

Appendix 2

Mathematics Learning Projects – GED Practice Test PA

1. Graphing (Informational) and Reading Scales (Number Line):

#1(a variation), #20, #21, #15

- On a rectangular graph, the bars, lines, or points show a connection between the vertical and horizontal scales.
- Read exact values of points and approximate values that are between grid lines. Talk about rounding.
- Discuss significance of certain points – the intercept and intersections of lines
- Discuss the concept of change as it is pictured in a graph.
- Ongoing extension: bring in samples of all kinds of graphs.

2. Rates:

7, #16

- Rely on the students' experiences to help them to find the answer.
- Reflect on the use of multiplication in these rate problems.
- Write mathematical expressions that describe the process that they used to find the answer.
- Discuss how the calculator can be helpful sometimes and be extraneous for some other facets of problem solving.

3. Algebra/Using a variable to mathematize a situation:

#19, #24, #11

- The set-up items build on the expressions that were written for the rate problems.
- Introduce the idea of a variable as a way to generalize arithmetic.
- Introduce the use of an exponent.

4. Algebra/Equations:

#19 variation, #3, #9

- Use the variation of #19 to show that they already understand equation solving when it is part of a real context.
- Show how the algebraic rules make sense in a practical way.
- Emphasize that the solution is the number that makes the equation true.

5. Data Analysis – Mean and Median

#2, #1 (also in informational graphs), #13

- Approach the problems informally, but when reflecting, try to make sense of the algebraic notation used in the definitions.
- Alert them to the formulas page.

Missing Concept: Probability

- This practice test does not include any items involving probability. You may want to go back to #28 in the old Practice Test CC to discuss the idea and introduce the use of fractions.



6. Fractions, Proportions and Percents:

Missing Concept: Size of Fractions:

- Although it is not likely that the GED test will emphasize performing operations with fractions, it is important that students are confident about and can work flexibly with the relative size of fractions and their equivalent representations as decimals and percents. Since these ideas are not present in any of the items in this particular practice test, incorporate them into the following items whenever possible or go back to item #8 in Practice Test CC.

#14, #18, #25, #10, #12, #23

- Encourage students to use their own reasoning to find the answers to these items, looking for the solid mathematics that is present. Later in the reflection phase, compare the student methods to the formal textbook procedure, allowing that there are many ways to solve problems. Students should strive to be flexible, using the method that makes sense to them and fits the problem.
- Emphasize the connections to previous activities – rates, algebra, fractions.

7. Graphing/coordinate:

#22, #4, #5, #6

- Use #22 to become familiar with the coordinate plane as well as the characteristics of a circle. In addition, it can also serve as the stimulus to talk about the number line with negatives and finding the distance between signed numbers. This is the only item in this practice test that mentions negatives, so use the extending phase to introduce them.
- Use #4, 5, and 6 to illustrate how a real situation changing over time can be pictured. Connect the idea of the y-intercept to earlier item #20.
- Discuss slope as the rate of change and try to make sense of the definition. Introduce the generalized linear function, $y = mx + b$, by using examples from previous items (#19). Compare to #15 where slope was not constant.

Insert the following projects anywhere after the algebra projects:

Geometry/Area, Perimeter and Volume:

#25, #11, #8, #22

- Most of these items are also in other Learning Projects. Use #11 and #25 to clarify the idea that square units are used to measure area. Superimpose grids so that squares can be counted before the formulas are used.
- Item #8 provides a rich problem that should bring out many individual reasoning methods. It also allows connections to be made to the rectangle items, the algebra procedures, and finding a square root. As before, do not force the formula, use it in the reflecting phase to sum up what has been discussed.
- #22 (the circle on the coordinate grid) is a perfect stimulus for this project as well. Begin by counting the squares inside the circle (some estimating with fractions will need to be done as well.) Introduce the idea of π along with the formula and compare results. Use the same process with the circumference of the circle. Be sure that students are aware that the formulas page will be included in every test.

Missing Concept - Volume

- Introduce the idea of volume in the extending phase. Manipulatives and real-life models are helpful.

Geometry/ Angles, Triangles, etc

#17

- Without any hints, students will likely guess correctly on this one because many remember that the angles of a triangle add to 180° , and B looks equal to C in the diagram. That makes this item a good example of the likely probability that there will be items on the test that stump them. Discuss test-taking strategies, including guessing.
- In the sharing phase, let students research and explain how angles are measured, what a right angle is, and even show that the angle sum of every triangle is 180° .
- While reflecting, engage the students in an exploration where they cut various triangles from folded paper (the fold is the altitude, thus making two sides equal) and then use a protractor to measure the base angles. Soon they will discover that the base angles of an isosceles triangle are equal.

Missing Concept – Pythagorean Theorem

Variation of #18 and #17

- Use the right triangles that are pictured in these two items to discuss the Pythagorean Theorem. To visualize what the theorem is saying, begin by asking the students to draw a square grid on each side of the small triangle in #18.
- Write a variation of the item, showing only the larger triangle with the two sides of 36 and 39 labeled. Ask the students to use the theorem to find the length of side A. (Calculator allowed)
- For #17, make up a variation where the length of BC is 10 inches. Use the theorem and a calculator to find the length of the other two sides.