1. Lake Aid is an annual benefit talent show produced by the students of Wilde Lake High School to raise money for the local food bank.

a. Several of the show organizers researched the possibility of selling DVDs of the show to increase donations to the food bank. They would have to pay for recording of the show and for production of the DVDs. The cost C (in dollars) would depend on the number of DVDs ordered n according to the rule $C = 230 + 5n$.

i. Explain what the numbers in the function rule tell about the situation.

ii. Explain what the function rule tells you to expect in tables of values for the function. Then complete the table below.

DVD's ordered (n)	0	1	2	3	10	22	45
Cost in $ (C)							

iii. Explain what the function rule tells you to expect in a graph of the function.

iv. Write a *recursive* rule to describe the pattern of change in the dependent variable.

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b. Proceeds from ticket sales, after security and equipment rental fees are paid, are donated to the local food bank. Once the ticket price was set, organizers determined that the proceeds P (in dollars) would depend on the number of tickets sold t according to the rule $P = 4t - 300$.

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c. The organizers of the event surveyed students to see how ticket price would affect the number of tickets sold. The results of the survey showed that the number of tickets sold T could be predicted from the ticket price p (in dollars) using the rule $T = 1200 - 100p$.

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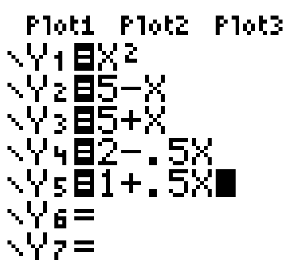
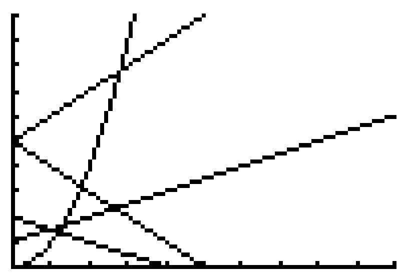
Given below are five equations and graphs. Without doing any calculating or graphing match each function with the graph that most likely represents it.





3. The table below shows the relationship between weekly profit and the number of customers per week for Skate World Roller Rink.

# of customers per week	100	200	300	400	500	600	700	800	900	100
Weekly Profit in dollars	-1000	-600	-200	200	600	1000	1400	1800	2200	2600

a. Determine the **slope** and ***y*-intercept** of the line that fits this data pattern.

b. Explain what the **slope** and ***y*-intercept** of the line tell you about the relationship between Skate

World profit and number of customers per week.

c. If Skate World reached maximum capacity during each skating session for a week, admissions for that week would total 2,400 customers. Estimate the rink's profit in this situation.

d. If Skate World reached maximum capacity during each skating session the week after they expanded, admissions for that week would total 3,400 customers. Estimate the rink's profit in this situation.

4. The table below gives the amount of money spent on national health care for the years 2008 – 2012.

2008	2009	2010	2011	2012
2411.7	2504.2	2599	2692.8	2793.4

a. Was the amount of money spent on national health care a linear function over time from 2008 to 2009? Explain how you could tell without plotting the data.

b. **i.** What is the rate of change in health-care expenditures from 2008 to 2009?

ii. What is the rate of change in health-care expenditures from 2009 to 2010?

iii. What is the rate of change in health-care expenditures from 2010 to 2011?

iv. What is the rate of change in health-care expenditures from 2011 to 2012?

v. What is the rate of change in health-care expenditures from 2008 to 2012?

vi. What does this suggest about the probable shape of a plot of the data?

5. Victoria got a job at her school as scorekeeper for a summer basketball league. The job pays $540 for the summer and the league plays on 20 nights. Some nights Victoria will have to get a substitute for her job and give her pay for that night to the substitute.

a. What should Victoria pay a substitute for one night?

b. Use the letters n for nights a substitute works, S for pay to the substitute, and E for Victoria's t total summer earnings.

i. Write a rule for calculating S as a function of n.

ii. Write a rule for calculating E as a function of n.

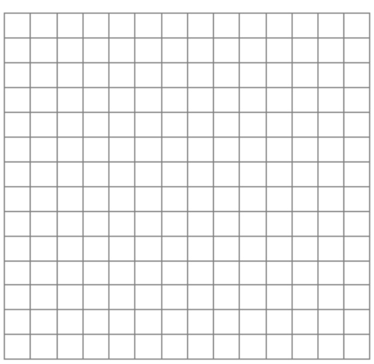
c. Sketch graphs of the functions that relate total substitute pay and Victoria's total summer earnings to the number of nights a substitute works. Compare the patterns in the two graphs.

Some of the best vacuum cleaners are only sold door-to-door. The salespeople demonstrate the cleaning ability of the appliance in people's homes to encourage them to make the purchase. Michael sells vacuum cleaners door-to-door. He earns a base salary plus a commission on each sale. His weekly earnings depend on the number of vacuum cleaners he sells as shown in the table below.

Michaels’s Earnings

# of Vacuum Cleaners Sold in a week	3	6	9	12
Weekly Earnings in dollars	350	700	1050	1400

a. Sketch a graph of the data.



b. Determine the rate of change in earnings as sales increase. What part of Michael's pay does this figure represent?

c. What would Michael's earnings be for a week in which he sold 0 vacuum cleaners?

d. Use your answers to Parts b and c to write a rule that shows how Michael's weekly earnings E can be calculated from the number of vacuum cleaners sold in a week S.

e. Company recruiters claim that salespeople sell as many as 15 vacuum cleaners in a week. What are the weekly earnings for selling 15 vacuum cleaners?

7. The table below shows the pattern of growth for one bean plant grown under special lighting.

Day	4	6	8	10
Height (in cm)	5	5.4	6.1	6.8

a. Plot the (*day*, *height*) data and draw a line that is a good fit for the trend in the data

b. Write a function rule for your linear model. What do the numbers in the rule tell about days of growth and height of the bean plant?

c. Predict the height of the plant on day 6 and check to see if that prediction seems to fit the pattern in the data table.

8. a. Explain what the constant term and the coefficient of the independent variable tell about the tables and graphs of the function.

$y = -8 + 3x$

b. Explain what the constant term and the coefficient of the independent variable tell about the tables and graphs of the function.

$p = 8.5n + 17.5$

c. Explain what the constant term and the coefficient of the independent variable tell about the tables and graphs of the function.

$y = 100 - 22x$

d. Explain what the constant term and the coefficient of the independent variable tell about the tables and graphs of the function.

$d = -4.9t + 16$

10. The Riverdale Adventure Club is planning a spring skydiving lesson and first jump. Through the club newsletter, club members were asked to take a poll as to whether or not they would purchase a video of their jump for various prices. The results of the poll are shown in the table below.

Cost (in dollars)	25	30	35	40	50	60	75
Number of Buyers	104	97	91	85	78	63	43

a. **i.** Create a linear model for the (*cost*, *number of buyers*) data.

ii. Represent your linear model as a graph on your calculator(give the window) and as a function rule.

b. **i.** Use your linear model from Part a to predict the number of members who would purchase a video of their jump for $45.

ii. Use your linear model from Part a to predict the number of members who would purchase a video of their jump for $70.

iii. Use your linear model from Part a to predict the number of members who would purchase a video of their jump for $90.

iv. Use your linear model from Part a to predict the number of members who would purchase a video of their jump for $10.

v. Which estimates would you most trust? Why?

c. Should you use your model to predict the number of buyers if videos cost $125? Why or why not?

d. i. For what cost of a video would you predict 50 buyers?

ii. For what cost of a video would you predict 75 buyers?

iii. For what cost of a video would you predict 100 buyers?