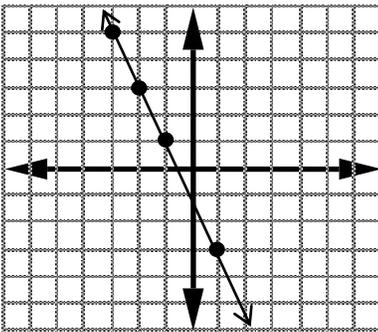
Slope: _____

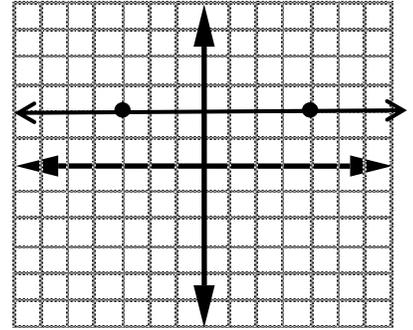b.

Slope: _____

c.

Slope: _____

d.

Slope: _____

e.

Slope: _____

f.

Slope: _____