Chapter 2 Linear Relations – Exam Review
MPM1D
Jensen

Section 1: Hypotheses and Sources of Data

1. State the opposite of each hypothesis

a) Most people's favourite colour is blue.

b) Teenagers spend more time listening to rock music than to classical music.

c) Bob's favourite type of ice cream is chocolate.

d) Most students study mathematics.

2. State a hypothesis about a relationship between the variables in each pair. Then, state the opposite of each hypothesis.

a) a father's shoe size and the shoe sizes of his children

b) the cost of a movie ticket and the number of people renting DVDs

c) the altitude of a city and the length of time it takes for water to boil

3. Which of the following data are primary and which are secondary?

a) The student Council President surveys students about a school dance.

b) A student downloads data from a comparison-shopping Web site about the prices of running soes at sporting goods stores across the country.

c) A researcher interviews 100 people to determine their favourite airline.

d) A teacher finds data on the 2006 Census in a report published by Statistics Canada.

e) A researcher interviews 100 employees about the length of time they spend travelling to the workplace.

4) Identify the population in each sample.

a) Generally, girls learn to talk before boys do.

b) As cars age, their value decreases

c) Most sporting goods stores charge more for ice skates than for hockey sticks

d) Generally, teenage boys learn to drive cars before teenage girls do

5) Identify the type of sample in each situation.

a) A business studies class interviews newly qualified Chartered Accountants at a single company to learn about their choices for career specialization.

b) A market research company randomly selects phone numbers from a city directory to survey citizen's opinions on a new brand of toothpaste.

c) Every fourth person entering a provincial park is asked to fill out a questionnaire about the park.

d) Visitors leaving a museum are interviewed to find out what restaurants people like to dine at.

6) List three ways you could divide workers in a company into groups for selecting a stratified random sample.

7) A recording company wants to survey Canadian musicians.

a) Identify the population

b) Suggest a stratified random sampling technique that the company could use.

8) A health club wants to select 100 of its 415 members for a survey.

a) Identify the population

b) Describe a systematic random sampling technique that the company could use.

Section 3: Scatter Plots

9) Identify the dependent variable in each pair.

a) physical activity and heart rate

b) cost of postage and mass of a letter

c) age of a tree and height of a tree

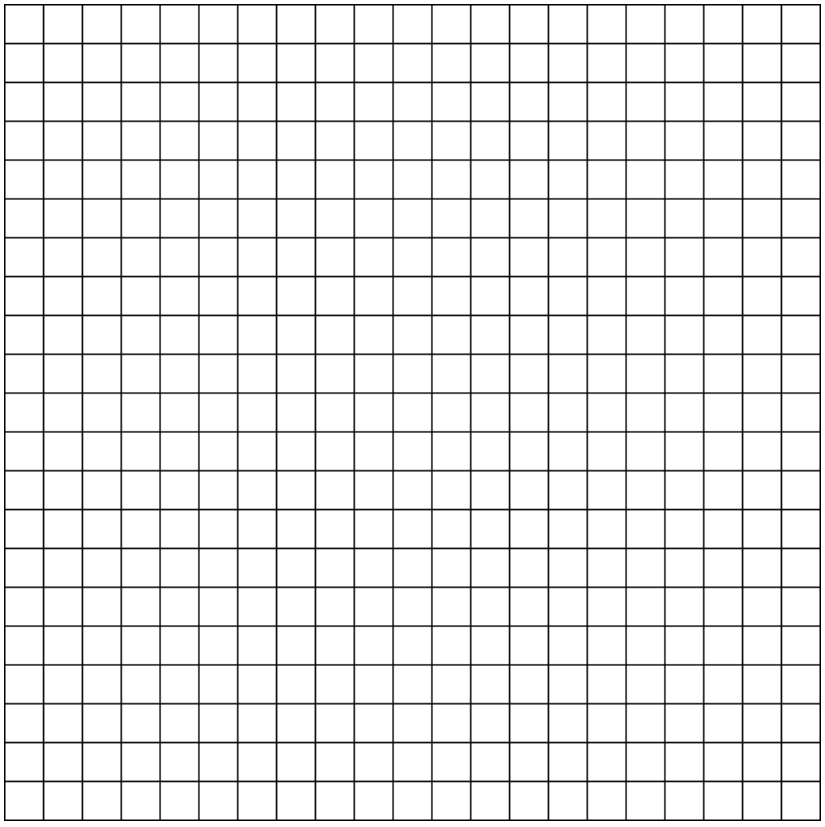
d) value of a car and age of a car

10) This table lists the number of hours of driving instruction received by students at a driving school and their driving test scores.

Instructional Hours	10	15	21	6	18	20	12
Student's Score	78	85	96	75	84	45	82

a) Identify the independent and dependent variables.

b) Make a scatter plot of the data. (Choose an appropriate scale and label the axes)



c) Describe the relationship between the variables.

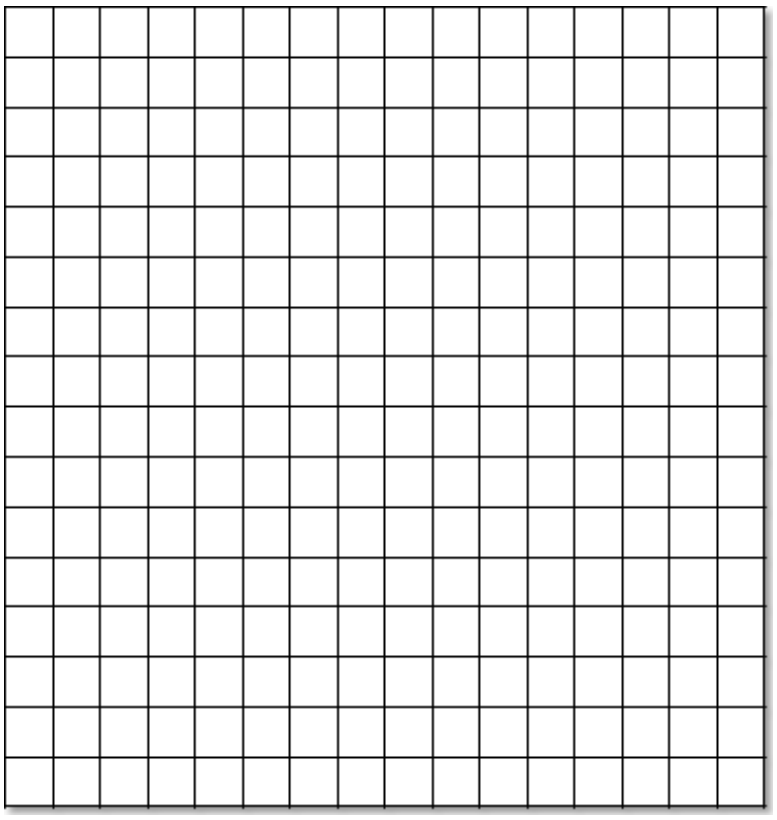
d) Are there any outliers? If so, explain how they differ from the rest of the data.

11) This table shows the number of math graduates from a university from 1999 to 2004.

a) Identify the independent and dependent variables

Year	Graduates
1999	152
2000	170
2001	176
2002	183
2003	190
2004	196

b) make a scatter plot of the data



c) Describe the trend in the number of math students graduating from the university.

d) Draw a line of best fit and predict the number of math students graduating from the university in 2008. Is this interpolation or extrapolation?

12) Define the following terms

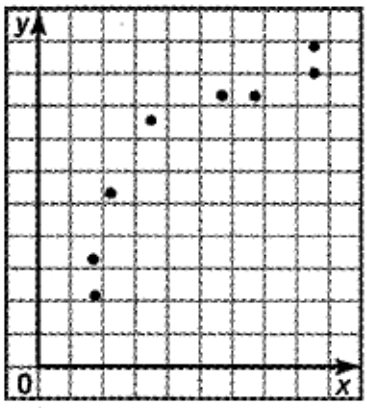
interpolate:

extrapolate:

Section 4: Linear and Non-Linear Relations

13) Do the following graphs show a linear relation or a non-linear relation?

a)



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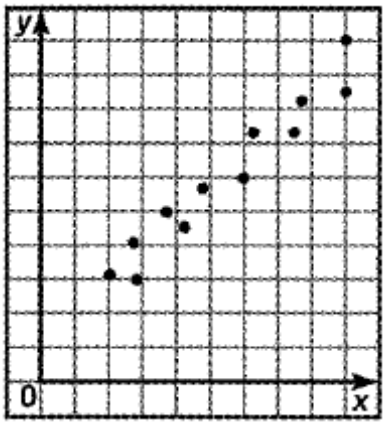
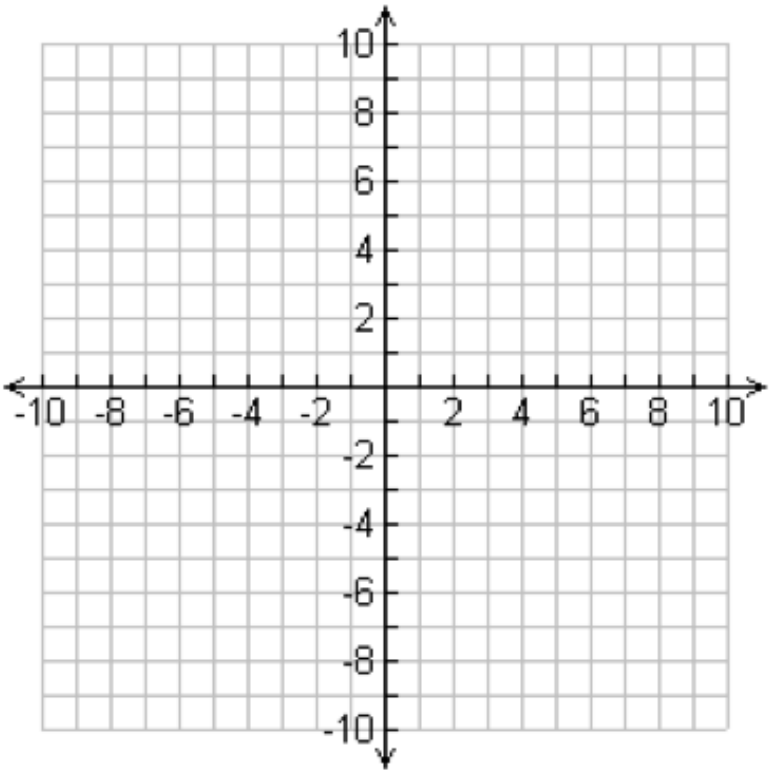


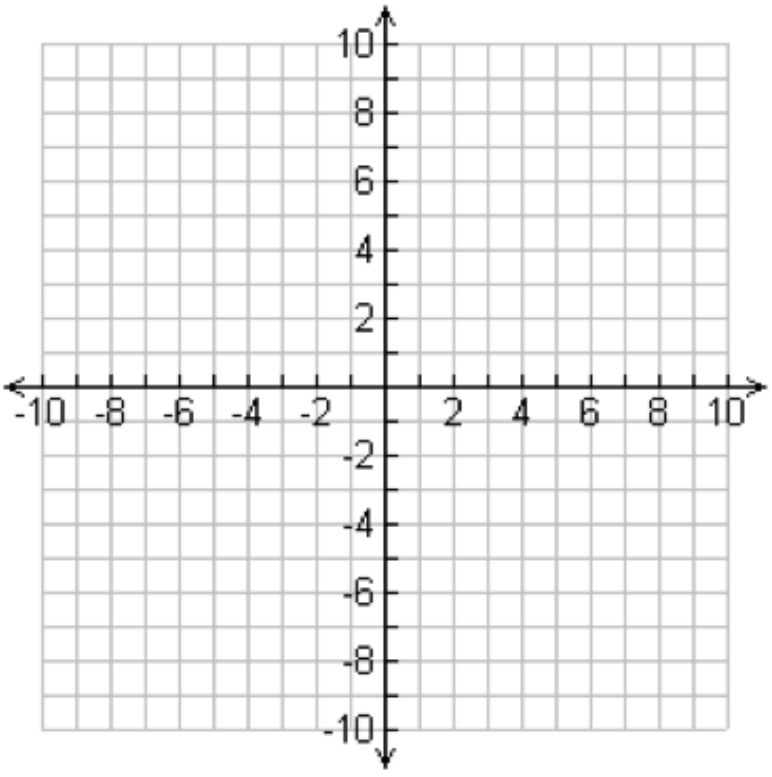
14. Plot each set of points on a grid. If your plots shows a linear relationship, draw a line of best fit. If the relation appears non-linear, sketch a curve of best fit.

a) $(-4, -3), (-3, -1), (-2, -1), (-1, -1), (0, 1), (1, 2), (2, 2), (3, 5), (4, 5), (5, 6)$



b)

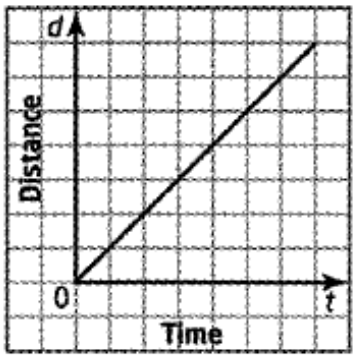
x	4	3	6	5	2	7	1	7
y	1	1	4	3	2	5	3	6



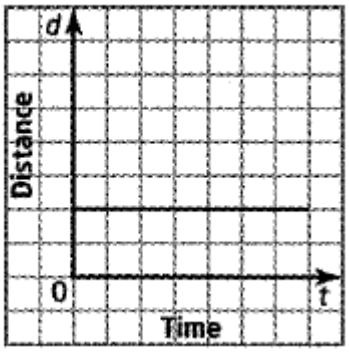
Section 5: Distance Time Graphs

15. Describe the motion shown in each distance-time graph

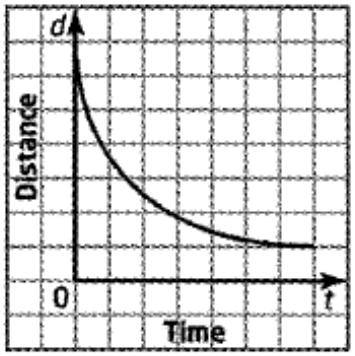
a)



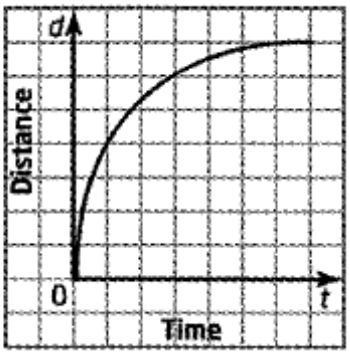
b)



c)

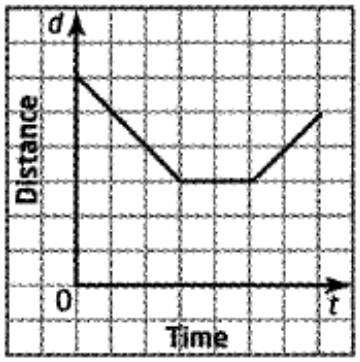


d)

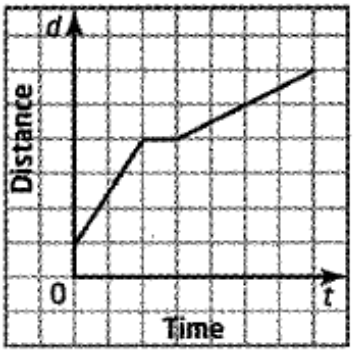


16. Describe a situation that corresponds to each distance-time graph.

a)

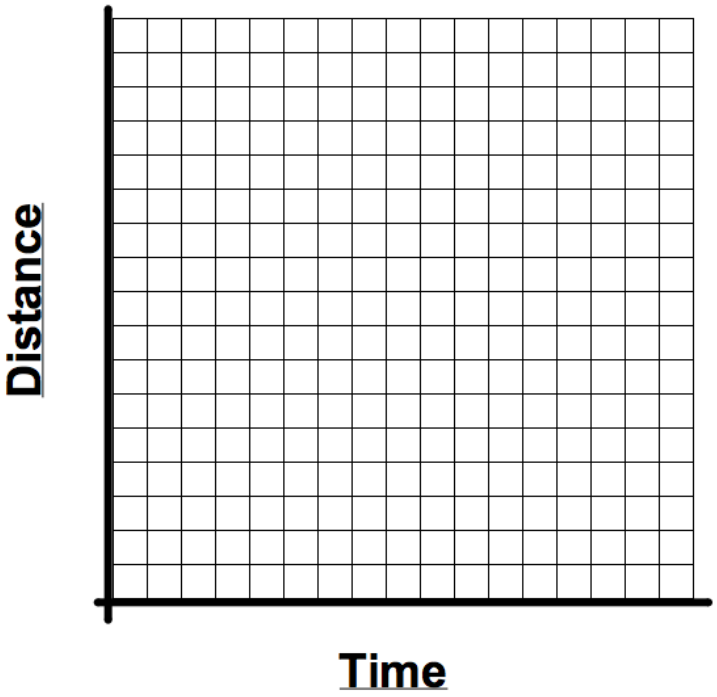


b)

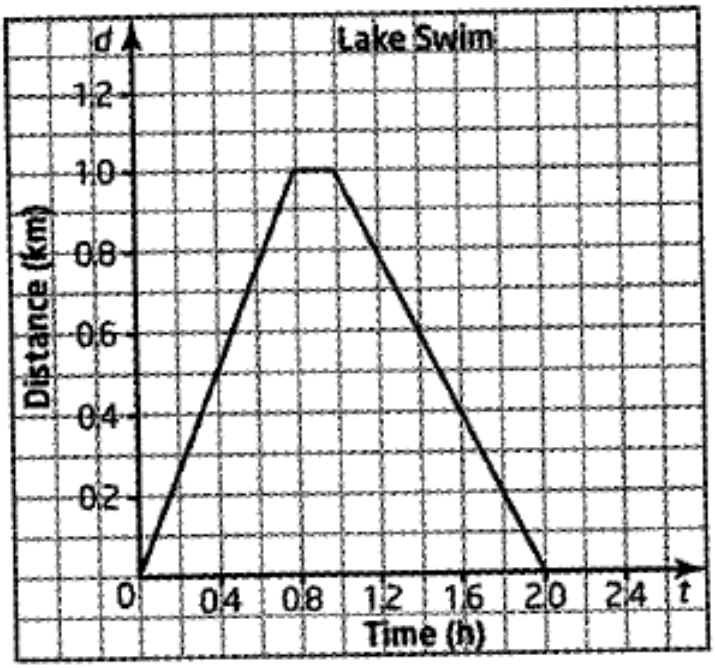


17) Draw a distance-time graph of a student's distance from school for the following situation.

A student leaves school at lunch, walking at a decreasing speed. He slows down, and then stops to talk to a friend. He turns around and walks back to school at an increasing speed.



18) A swimmer starts out from shore and swims to a dock directly across the lake and back. This graph shows the swimmer's distance from shore during this trip.



a) How long did this trip take?

b) How far is it to dock directly across the lake?

c) What does the flat portion of the graph represent?

d) Was the swimmer swimming faster on the way to the dock or on the way back?

Answers:

1)a) Most people's favourite colour is not blue b) Teenagers do not spend more time listening to rock music than to classical music c) Bob's favourite type of ice cream is not chocolate d) Most students do not study mathematics

2) Answers will vary: example a) Children tend to grow to have the same shoe size as their fathers. Opposite: Children do not tend to grow up to have the same shoe size as their fathers.

3) a) Primary b) Secondary c) Primary d) Secondary e) Primary

4) a) all children b) all cars c) all sporting goods stores d) all teenagers

5) a) non-random sample b) simple random sample c) systematic random sample d) non-random sample

6) Answers may vary – example: by gender, by age, by seniority

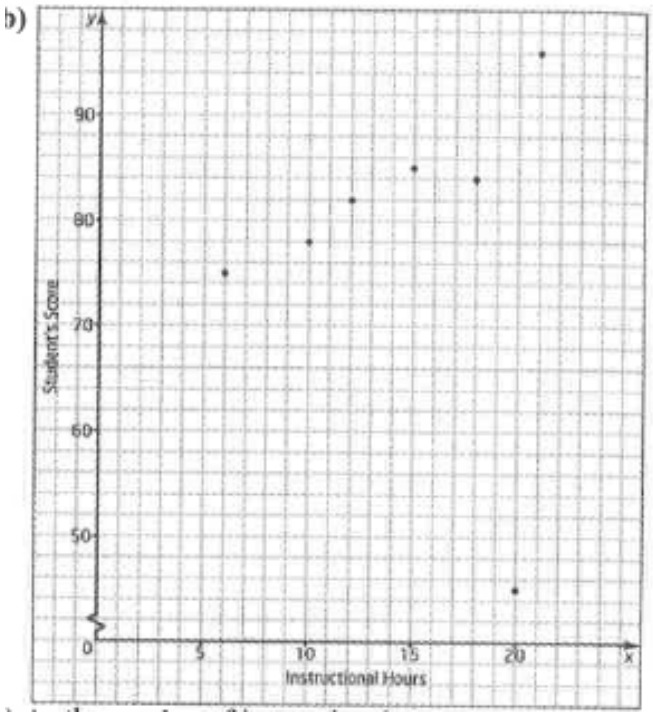
7) a) all Canadian musicians b) answers may vary – example: randomly select 5% of the musicians in each province and territory.

8) a) all health club members b) answers will vary – example: randomly select a starting point on the list of members, and then select every 5^{th} person until you have a total of 100.

9) a) hear rate b) cost of postage c) height of tree d) value of car

10) a) independent: instructional hours; dependent: student's score

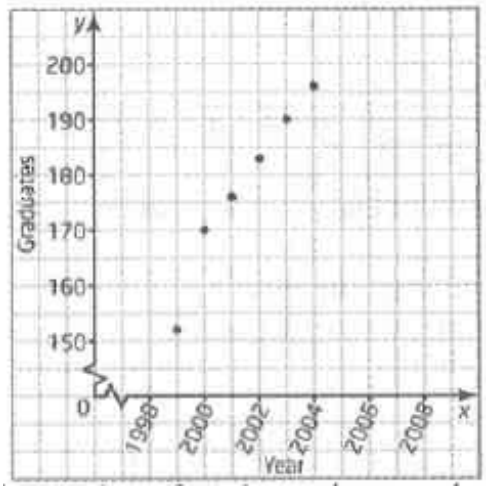
b)



c) as the number of instructional hours increases, so does the score d) the outlier is (20,45). The scatter plot indicates a positive linear correlation except for this point.

11) a) Independent: year; Dependent: number of graduates

b)

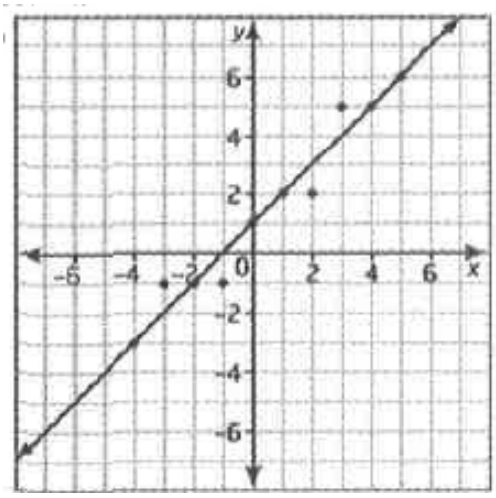


c) The number of graduates increased every year. d) about 223; extrapolation

12) Interpolate: to estimate values lying between given data
Extrapolate: estimate values lying outside the given range of data

13) a) non-linear b) linear

14) a)



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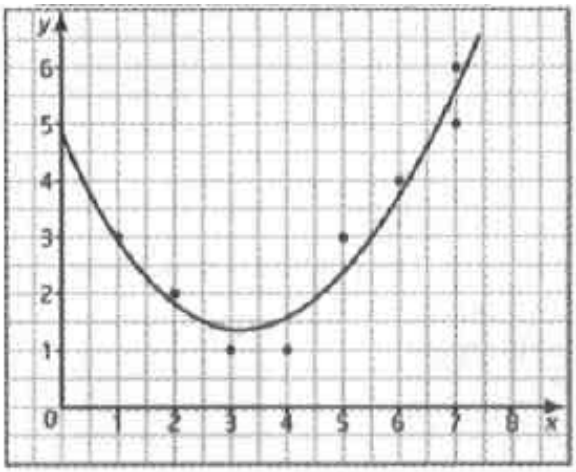
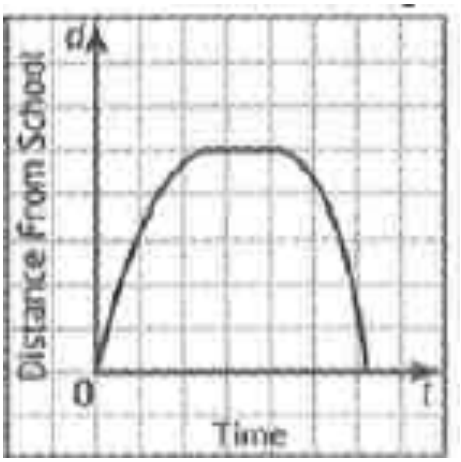


15) a) moving away at a constant speed b) no movement
c) moving closer at decreasing speed (deceleration) d) moving away at decreasing speed (deceleration)

16) answers will vary – examples: a) walks from school to the library, picks up a library book, and then walks back toward school but stops at a friend's house b) leaves home and runs at a constant speed for 2 minutes, stops for 1 minute, and then walks in the same direction at a constant speed for 5 minutes.

17)



18) a) 2h b) 1 km c) stopping at the dock directly across the lake d) on the way to the dock