Filling in Coordinate Grid Planes

A coordinate grid is a system that can be used to write an address for any point within the grid. The grid is formed by two number lines called $x$ and $y$ that intersect at the 0-point on each line. The coordinates (address) for a point on the grid are written in parentheses. The $x$-coordinate is always shown first; the $y$-coordinate is always second.

Look at the coordinate grid at right. The coordinates of point A are (2,3). Point A is 2 places to the right on the $x$-axis and 3 places up on the $y$-axis. The coordinates of point B are (−4,4). Point B is 4 places to the left on the $x$-axis and 4 places up on the $y$-axis. Notice that a negative $x$-coordinate is to the left of 0 on the $x$-axis. To plot a negative $y$-coordinate, move down the $y$-axis below 0.

On the GED Math Test, you may be asked to plot points on a coordinate grid. You will learn more about coordinate grids in Program 39.

**GED Practice**

Plot the following coordinates on the grid shown at right.

1. Plot the point with coordinates (5,1).
2. Plot the point with coordinates (−1,1).
3. Plot the point with coordinates (−3,−5).
4. Plot the point with coordinates (4,−2).

*Answers and explanations start on page 308.*
Plotting Points to Complete a Figure

The GED Math Test may assess your combined understanding of geometric figures and the coordinate plane. You will learn more about graphing on a coordinate grid in Program 39.

Look at the coordinate grid below. The following points are graphed on the coordinate grid: (−2,3), (2,3), and (2,−1). Suppose a question asked you to graph the coordinate point that would complete the square. You know that a square has four equal sides, so find the distance between two points on a side. In this case, you could count the distance: 5. To complete the square, count down 5 spaces from (−2,3) or count 5 spaces to the left of (2,−1). Fill in the point at the coordinates (−2,−1).

On the GED Math Test, you may be asked to plot points on a coordinate grid. You will learn more about coordinate grids in Program 39.

GED PRACTICE

Graph the point that completes the rectangle on the coordinate plane shown below.
Plotting Points

See how to plot a point using its coordinates.

Example: Point D is found at \((-3, -2)\). Plot point D.

Start at the point of origin. Since the \(x\)-coordinate is negative, count 3 spaces to the left. The \(y\)-coordinate is also negative; count 2 spaces down. Plot the point at the intersection of the lines and label point D.

Skill Practice

Write the coordinates for the points shown on the coordinate system.

1. Point A
2. Point B
3. Point C
4. Point D
5. Point E
6. Point F
7. Point G
8. Point H
9. Plot the following points on the coordinate system.
   - Point J = \((-2, 5)\)
   - Point K = \((1, 4)\)
   - Point L = \((-3, 1)\)
   - Point M = \((0, -6)\)
   - Point N = \((2, -1)\)
10. Answer this question without plotting the points.
    - Point N = \((-1, 3)\) and point \(P = (3, -1)\). Do the two points lie in the same quadrant? How do you know?
PART ONE DIRECTIONS: Choose the one best answer to each of the following problems. Use a calculator wherever necessary.

1. Janet is traveling from Fargo to Willston, a distance of 417 miles. If her speed does not exceed 65 miles per hour, which of the following inequalities could be used to find the amount of time the drive will take? (Hint: Use the formula: \(d = rt\)).
   (1) \(\frac{65t}{417} \geq 417\)
   (2) \(\frac{65t}{417} \leq 417\)
   (3) \(65t < 417\)

2. Which of the following is a possible solution for the inequality \(3x < 150\)?
   (1) 56
   (2) 54
   (3) 52
   (4) 50
   (5) 48

3. Which point has the coordinates \((2, -7)\)?
   (1) A
   (2) B
   (3) C
   (4) D
   (5) E

4. What is the slope of line LM?
   (1) \(\frac{1}{4}\)
   (2) \(\frac{1}{2}\)
   (3) 2
   (4) 3
   (5) 4

5. A number \(x\) is greater than or equal to \(-2\) and less than \(4\). Which of the following is a graph of the solution set for \(x\)?
   (1)
   (2)
   (3)
   (4)
   (5)

6. Which of the following solution sets expresses the solutions to \(x^2 - 2x - 8\)?
   (1) \(-2\) and \(2\)
   (2) \(6\) and \(-8\)
   (3) \(4\) and \(-2\)
   (4) \(-4\) and \(2\)
   (5) \(-6\) and \(8\)

Questions 3 and 4 are based on the following diagram.

Questions 7 is based on the following figure.

7. Which line has a slope that is undefined?
   (1) J
   (2) K
   (3) L
   (4) M
   (5) N
Alternate Math Formats

The questions below are based on the math skills in Programs 38–39. For more information on answering alternate format items, review pages 20–22.

Grid in the answers to questions 21 through 30.

21. Show the location of the point with the coordinates (−4, −3). Mark your answer on the coordinate grid at right.

22. Show the location of the point with the coordinates (5, −1). Mark your answer on the coordinate grid at right.

Questions 23 and 24 refer to the following figure.

23. Line M passes through point D at coordinates (6, 6) and point B at coordinates (3, −6). What is the slope of Line M?

24. Line L passes through points E and D. What is the slope of Line L?
Answer Key

PROGRAM 27: PASSING THE GED MATH TEST

GED Practice, page 16
(5) $131
Press: 1 5 + 2 2 + 9 4 =
The display reads: 131.

GED Practice, page 17
(3) $1,428
Press: 2 3 8 × 6 =
The display reads: 1428.

GED Practice, page 18
(5) $130
Press: 1 1 × 8 = M+ 7 × 6 = M+ MR
The display reads: 130.

GED Practice, page 19
1. (4) $36
Press: 1 2 0 × 3 0 %
The display reads: 36.
2. (3) between 6 and 7
Press: 4 2 6
The display reads: 6.480740698

The whole-number part of the number is 6.
The decimal part represents a fractional amount. The square root of 42 is between 6 and 7.

GED Practice, page 20
Your grid may be slightly different. Remember, your answer can start in any column. For item 3, you do not have to show the leading 0 on the grid.

GED Practice, page 21
1.–4. You should have plotted the following points.

GED Practice, page 22
You should have graphed the point with coordinates (−4, 1).

PROGRAM 28: NUMBER SENSE

Your Approach to Learning Math
Skill Practice, page 29
1. Your answer may vary. Sample answer:
   figuring the tip at a restaurant
   figuring out how much is left in the checking account
   buying groceries
   putting gas in the car
   shopping around to find the best price for pet supplies
2. Your answer may vary. Sample answer:
d. I separate items into groups that cost about $10 and add them.
3. Your answer may vary. Sample answer:
d. I move the decimal point to find 10%, double it to get 20%, and then round down to the nearest quarter. I figure the amount is pretty close to 15%.
4. Your answer may vary. Sample answer:
d. I make a list of instructions, but I always ask my friend for landmarks that will help me know if I have gone too far or the wrong way.

Understanding Our Number System
Skill Practice, page 31
1. five hundred
2. six million
3. one thousand
4. four hundred million
5. sixty
6. nine hundred thousand
7. −5
8. +3 1/8
9. −100 ft
10. (4) John has done more than he has left to do. John has done 75%. If the whole job is 100%, John has 25% left to do. The only true statement is choice (4).
Skill Practice, page 277
1. \((3) x > 4\)
   
   \[
   3x + 8 > 20 \\
   3x > 12 \\
   x > 4
   \]

2. \(\$8.90x \leq \$356\)  Let \(x\) (or any variable) equal the number of hours Mae works. If she works 40, the maximum number of hours, her pay will be \(40(\$8.90)\), which equals \(\$356\). Set up the inequality so that the wage times the number of hours is equal to or less than \(\$356\).

3. \((1) 48 > 12w\)  Use the formula \(A = lw\).
   
   Substitute the known quantities: \(48 = 12w\).
   
   Finally, change the equation to an inequality to represent the problem: \(48 > 12w\).

Problem Solver Connection, page 277
Graph of the inequalities \(x < -2\) or \(x > 3\):

Skill Practice, page 279
1. \(50\)  Each number is 7 greater than the number before.
2. \(21\)  Add 2, then 3, then 4, and so on.
3. \(6\)  Add 2, then subtract 1, add 2, subtract 1, and so on.
4. \(36\)  Add 3, then 5, then 7, then 9, and so on.
5. \(34\)  Each new number is the sum of the two numbers that came before.
6. To find the total cost \((c)\), multiply the unit cost, or rate \((r)\), by the number of bottles of glue \((n)\): \(c = nr\).
7. To find the area \((A)\), square the measure of the side \((s)\): \(A = s^2\).
8. To find the total water usage \((U)\), multiply 50 gallons by the number of loads \((n)\): \(U = 50n\).
9. To find the amount for shipping and handling \((S)\), multiply the merchandise total \((t)\) by 0.07 and add \(5\): \(S = 0.07t + 5\).
10. \(\$2000\)  Find \$100 on the vertical scale and follow it over to a point on the line. The point is directly over the amount \$2000 on the horizontal scale.

Skill Practice, page 281
1. \((2x + 1)\)
   a. input 0, output 1
   b. input 1, output 3
   c. input 2, output 5
   d. input 3, output 7

Science Connection, page 281
The 6th generation will have 8 bees.
The 7th generation will have 13.

Skill Practice, page 283
1. \((-4,4)\)  5. \((4,0)\)
2. \((0,7)\)  6. \((5,-5)\)
3. \((2,5)\)  7. \((-1,-2)\)
4. \((6,3)\)  8. \((-6,-5)\)

10. No  Point N has a negative value for \(x\), and point P has a positive value for \(x\). The points must fall in different quadrants. (Note: The signs for the \(y\)-coordinates also differ.)

Skill Practice, page 285
1.
3. (2) B  Count over to 2 on the x-axis and down to −7 on the y-axis.
4. (4) 3  The fastest way to find slope is to count the number of spaces you need for the rise and run and write a ratio. From point L, count up 9 spaces and 3 spaces to the right to reach point M. Write the ratio and express in lowest terms: \( \frac{9}{3} = \frac{3}{1} \). The slope is 3.
5. (4) A closed circle shows that the number is included in the solution set. An open circle means that the number is not included in the solution set.
6. (3) 4 and −2  You can solve by factoring the quadratic equation and setting each factor equal to zero: \( x^2 - 2x - 8 = 0 \), so \( (x-4)(x+2) = 0 \).
   \( x - 4 = 0 \quad \Rightarrow \quad x + 2 = 0 \)
   \( x = 4 \quad \Rightarrow \quad x = -2 \)
   You can also solve by substituting the numbers from the answer choices for \( x \) to see which solutions make the equation true.
7. (2) K  The slope of a vertical line is undefined. (The slope of a horizontal line is zero.)
8. (3) $95  Sharon’s weekly costs are a function of the number of earrings she makes. Find 25 on the horizontal axis and move directly up to the corresponding point on the line. Read across to the scale. The point above 25 represents a cost of $95.
9. (2) C = 20 + 3n  The fixed cost of $20 is added to the number of earrings multiplied by $3.
10. (2) 3b + 8 ≥ 29  Quickly substitute 10 for \( b \) in each answer choice, and you’ll find choice (2) is true.
11. (4) between 10 and 11  Draw an imaginary right triangle with PQ as the hypotenuse. The lengths of the legs are 6 and 9. Use the Pythagorean relationship to find the length of the hypotenuse.
   \( c^2 = a^2 + b^2 \)
   \( c^2 = 6^2 + 9^2 \)
   \( c^2 = 36 + 81 \)
   \( c^2 = 117 \)
   \( c = \sqrt{117} \)
   Since \( 10^2 = 100 \) and \( 11^2 = 121 \), you know the hypotenuse must be between 10 and 11 units long.
12. (2) −3  Use the points P and Q and count the spaces for the rise and run. The rise is 9 and the run is −6. Write a ratio and express in lowest terms: \( \frac{9}{-6} = \frac{-3}{2} \). Note: You do not have to use points P and Q. You can use any two convenient points on the line. You can also use the slope formula given on the GED formulas page, although this method tends to take more time.
13. (5) (3,4)  Remember, the x-coordinate is the first number, and the y-coordinate is the second number. Substitute the numbers from the coordinates for the \( x \) and \( y \) variables in the equation. Only choice (5) makes the equation true: \( y = 3x - 5 \), and \( 4 = 3(3) - 5 \).
14. (1) −3 and 1  You can solve by factoring the quadratic equation and setting each factor equal to zero: \( x^2 + 2x - 3 = 0 \), so \( (x + 3)(x - 1) = 0 \).
   \( x + 3 = 0 \quad \Rightarrow \quad x - 1 = 0 \)
   \( x = -3 \quad \Rightarrow \quad x = 1 \)
   You can also solve by substituting the numbers from the answer choices for \( x \) to see which solutions make the equation true.
15. (1) 5  Since you are asked to find one answer that is not in the solution set of the equation, and your answers are consecutive numbers, either 5 or 9 will be the correct choice. Substitute one of these two possibilities and you will know whether that choice or the only other possibility is correct.
16. (5) \( r + \frac{1}{2} \)  Only the love seat is one-half its regular price \( (\frac{1}{2}) \) when the recliner is purchased at its regular price \( (r) \).
17. (2) \( \frac{\frac{5}{6} - \frac{2}{1}}{6 - 1} \)  Use the formula for finding slope from the GED formulas page. Let \( (1,-2) = (x_1,y_1) \) and \( (6,5) = (x_2,y_2) \). Substitute and compare to the answer choices.
18. (3) \( \sqrt{3-(-1)^2} + (5 - 3)^2 \)  Find the coordinates for points M and N: \( M = (-1,3) \) and \( N = (3,5) \). Use the formula for finding the distance between two points in a plane from the GED formulas page. Let \( M = (x_1,y_1) \) and \( N = (x_2,y_2) \). Substitute and compare to the answer choices.
19. (2) (4,−2)  Start at the y-intercept, −4, and use the slope to plot the points on the new line. Since the slope is \( \frac{-3}{2} \), move up 1 and 2 to the right. Continue the pattern until you intersect line g.
20. (5) \( y = 5 \)  By looking at the graph, we can see that for every point, \( y = 5 \). For all choices but choice (5), we can substitute different values for \( x \) and get solutions where \( y \) does not equal 5.

Alternate Math Formats, pages 295–296
21. and 22.