Reading and Interpreting Graphs and Tables

Graphics in Daily Life

Graphics are an integral part of both the workplace and daily life. Charts, tables, graphs, and diagrams provide necessary information for the completion of job-related and academic tasks. Competent interpretation of graphs requires that students develop skills both in decoding graphs and in applying that information to a specific task.

Numerical information is often embedded in graphic contexts important in adults' lives. Think for a moment about the various graphics used in daily life. People read newspapers and magazines and interpret information presented in graphs, tables, and charts. Statements of employee benefits, payment schedules, tax tables, mileage charts, and even sports league standings are depicted in graphics.

Often very little computation is needed when reading graphics, but one still needs an understanding of diverse mathematical concepts and the ability to apply this understanding along with reading comprehension skills. If either text or numerical information is skipped, the graphic loses meaning and critical information can be lost.

Approximately 50 percent of the questions on the GED Mathematics Test use some type of graphic. Students answer questions based on text, graphics, or a combination of text and graphics. The analysis of the GED Mathematics Test data shows that the interpretation of graphics was more problematic for students in the Below group than for those in the Near group.[1] The Below group missed three additional questions related to graphs and tables. It is also important to note that graphic literacy is an integral part of other GED Tests, occurring in 50 to 60 percent of the GED Science and Social Studies Tests. Ensuring that students have an understanding of graphics is an important component of the GED curriculum.

Graphs, Tables, and Charts—Most Missed Questions

According to the analysis of GEDTS data, each of the mathematical content areas asks candidates to construct, read, interpret, or draw inferences from graphs, tables, or charts to model or solve a problem. The data indicate that GED candidates often lack the procedural abilities needed to read and extract information in graphic or tabular form. The data also show that students lack the conceptual abilities required to compare graphical figures representing different conditions. An example is when students are given a line graph and must predict a trend between two or more indicators. Even though the GED Test provides graphics with different colors for each item, students have difficulty comparing and contrasting the data.

Because of the difficulty that GED candidates have in interpreting graphical and tabular data, it is important that students be familiar with the various types of diagrams they may encounter on the GED Tests and learn strategies for working with the different types of data contained within the graphics.

Skill gaps identified among GED candidates include:

Transitioning between text and graphics where candidates need to have the skills to read text descriptions of events or problems and translate this information into graphical formats, or where candidates need to read text descriptions of events or problems and add this information to the data already displayed in a graphic.

Interpreting and comparing graphical data where candidates interpret and compare more than one data set appearing within a graphical illustration, or compare information contained in two or more graphics.

Interpreting and selecting tabular data for computation where graphs or tables depict more information than required to answer the question. Candidates must critically read the problem and first identify pertinent versus non-pertinent data. Then the candidate must interpret the pertinent data to solve the problem.

Identifying how graphs can show different types of information.

GED-Type Question Samples

The following are examples of GED-type questions for each area that simulate the types of questions most often missed by GED candidates. They address each of the areas in graphic literacy identified by the analysis of the GED Mathematics Test.

Sample Questions: Selecting the Correct Graph
The following two questions require that a graph be selected to accurately depict the information described in the text.

The temperature at 6:00 a.m. on Monday was 60° F. The temperature rose steadily until it reached a maximum of 85° F at 3:00 p.m. The temperature then dropped steadily and again was 60° F at 6:00 p.m. Which graph represents this time-temperature relationship?
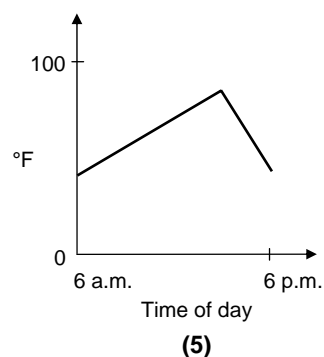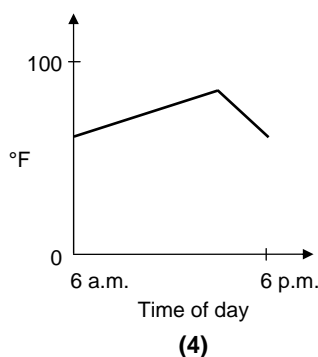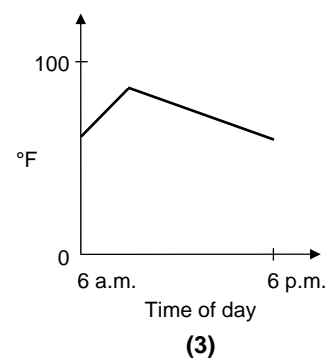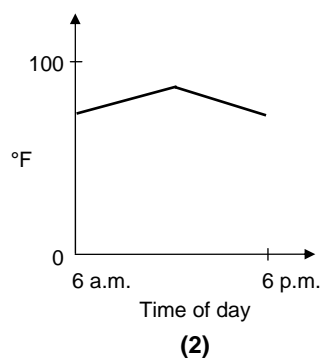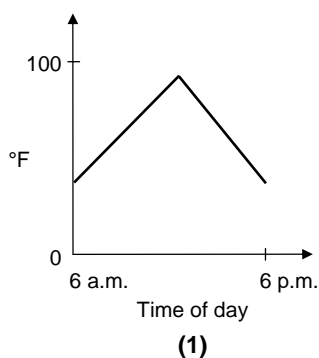
House A cost $100,000 and increased in value as shown in the graph below.
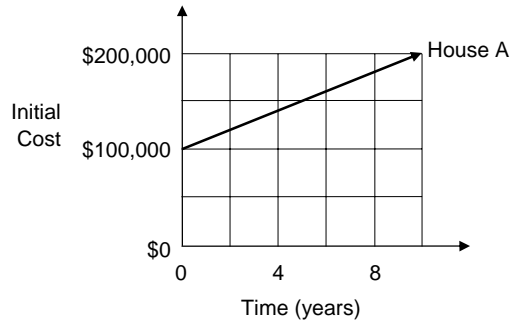
House B cost less than house A and increased in value at a greater rate. Sketch a graph that might show the changing value of house B.

(1)

(2)

(3)

(4)

(5)
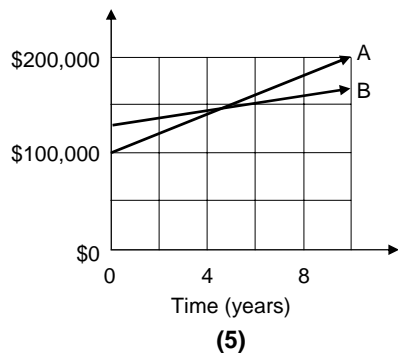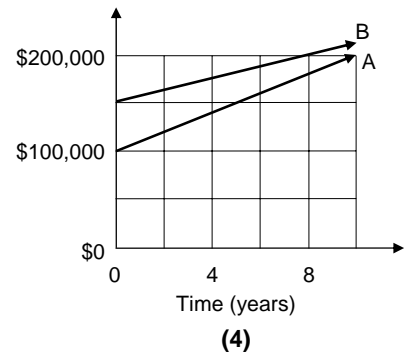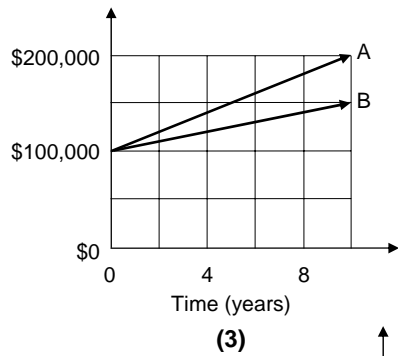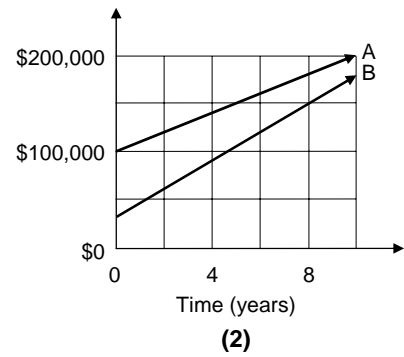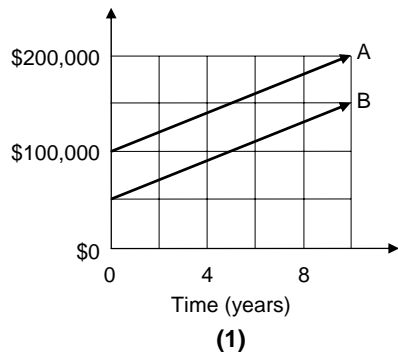
COMMON STUDENT ERRORS

Interpreting text and transferring that information to a graphic requires practice. The above two questions require that students read text and select the graph that best displays the information. The questions also require students to depict relationships. To assist students with this type of question, they should first visualize what the text is describing and then draw a graph depicting the information. By first depicting the information visually or through the drawing of a sample graphic, they can better view the correct graphic and select the correct answer. The correct answer for the first sample question is: (4). The correct answer for the second sample question is: (2).

Sample Question: Transitioning Between Text and Graphics

The profit, in thousands of dollars that a company expects to make from the sale of a new video game is shown in the graph. What is the expected profit before any video games are sold?

Video Games Sold
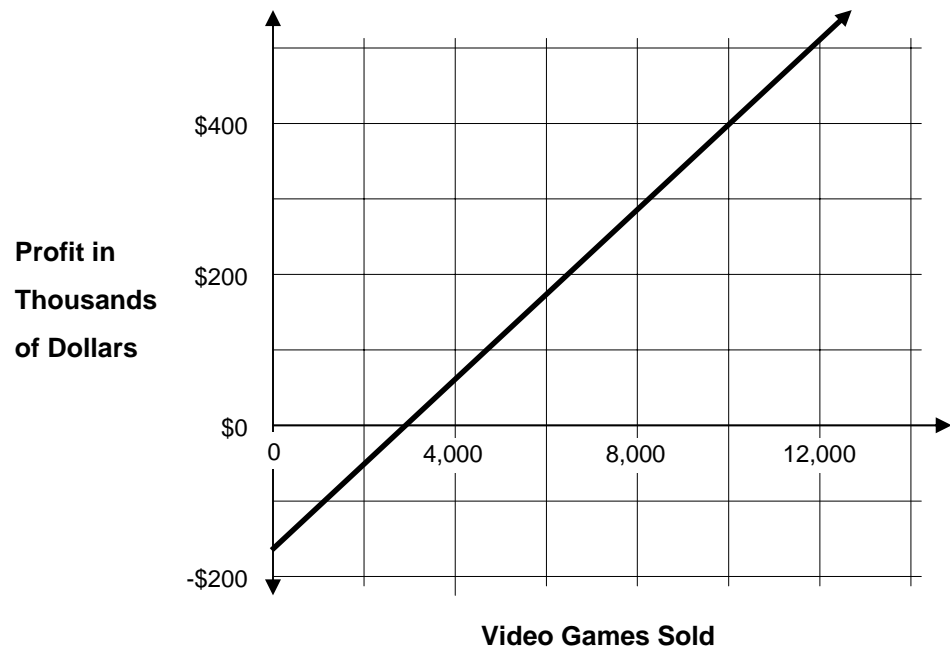
(1) $0

(2)   - $150

(3)   - $250

(4)   - $150,000

(5)   - $250,000

COMMON STUDENT ERRORS

When interpreting graphs, students do not always read the legends that accompany the different numerical values. In this type of question, students selected (2) -$150 because they did not critically read the text that identified the information on the axis. In this case, the distracter -$150 was selected, rather than the correct answer of -$150,000. Also, the graph starts with negative numbers on the vertical axis. Students are often used to seeing graphs that begin at 0, rather than a negative number.

Sample Question: Interpreting and Comparing Graphical Data

The changing values of two investments are shown in the graph below.
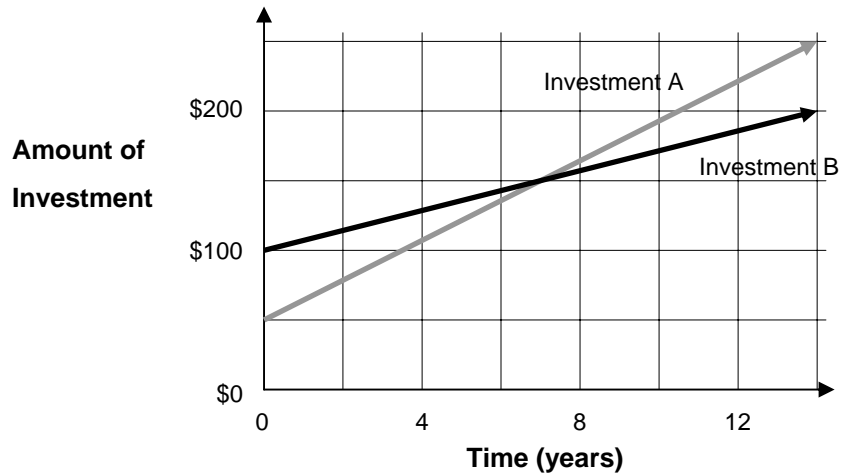
How do the amount initially invested and the rate of increase for investment A compare with those of investment B?

Compared to investment B, investment A had a

(1) lesser initial investment and a lesser rate of increase.

(2) lesser initial investment and the same rate of increase.

(3) lesser initial investment and a greater rate of increase.

(4) greater initial investment and a lesser rate of increase.

(5) greater initial investment and a greater rate of increase.

COMMON STUDENT ERRORS

For students to interpret the correct answer, they need to visualize what type of trend would be depicted by each of the answers. Although investment A and investment B are depicted by different colors, students must identify a trend through the comparison of the two investments. Many students inverted the trend because they did not read critically. The question asks what was occurring with investment A, not B.

Sample Questions: Interpreting and Selecting Tabular Data for Computation

Results of Internet Purchase Survey

Number of purchases	Number of respondents
0	14
1	22
2	39
3	25

What was the total number of internet purchases made by the survey respondents?

(1) 86

(2) 100

(3) 106

(4) 175

(5) 189

Claude is sewing 3 dresses in style B using fabric that is 54 inches wide. The table below contains information for determining the yards of fabric needed.

What is the minimum number of yards of fabric recommended for one dress each of size 10, 12, and 14?

Dress Size		10	12	14	16
Style A		Yards of Fabric Needed			
Fabric Width	35 in.	3.25	3.875	3.875	3.875
	45 in.	3	3	3.25	3.25
	54 in.	2.375	2.5	2.75	2.75
	60 in.	2.25	2.25	2.25	2.5
Style B		Yards of Fabric Needed			
Fabric Width	35 in.	3.875	4	4.125	4.625
	45 in.	3.125	3.25	3.25	3.625
	54 in.	2.5	2.875	3	3
	60 in.	2.25	2.375	2.5	2.75

COMMON STUDENT ERRORS

In both questions, students had to identify the information needed and calculate the correct answer. Not identifying pertinent information is a common error pattern. Students need to outline the information necessary and then decide what calculation needs to be completed. With both questions, students did not complete a multi-step process based on pertinent information to achieve the correct answer.

Incorporating Graphic Literacy into the Classroom

There are many diverse ways to incorporate graphic literacy into the classroom.

- Have students graph information from their daily lives. For example, they could develop a circle graph showing how they spent the last 24 hours or a bar graph showing how many miles they drove each day for a week. The data from daily life that could be displayed graphically is endless. The important thing is to assist students in understanding how graphs are constructed and the information that can be obtained from using graphs. Examples are such things as taxes, calories in products, profit and loss measures, or population gains and decreases. Students should list how they personally use graphs.

- Have students bring newspaper or magazine articles or other text-rich materials to class that contain numerical information. Have all students read the same article and identify the numerical information that needs interpretation. Students should discuss the implications of these data. Have students brainstorm how to graph the data and share their findings with others.

- Advertisements are a great source of data. Students need experience in reading critically. *Do the data really support that 9 out of 10 people…?* Create a file of advertisements to use for analyzing graphics. Have students challenge the data and its implications. Questions to begin their probing could include:

  1. Where did the data come from on which the statement is based?

  2. How reliable or accurate are the data?

  3. According to the data, are the claims made sensible and justified?

  4. Is there any missing information?

- Provide students Provide students with classroom activities that require collecting, organizing, graphing, analyzing, and researching data. Topics can be as simple as "What percentage of this class is right- or left-handed?" From this type of topic, students will have numerous opportunities to use their problem-solving skills to create a well-developed graphic that accurately displays the information.

- Have students create their own GED-type questions based on graphs and charts that they develop or use in real-life situations. This type of activity assists in creating a GED classroom atmosphere where learning is viewed as applicable to real life.

- Rate of change can be a difficult concept to teach. Have students select a topic of interest to them, such as the housing market, and keep track of data related to their topic for a specified length of time. Students may even wish to obtain data from two different sources, such as the housing market in two different areas, data from the area in which they currently live, and perhaps data from a neighboring area or an area in which they grew up. This provides students with information by which they can create a graph to show trends, as well as the comparison between trends in two different situations.

---

[1] The GEDTS Statistical Study for Mathematics used information from the three operation test forms, using the top 40 percent of the most frequently missed items. Those items represented 40 percent of the total test items on the test forms. (*GEDTS Conference, July 2005*)