Appalachian Rural Systemic Initiative

Diagnostic Mathematics Tests

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Instructions

The Diagnostic Mathematics Tests were designed to be end-of-the-year tests to assess how well students at the respective grade levels understood and could apply content that they would be expected to master. Each of the items is correlated to major content indicators that should be taught during the specified grade level. In order to fairly determine understanding, however, most of the test items are written at a level of difficulty that is higher than commonly found in many textbooks. Mastery tests normally require 3 or more items per concept in order to assign mastery. In order to shorten this test to a reasonable time, the decision was made to make this a diagnostic test rather than a mastery test, i.e., responses should give some indication of whether a student has understanding of a concept or skill, but it does not assure mastery – the items will provide some indication of skills/concepts a student does not know, but should.

These tests can also be used as pre-tests with the understanding that few students would be expected to perform well on most items. If, however, there were items on which most students were successful, then that topic could be eliminated (other than possible review) from the instructional sequence for that year. Any students who did not demonstrate mastery on these topics could receive instruction individually in class or in Extended School Service programs.

As with the CATS tests, there is no set time limit with these tests. As long as students are working and making satisfactory progress, they should be allowed to continue completing the test. The administration of the End-of-Primary Test is different. It is expected that the teacher read this test to the students, pausing after each question has been read twice to allow all students to indicate that they have completed the question (or decided to skip it) before proceeding. Teachers can develop various methods for students to be able to provide this indication (pencils down, eyes toward the teacher, cup turned over, etc.)

The Fourth, Fifth, Sixth Grade and Pre-Algebra Diagnostic Mathematics Tests can either be answered on scannable answer sheets or the answers can be circled on the test packet. The End-of-Primary Test is to be answered on the test form. Before beginning each test, the teacher should model how to ”bubble in” the circle on the End-of-Primary Test or on the scannable answer sheets if they are used in the other grade levels. In addition, all tests require some of the answers be written and scored using a rubric. It is suggested that a blank sheet of paper be provided to students in grades 4-7 to answer these specific questions. The teacher administering the test needs to model how to provide the answers to these types of questions, i.e., number the response according to the problem number, label any drawings, tables, or graphs according to the appropriate problem number, etc.

For the purposes of this test, calculators should not be used.

End-of-Primary Diagnostic Math Test

Blacken the circle next to the best answer for each of the following. If there are no circles then answer the questions.

1. In the number --- 4,183 --- the digit in the hundreds' place is:			
A 4 O	B 1 O	C 8 O	D 3 O

2. The first four multiples of 6 are:			
A 2, 3, 6, 12 O	B 6, 12, 18, 24 O	C 3,9,12,15 O	D 6,7,8,9 O

3. Four hundred four can be written as:			
A 4004 O	B 40004 O	C 404 O	D 4040 O

4. 705 -246 is:			
A 541 O	B 459 O	C 559 O	D 469 O

5. 3 + 5 + 23 =			
A 103 O	B 13 O	C 31 O	D 211 O

6. 9 x 6 =			
A 48 O	B 45 O	C 56 O	D 54 O

7. 72 ÷ 8 =			
A 8 O	B 6 O	C 9 O	D 7 O

8. Billy went to school with 9 small toys in his pockets. He gave 3 to his friend, Alan. How many toys did he have when he went back home? Which of the following number sentences will help you to solve this problem?			
A 12 – 9 = O	B 9 + 3 = O	C 9 – 3 = O	D 6 + 3 = O

9. Heather is in a reading contest. She read twice as many books the second week as she read the first week. She read as many books the third week as she read during both of the first two weeks. She read a total of 12 books during the three weeks. How many did she read the first week?			
A 2 O	B 3 O	C 1 O	D 4 O

10. How much of this figure is shaded?

A	B	C	D
$\frac{5}{8}$	$\frac{8}{7}$	$\frac{5}{3}$	$\frac{5}{9}$
O	O	O	O

11. A bag contains 2 white marbles, 3 red marbles, and 5 green marbles. What fraction of all of the marbles are red?

A	B	C	D
$\frac{3}{8}$	$\frac{10}{3}$	$\frac{3}{7}$	$\frac{3}{10}$
O	O	O	O

12. Draw all of the lines of symmetry in the following shape.

13. 14
6
+ 92 is:

A	B	C	D
1012	1022	112	122
O	O	O	O

14.

The timeline above shows the times that Sharon did some activities during a school day. They were: **f** – woke up and began dressing; **g** – began eating breakfast; **h** – began waiting for school bus; **j** – began riding bus to school; **k** – began morning classes; **m** – began eating lunch; **n** – began afternoon classes; **o** – started home on school bus. Which took the most time?

A	B	C	D
getting dressed	Morning classes	Eating lunch	Afternoon classes
O	O	O	O

15. 

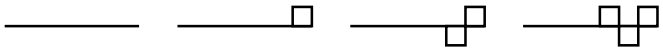
The time on this clock is:

A	B	C	D
10:06	10:01	1:50	1:10
O	O	O	O

16. Sean has a bag that contains 4 red balls, 3 yellow, 5 blue, and 1 white. What is the probability that he will reach in without looking and pull out a red ball?

A	B	C	D
$\frac{4}{9}$	4	$\frac{4}{12}$	$\frac{4}{13}$
O	O	O	O

17. Draw the next two shapes in this pattern:



18. Write the next two parts of this pattern.

A1a B2b C3c

19. Aaron, Brittany, Chase, and Della each have a different favorite number. Their favorite numbers are (not in order) 2,5,6, and 7. Della's favorite number is even. Brittany's favorite is a multiple of 3. Chase's favorite is less than Brittany's but greater than Della's. Aaron's number is the largest of all of the friends. What is each person's favorite number? Explain how you found your answer.

20. Eric counted his collection of baseball cards on Sunday. On Monday, his friend, Charley, gave him 3 more cards. The next day another friend, Chris, gave him some more cards. He now had 28 cards. This was twice as many as he had on Monday. How many cards did he have on Sunday?

A	B	C	D
11	14	7	12
O	O	O	O

21. Bethany watched 3 hours of T.V. on Friday night; 1 hour longer on Saturday; and 1 hour less on Sunday than she did on Friday. How many hours of T.V. did she watch over the weekend?

A	B	C	D
5	10	9	8
O	O	O	O

22. What number goes in the next box of the table?

1	5
2	6
3	7
4	??

A	B	C	D
8	5	9	11
O	O	O	O

23. What is the missing number in this table?

2	5
4	9
5	11
3	??

A	B	C	D
15	13	10	7
O	O	O	O

24. Which numbers are written in order from least to greatest?

A	B	C	D
548, 692, 136, 428	345, 456, 123, 789	110, 101, 125, 138	285, 392, 516, 773
O	O	O	O

25 Add. 26 + 65			
A 811 O	B 91 O	C 81 O	D Not here O

26. What time is shown on this clock? 6 : 50			
A 10 minutes after 6 O	B 10 minutes before 6 O	C 10 minutes before 7 O	D 10 minutes after 7 O

27. John had a quarter and four pennies. He found two more pennies and a nickel. How much money does he now have?			
A 41 ¢ O	B 36 ¢ O	C 61¢ O	D Not here O

28. Sue had a quarter and two dimes. She bought a piece of candy for thirty-seven cents. How much change did she get back?

A	B	C	D
6¢	18¢	41¢	Not here
O	O	O	O

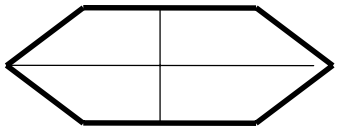
29. How long is this line segment to the nearest inch?

A	B	C	D
3 inches	4 inches	5 inches	Not here
O	O	O	O

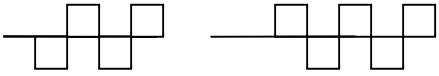
30. How long is this line segment to the nearest centimeter?

A	B	C	D
8 cm	9 cm	10 cm	Not here
O	O	O	O

Solutions to End-of-Primary Diagnostic Test

1. b. 1 (develop understanding of place value—to 1000's)
2. b. 6, 12, 18, 24 (introduce multiples) If a student answered: (a) s/he confuses the difference between multiples and factors; (c), s/he found multiples of 3; (d), s/he found the first four whole numbers beginning with 6.
3. c. 404 (use number words, numerals, diagrams, & concrete models to represent whole numbers to 1000)
4. b. 459 (add/subtract 2- & 3-digit numbers with regrouping) If student answered: (a), s/he subtracted the smaller digits from the larger digits; (c), s/he didn't rename hundreds' place; (d), added 10 to both tens' and ones' place.
5. c. 31 (column addition) If student answered: (a), s/he wrote the columns from left-to-right and added; (b) added each digit; (d), added each column without renaming.
6. d. 54 (multiplication facts to 9)
7. c. 9 (perform simple division without remainders)
8. c. 9 – 3 = (develop use of number sentences in solving 1- and 2-step story problems)
9. a. 2 (use strategies to solve logical thinking/deductive reasoning problems)
6. a. $\frac{5}{8}$ (concept of fraction – recognize simple fractions) If student answered: (b) or (c), s/he compared shaded to unshaded, not to the total.
11. d. $\frac{3}{10}$ (concept of fraction – recognize simple fractions) If student answered: (b), s/he compared all to red; (c) s/he compared red to "not red."
12. 

"Proficient" will draw both lines of symmetry. (explore line symmetry)
"Apprentice" will draw only one line of symmetry.

13. c. 112 (column addition) If student answered: (a) or (b), s/he added without renaming.
14. d. afternoon classes (read simple timelines)
15. a. 10:06 (tell time to minute)
16. d. $\frac{4}{13}$ (conduct simple probability experiments)
17.  (extend geometric patterns)

18. D4d, E5e (identify/describe/create patterns in real-life situations using pictures, symbols, & concrete objects)

19. Aaron: 7; Brittany: 6; Chase: 5; Della: 2 (introduce multiples; use strategies to solve logical thinking/deductive reasoning problems)
"Distinguished" will not only be correct, but will also clearly explain/illustrate the strategy used and will indicate that s/he had verified the solution. "Proficient" will be correct and will clearly explain the strategy used. "Apprentice" will be correct, but may only write the answers, or the strategy used is either not given or not clear. "Novice" has incorrect answers.

20. a. 11 (use strategies to solve logical thinking/deductive reasoning problems; develop the use of number sentences in solving 1- and 2-step problems)

21. c. 9 (collect/organize/interpret data; use strategies to solve logical thinking/ deductive reasoning problems)

22. a. 8 (construct/read/interpret charts/tables; recognize/extend/find rules in number patterns)

23. d. 7 (construct/read/interpret charts/tables; recognize/extend/find rules in number patterns)

24. d. 285, 392, 516, 773 (compare/order whole numbers) If student answered: (b), s/he ordered digits in each number rather than the numbers.

25. b. 91 (add/subtract 2-digit numbers with regrouping) If student answered: (a), s/he added each column separately without renaming; (c) s/he added without renaming.

6. c. ten minutes before 7 (telling time to minutes – before & after hour)

27. b. 36¢ (add/subtract amounts of money)

28. d. not here -- 8¢ (add/subtract amounts of money)

29. b. 4 inches (use of metric/customary measures – length; estimate measures by rounding)

30. c. 10 cm (use of metric/customary measures – length; estimate measures by rounding)