

Appendix: Making and Using Graphs

Chapter 1

ANSWERS TO APPENDIX CHECKPOINT

■ Study Plan Problems

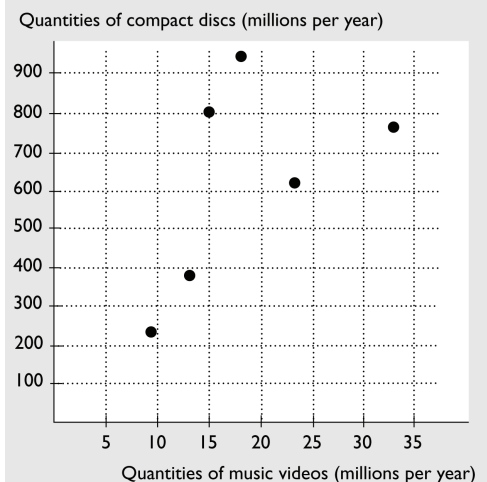
The spreadsheet in the table provides data on the U.S. economy: Column A is the year; the other columns are quantities sold in millions per year of compact discs (column B), music videos (column C), and singles downloads (column D). Use this spreadsheet to work Problems 1 and 2.

1. Draw a scatter diagram to show the relationship between the quantities sold of compact discs and music videos. Describe the relationship.

Figure A1.1 illustrates the relationship of the data from the spreadsheet between the quantities sold of compact discs and the quantities sold of music videos. Over all the period, there appears to be a positive or direct relationship; that is, when more compact discs are sold, more music videos are sold.

	A	B	C	D
1	2000	943	18	19
2	2002	803	15	51
3	2004	767	33	139
4	2006	620	23	586
5	2008	385	13	1,033
6	2010	226	9	1,162

FIGURE A1.1
Appendix Checkpoint Study Plan Problem 1



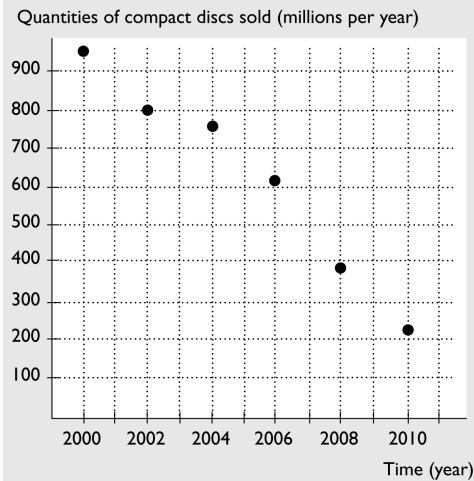
2. Draw a time-series graph of quantity of compact discs sold. Say in which year or years the quantity sold (a) was highest, (b) was lowest, (c) increased the most, and (d) decreased the most. If the data show a trend, describe it.

Figure A1.2 illustrates the time series of the quantity of compact discs sold using the data from the spreadsheet.

- The quantity sold was the highest in 2000.
- The quantity sold was the lowest in 2010.
- The quantity sold *never* increased.
- The quantity sold decreased the most between 2006 and 2008 when it decreased by 235 million.

Over the entire time period covered in the figure, there is a downward trend in the quantity of compact discs sold.

FIGURE A1.2
Appendix Checkpoint Study Plan Problem 2



3. The following data shows the relationship between two variables x and y .

x	0	1	2	3	4	5
y	32	31	28	23	16	7

Is the relationship between x and y positive or negative? Calculate the slope of the relationship when x equals 2 and when x equals 4. How does the slope change as the value of x increases?

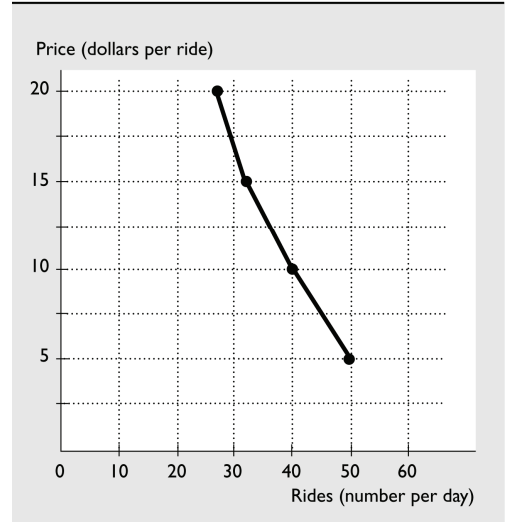
The relationship is negative: When x increases, y decreases. The slope of the relationship equals the change in y divided by the change in x along the tangent line; that is, the slope of the relationship at a point equals the slope of the tangent line at that point. When x equals 2, the slope of the tangent line equals -4 , so the slope of the relationship equals -4 . When x equals 4, the slope of the tangent line equals -8 , so the slope of the relationship equals -8 . The slope of the relationship increases in magnitude (the line becomes steeper) as x increases.

4. The table provides data on the price of a balloon ride, the temperature, and the number of rides a day. Draw graphs to show the relationship between
- The price and the number of rides, when the temperature is 70°F.

Price (dollars per ride)	Balloon rides (number per day)		
	50°F	70°F	90°F
5	32	50	40
10	27	40	32
15	18	32	27
20	10	27	18

Figure A1.3 illustrates the relationship between the price and the number of rides when the temperature is 70°F.

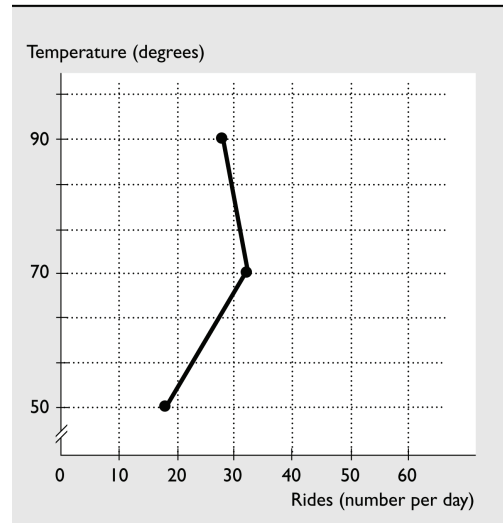
FIGURE A1.3
Appendix Checkpoint Study Plan Problem 4



- The number of rides and the temperature, when the price is \$15 a ride.

Figure A1.4 illustrates the relationship between the number of rides and the temperature, when the price is \$15 a ride.

FIGURE A1.4
Appendix Checkpoint Study Plan Problem 4



■ Instructor Assignable Problems

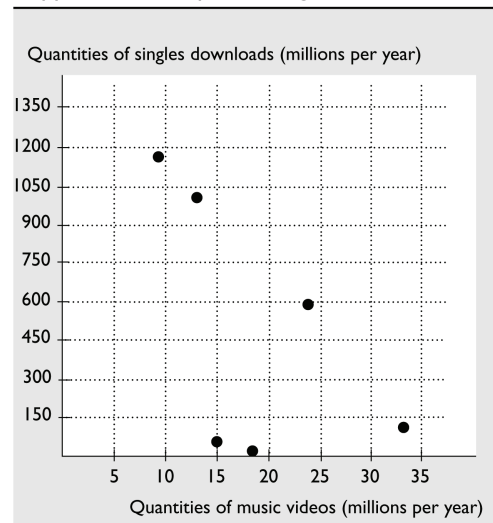
Use the information in the table to work Problems 1 and 2. Column A is the year; the other columns are quantities sold in millions per year of compact discs (column B), music videos (column C), and singles downloads (column D).

1. Draw a scatter diagram to show the relationship between quantities sold of music videos and singles downloads. Describe the relationship.

Figure A1.5 illustrates the relationship of the data from the spreadsheet between the quantities sold of music videos and singles downloads. Over all the period, there appears to be a (weak) negative or indirect relationship; that is, when fewer music videos are sold, more singles are downloaded.

	A	B	C	D
1	2000	943	18	19
2	2002	803	15	51
3	2004	767	33	139
4	2006	620	23	586
5	2008	385	13	1,033
12	2010	226	9	1,162

FIGURE A1.5
Appendix Checkpoint Assignable Problem 1



2. Draw a time-series graph of the quantity of music videos sold. Say in which year or years the quantity sold (a) was highest, (b) was lowest, (c) decreased the most, and (d) decreased the least. If the data show a trend, describe it.

Figure A1.6 illustrates the time series of music videos sold using the data from the spreadsheet.

- The quantity sold was the highest in 2004.
- The quantity sold was the lowest in 2010.
- The quantity sold decreased the most between 2004 and 2006 and between 2006 and 2008, when it decreased by 10 million per period.
- Setting aside the period during which the quantity increased, the quantity sold decreased the least between 2000 and 2002.

There is a *slight* downward trend in the quantity of music videos sold.

Use the following data on the relationship between two variables x and y to work Problems 3 and 4.

x	0	1	2	3	4	5
y	0	1	4	9	16	25

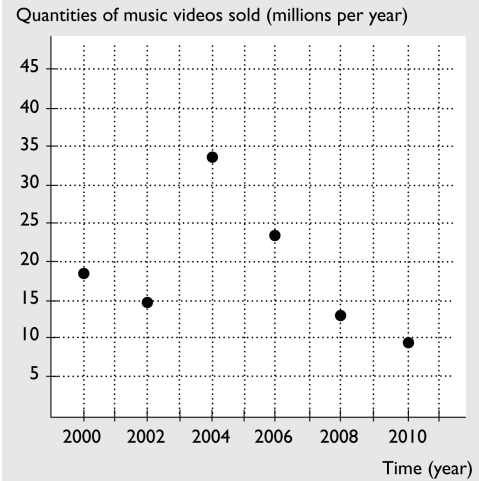
3. Is the relationship between x and y positive or negative? Explain.

The relationship is positive: When x increases, y also increases.

4. Calculate the slope of the relationship when x equals 2 and x equals 4. How does the slope change as the value of x increases?

The slope of the relationship equals the change in y divided by the change in x along the tangent line; that is, the slope of the relationship at a point equals the slope of the tangent line at that point. When x equals 2, the slope of the tangent line equals 4, so the slope of the relationship equals 4. When x equals 4, the slope of the tangent line equals 8, so the slope of the relationship equals 8. The slope of the relationship increases as x increases.

FIGURE A1.6
Appendix Checkpoint Assignable Problem 2



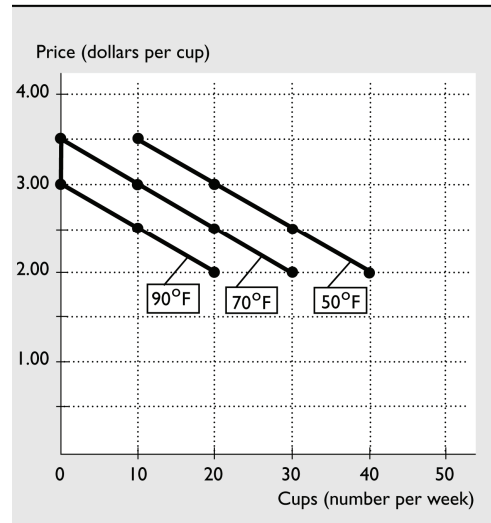
5. The table provides data on the price of hot chocolate, the temperature, and the number of cups a week. Draw graphs to show the relationship between

- The price and the number of cups of hot chocolate, when the temperature is constant.

Figure A1.7 illustrates the relationship between the price and the number of cups holding constant the temperature. Note that there are three relationships, one for each temperature.

Price (dollars per cup)	Hot chocolate (number per week)		
	50°F	70°F	90°F
2.00	40	30	20
2.50	30	20	10
3.00	20	10	0
3.50	10	0	0

FIGURE A1.7
Appendix Checkpoint Assignable Problem 5



- The temperature and the number of cups of hot chocolate, when the price is constant.

Figure A1.8 illustrates the relationship between the number of cups and the temperature, holding constant the price. Note that there are four relationships, one for each price.

FIGURE A1.8
Appendix Checkpoint Assignable Problem 5

