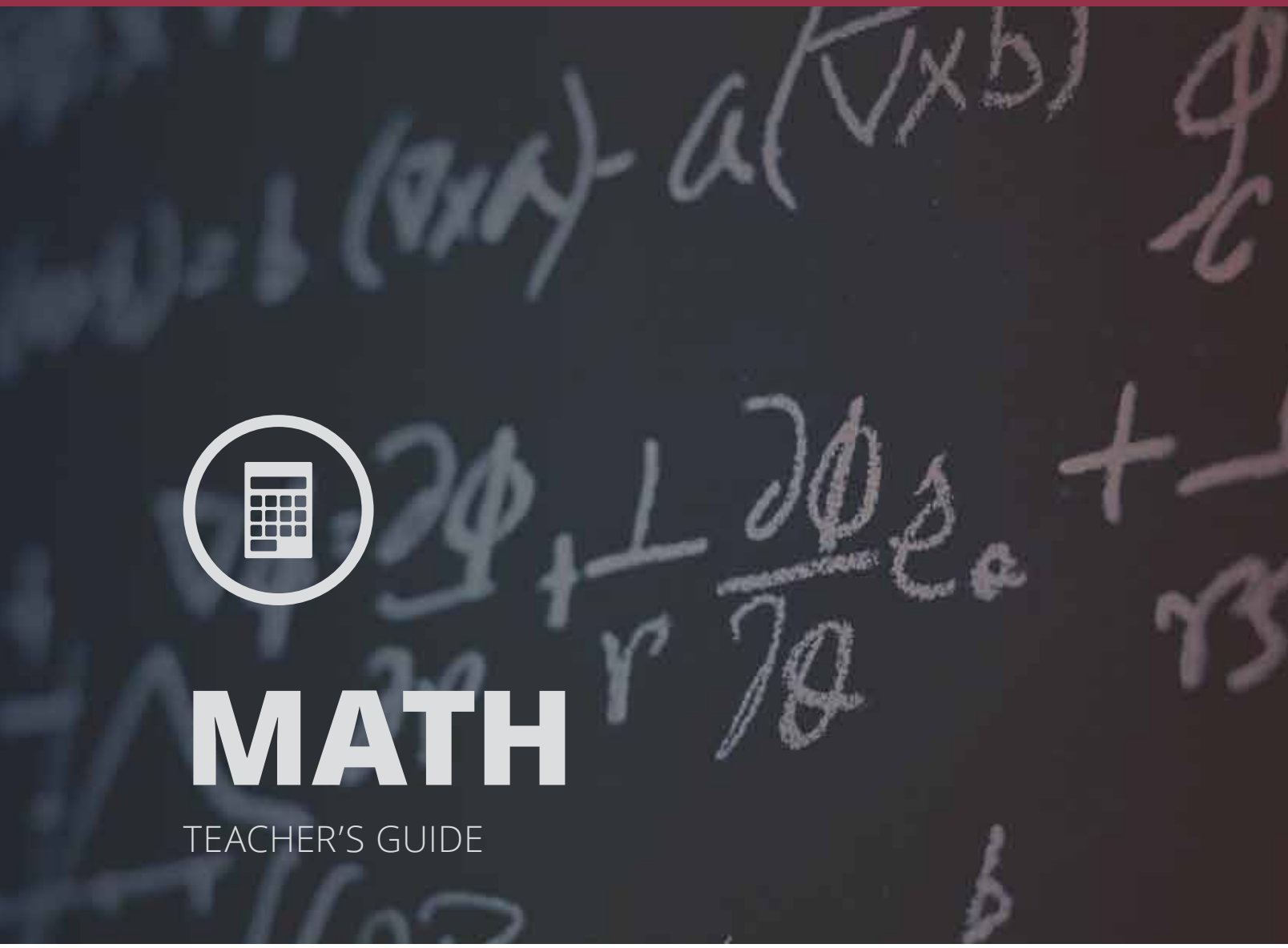
LIFEPAC®



MATH

TEACHER'S GUIDE

10th Grade

Alpha Omega
PUBLICATIONS

MATH 1000

Teacher's Guides

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INSTRUCTIONS FOR TENTH GRADE MATHEMATICS

The LIFEPAC curriculum from grades two through twelve is structured so that the daily instructional material is written directly into the LIFEPACs. The student is encouraged to read and follow this instructional material in order to develop independent study habits. The teacher should introduce the LIFEPAC to the student, set a required completion schedule, complete teacher checks, be available for questions regarding both content and procedures, administer and grade tests, and develop additional learning activities as desired. Teachers working with several students may schedule their time so that students are assigned to a quiet work activity when it is necessary to spend instructional time with one particular student.

Mathematics is a subject that requires skill mastery. But skill mastery needs to be applied toward active student involvement. Measurements require measuring cups, rulers, empty containers. Boxes and other similar items help the study of solid shapes. Construction paper, beads, buttons, beans are readily available and can be used for counting, base ten, fractions, sets, grouping, and sequencing. Students should be presented with problem situations and be given the opportunity to find their solutions.

Any workbook assignment that can be supported by a real world experience will enhance the student's ability for problem solving. There is an infinite challenge for the teacher to provide a meaningful environment for the study of mathematics. It is a subject that requires constant assessment of student progress. Do not leave the study of mathematics in the classroom.

The Teacher Notes section of the Teacher's Guide lists the required or suggested materials for the LIFEPACs and provides additional learning activities for the students. Additional learning activities provide opportunities for problem solving, encourage the student's interest in learning and may be used as a reward for good study habits.

MATH 1001

Unit 1: A Mathematical System

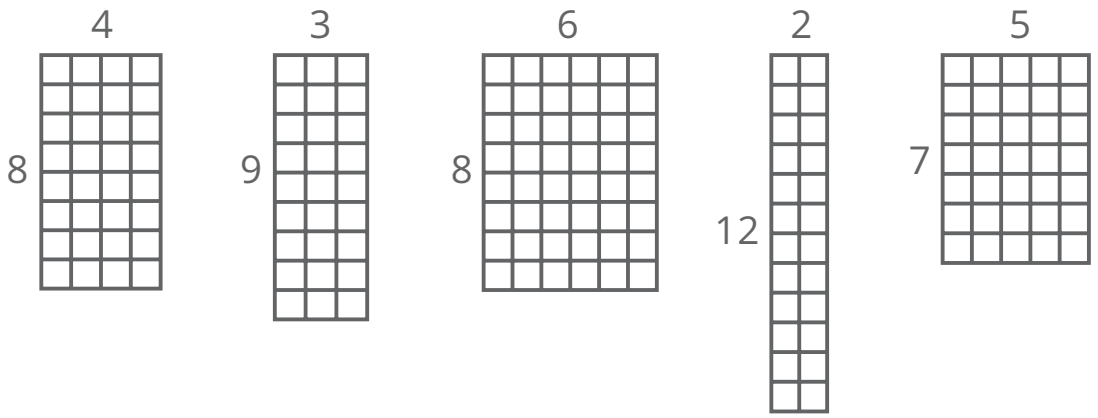
TEACHING NOTES

MATERIALS NEEDED FOR LIFEPAC	
Required	Suggested
(None)	• an instrument to make straight lines such as a ruler or straightedge

ADDITIONAL LEARNING ACTIVITIES

Section 1: Undefined Terms

1. On graph paper, have students make each of the following diagrams that represent tables. Dimensions should be written along the sides.



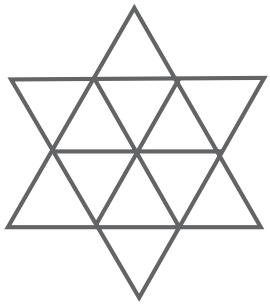
Have students draw the path a small ball would take for each table, starting at the lower left-hand corner, and moving the ball at a 45° angle with each side of the table. The ball always moves one unit up or down for one unit left or right. If the ball stops in a corner, mark the corner with a large dot. At that point the path of the ball terminates; otherwise, it continues rebounding at a 45° angle as it hits each side or end.

Do you think the ball will always end up in a corner?

If the ball starts from the lower left-hand corner, do you think it can stop in any of the four corners?

Section 2: Basic Definitions

1. Discuss these questions with your class.
    a. Can a ray have more than one name?
    b. Can a ray have two end points?
    c. How many line segments are in a line?
2. Have students draw the following figure. Ask them to determine the number of triangles of any size in the figure.



3. During their study of geometry, the students will be learning the definition of many terms. Encourage them to learn each new term as it is presented because later terms will be defined by using earlier terms. New terms will be defined as they need them in their study of geometry. Many of the definitions, theorems, and postulates in this unit will be needed in later units. Lists of these kept and maintained will be very helpful for future reference. The student should start a notebook now! Then as definitions, theorems, and postulates are given in the LIFEPAC they should be added to the notebook and used for reference.

Section 3: Geometric Statements

1. Discuss these questions with your class.
    a. Are any two points always collinear?
    b. Will any two noncollinear lines intersect?
    c. Do any postulates and theorems exist other than the ones used in the LIFEPAC?
2. Research Euclid, a Greek mathematician of 300 B.C., for whom Euclidean geometry is named.
3. Write several general statements such as “all rectangles have four sides.” Then write several specific statements such as “a square has four equal sides.” Devise a postulate or a theorem of your own. Remember that a postulate is a statement accepted without proof and that a theorem is a general statement that can be proved. Prove your theorem(s).

ANSWER KEYS

SECTION 1

1.1 location or position
1.2 a dot
1.3 Example:

1.4 infinite number
1.5 none
1.6 no
1.7 points
1.8 straight
1.9 a. $\overleftrightarrow{AB}$
b. $\overleftrightarrow{CD}$
c. $\overleftrightarrow{EF}$
1.10 infinite number
1.11 A line exceeds indefinitely in both directions.
1.12 a. flat
b. points
1.13 a. plane *R*
b. plane *S*
c. plane *T*
1.14 infinitely long
1.15 no thickness
1.16 no

SELF TEST 1

1.01 plane (table top)
1.02 line (arrow)
1.03 planes (cover and pages of book)
1.04 points (marbles)
1.05 lines (parallel railroad tracks)
1.06 points (freckles)
1.07 e
1.08 c
1.09 a
1.010 b
1.011 f
1.012 d
1.013 $\overleftrightarrow{AC}$
1.014 a. intersects
b. *E*
1.015 point *T*
1.016 *B* or *R* (same plane)
1.017 a. $\overleftrightarrow{AC}$
b. line *x*
c. line *w*
1.018 *S*
1.019 *S*, *E*, *A*, *C*, *T*
1.020 *C*, *R*, *A*, *B*

SECTION 2

2.1 unacceptable (not restrictive enough)
2.2 unacceptable (not restrictive enough)
2.3 unacceptable (too restrictive)
2.4 acceptable
2.5 space
2.6 no (some are coplanar)
2.7 yes
2.8 a. S
Either order:
b. R
c. T
2.9 $UV + VW = UW$
2.10 false (they are coplanar)
2.11 true
2.12 true
2.13 false (they are coplanar)
2.14 true
2.15 true
2.16 true
2.17 false (the three points are not collinear)
2.18 true (definition of a plane)
2.19 true
2.20 no (do not have the same end point)
2.21 yes
2.22 Either order:
a. $\overrightarrow{AC}$
b. $\overrightarrow{AB}$
2.23 Any order:
a. $\overline{CA}$
b. $\overline{CB}$
c. $\overline{AB}$
d. $\overline{AD}$
2.24 yes
2.25 point B
2.26 opposite rays
2.27 midpoint of $\overline{CB}$
2.28 no (the figure formed is not a straight line)
2.29 no (the three points are not collinear)

SELF TEST 2

2.01 The points must be collinear.
2.02 Either order:
a. $\overline{SA} = \overline{AM}$
b. $\overline{SA} + \overline{AM} = \overline{SM}$

2.03 $GO + OD = GD$

2.04 no (point O is not necessarily in a position such that $GO = OD$)

2.05 $\overrightarrow{SA}$

2.06 midpoint

2.07 U is between N and S.

2.08 U is between N and S.

2.09 one

2.010 Any order:
$\overline{NU}$, $\overline{UT}$, and $\overline{NT}$

2.011 space
2.012 line
2.013 line
2.014 c
2.015 c
2.016 c
2.017 b
2.018 b
2.019 b
2.020 b
2.021 b
2.022 b
2.023 d
2.024 d

SECTION 3

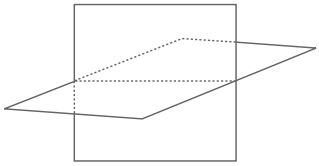
3.1 Postulate 5: If two planes intersect, then their intersection is a line.
3.2 one
3.3 Postulate 2: Through any two different points, exactly one line exists.
3.4 a. no
b. Postulate 2: Through any two different points, exactly one line exists.
3.5 a. no
b. The three points cannot be on one line.
3.6 Postulate 1: Space contains at least four points not all in one plane.
3.7 Postulate 2: Through any two different points, exactly one line exists.
3.8 Postulate 3: Through any three points that are not on one line, exactly one plane exists.
3.9 Postulate 4: If two points lie in a plane, the line containing them lies in that plane.
3.10 Postulate 1: A plane contains at least three points not all on one line.
3.11 false (undefined terms are used to state some postulates)
3.12 false (a postulate does not require proof)
3.13 false (two planes intersect in exactly one line)
3.14 true
3.15 false (a plane must have at least 3 points)
3.16 false (the intersection of two planes is exactly one line)
3.17 the multiplication by one postulate
3.18 the commutative postulate for addition
3.19 the distributive postulate
3.20 the addition of zero postulate
3.21 the additive inverse postulate
3.22 the multiplication by one postulate
3.23 the addition of zero postulate
3.24 the commutative postulate of multiplication
3.25 the distributive postulate
3.26 the multiplicative inverse postulate
3.27 the addition postulate of inequality
3.28 the multiplication postulate of inequality
3.29 the multiplication postulate of inequality
3.30 the transitive postulate of equality
3.31 the symmetric postulate of equality
3.32 the comparison postulate
3.33 the multiplication postulate of inequality
3.34 the transitive postulate of inequality
3.35 the multiplication postulate of inequality
3.36 the reflexive postulate of equality
3.37 three collinear points
Example:

3.38 three noncollinear points
Example:

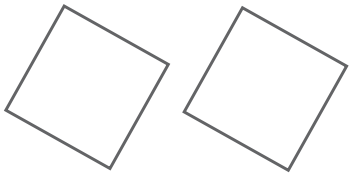
3.39 two intersecting lines
Example:

3.40 two nonintersecting lines
Example:

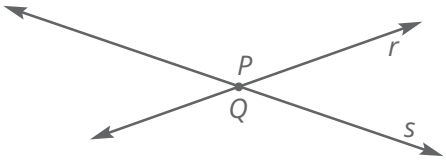
3.41 two intersecting planes
Example:



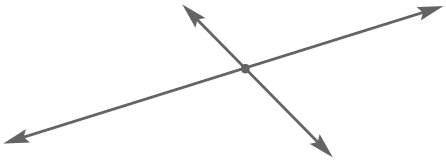
3.42 two nonintersecting planes
Example:



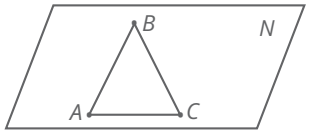
3.43 false (skew lines do not lie in one plane)
3.44 true
3.45 false (two intersecting lines lie in one plane)
3.46 false (three noncollinear points determine a plane)
3.47 true
3.48 They are the same point. Or, they are the point of intersection.



3.49 Theorem 1-1: If two lines intersect, then their intersection is exactly one point.



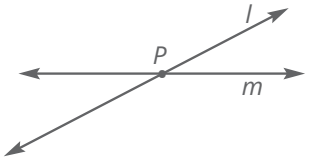
3.50 They lie in plane *N*.



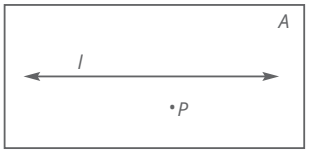
3.51 Postulate 4: If two points lie in a plane, the line containing them lies in that plane.
3.52 an infinite number
3.53 an infinite number
3.54 exactly one
3.55 exactly one
3.56 planes: *BCE*, *BEA*, *CED*, *AED*, *ABCD*, *ACE*, and *BDE*
3.57 the division property of equality
3.58 the multiplication property of equality
3.59 the subtraction property of equality
3.60 the addition property of equality
3.61 the multiplication property of equality
3.62 the addition property of equality
3.63 the multiplication property of equality
3.64 true
3.65 false (If $a + 2 < b + 3$, then $a < b + 1$.)
3.66 true
3.67 false (If $2 > -a$, then $a > -2$.)
3.68 the subtraction property of equality
3.69 the division property of equality
3.70 the addition property of equality
3.71 the subtraction property of equality
3.72 the division property of equality
3.73 the distributive postulate
3.74 the subtraction property of equality
3.75 the division property of equality
3.76 the distributive postulate
3.77 the subtraction property of equality
3.78 the subtraction property of equality
3.79 the division property of equality
3.80 the distributive postulate
3.81 the distributive postulate
3.82 the zero product property
3.83 the subtraction property of equality

SELF TEST 3

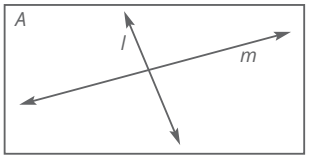
3.01 Example: line *l* intersects *m* at *P*.



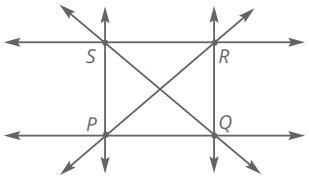
3.02 Example: Plane *A* contains line *l* and point *P*.



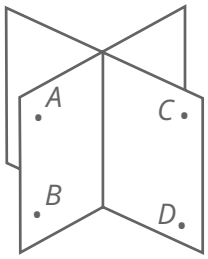
3.03 Example: Line *l* intersects line *m*; plane *A* contains both lines.



3.04 Example: $\overleftrightarrow{PQ}$, $\overleftrightarrow{PR}$, $\overleftrightarrow{PS}$, $\overleftrightarrow{QR}$, $\overleftrightarrow{QS}$, and $\overleftrightarrow{RS}$ are six different lines.



3.05 Example: *A*, *B*, *C*, and *D* are not all in one plane.



3.06 false (an undefined term can be used in a theorem)
3.07 true
3.08 false (two intersecting lines lie in one plane)
3.09 true
3.010 false (a segment has exactly two endpoints)
3.011 theorem
3.012 defined
3.013 postulate
3.014 line *AB*

3.015 line
3.016 b
3.017 d
3.018 c
3.019 a
3.020 Theorem 1-1: If two lines intersect, then their intersection is exactly one point.
3.021 Postulate 2: Through any two different points, exactly one line exists.
3.022 Postulate 4: If two points lie in a plane, the line containing them lies in that plane.
3.023 Postulate 5: If two planes intersect, then their intersection is a line.
3.024 the subtraction property of equality
3.025 the reflexive postulate of equality

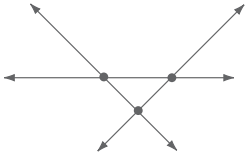
LIFEPAC TEST

1. c
2. d
3. a
4. e
5. b
6. space
7. *A*

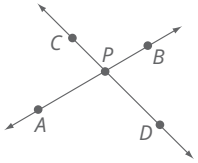
8. *BC*

9. midpoint

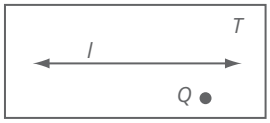
10. proof
11. prove
12. two
13. four
14. three



15. *-a*
16. lines *AB* and *CD* intersecting at point *P*

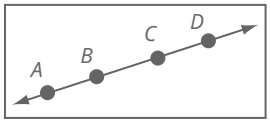


17. line *l* and point *Q* not on *l*, both in plane *T*



18. segment *UV* with midpoint *M*

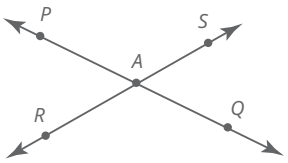
19. collinear and coplanar points *A*, *B*, *C*, and *D*



20. opposite rays $\overrightarrow{AC}$ and $\overrightarrow{AB}$

ALTERNATE LIFEPAC TEST

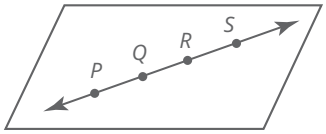
1. e
2. d
3. b
4. a
5. c
6. collinear
7. Either order:
a. *P*
b. *Q*
8. *RS*
9. midpoint
10. postulate
11. theorem
12. line
13. four
14. four
15. c
16.



17.

18.

19.



20.

MATH 1001

ALTERNATE LIFEPAC TEST

NAME _____

DATE _____

SCORE _____

54
68

After each model in Column I, write the matching term from Column II (each answer, 2 points).

	Column I		Column II
1.		_____	a. $\overline{AB}$
2.		_____	b. Point Q
3.		_____	c. $AB + BC = AC$
4.		_____	d. $\overleftrightarrow{AB}$
5.		_____	e. $\overrightarrow{AB}$

Complete the following statements (each answer, 3 points).

6. Two or more points all on the same line are called _____ points.

7. The two end points of $\overline{PQ}$ are a. _____ and b. _____ .

8. If point P is between R and S, then $RP + PS$ = _____ .

9. If $AB = BC$ on AC, point B is called the _____ of $\overline{AC}$.

10. A _____ is a statement we accept without proof.

11. A _____ is a statement we must prove.

12. A _____ contains at least two points.

13. Space contains at least _____ points.

14. How many planes are determined by four noncoplanar points? _____

15. _____ + $(-c) = 0$.

Sketch and label the following conditions (each answer, 5 points).

16. Two lines, $\overleftrightarrow{PQ}$ and $\overleftrightarrow{RS}$, intersecting in a point *A*.

17. A line *n* and a point *B* not on *n* that are both in plane *X*.

18. A segment with midpoint *A* and end points *C* and *D*.

19. Collinear and coplanar points *P*, *Q*, *R*, and *S*.

20. Opposite rays $\overrightarrow{XY}$ and $\overrightarrow{XZ}$.

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