HSPE Mathematics

Hints for SUCCESS – The BASICS

Be positive, be reassuring. Tell the students that if they have done what you have asked in preparation, then they are prepared for the test. They *will* pass the test!

1. Have students read entire test before starting; place a "√" by problems they know how to do for sure, a "?" by the ones they are not sure of, and an "X" by the ones they have no idea how to answer.
2. Do the "√" problems first, followed by the problems marked with a "?", then do the "X".
3. This is important, the goal is not to make a 100%, the goal is to pass the test. Make sure you get every "√" problem correct!!!
4. Don't do problems in your head, the distracters will kill you. EX. If the dimensions of a rectangle are *doubled*, how is the area affected? Many students will answer "*doubled*". The answer is "*quadrupled*". Do the math!
5. Don't leave any answers blank. On the problems marked with an "X", eliminate dumb answers before making an intelligent guess.
6. Use the pictures, if they look equal, they probably are equal on <u>*this*</u> test.

Word Associations – English to Math Translations

STATISTICS

MEAN – Know the TOTAL # of points
MEDIAN – MIDDLE – ($) Arrange the scores in order
MODE – most frequent

RANGE – DIFFERENCE in high and low scores

GRAPHING

CIRCLE – Take fraction of 360° or of $2\pi r$ - central angle
BOX & WHISKER – Find the MEDIAN, then find the MEDIANS for top and bottom halves.
STEM & LEAF – tens column – units column
NORMAL CURVE – median, 50% above and below, quartiles
BAR & HISTOGRAMS
X-Y READING & GRAPHING
GRAPHING INEQUALITIES, 1&2 variables including absolute value

GEOMETRY

AREA – MULTIPLY, lw, bh, ½ bh, ½(B+b)h, πr^2
Area - IRREGULAR SHAPES – turn into rectangles and add
Area Shaded regions – subtract area of smaller region from larger
VOLUME prism – MULTIPLY THE *AREA* BY THE HEIGHT
VOLUME pyramid – MULTIPLY AREA BY HEIGHT ÷ 3
PERIMETER – ADD all sides
CIRCUMFERENCE – 2 πR
CONGRUENCE Thms – SSS, SAS, ASA, AAS HL, LL
SIMILARITY Thms – AA, SAS

ANGLES

COMPLEMENTARY (C – corner 90˚) & SUPPLEMENTARY (S– straight 180˚)
LINEAR PAIR – sum 180
VERTICAL ANGLES are equal
ANGLES FORMED BY || LINES Use ABBA
Alt int angles are =
Alt ext angles are =
Corresponding angles are equal
Same side interior equal 180
SUM OF INTERIOR ANGLES OF A TRIANGLE – 180˚
SUM OF INTERIOR ANGLES POLYGON (n – 2) 180˚
SUM OF EXTRERIOR ANGLES POLYGON – 360˚

Use the picture, if the angles look the same, set them equal. If they don't look the same, set their sum equal to 180. (Doesn't always work)

CIRCLE THEOREMS

ANGLES
Central angles = arc
Inscribed angles = ½ intercepted arc
Vertex inside circle = ½(sum of intercepted arcs)
Vertex outside circle = ½(difference of intercepted arcs
SEGMENTS
DIAMETER = 2 r
Product of segment of chords
Secants & tangents,
ARC LENGTH fraction of 2πr

PROBABILITY

ONE STEP; Count – PROBABILIITY = SUCCESS/TOTAL
MULTI-STAGE; DRAW A TREE DIAGRAM or use counting method

COUNTING METHODS

Permutation (order matters) Use $n!/(n-r)!$

Combinations (order does not matter) $n!/[(n-r)!r!]$

HOW MANY DIFFERENT WAYS – MULTIPLY

PYTHAGOREAN THEOREM

RIGHT TRIANGLES – $c^2 = a^2 + b^2$

RATIO & PROPORTION

TYPE I – Make sure the ratios match

TYPE II – Make an equation

SIMILAR POLYGONS

PERCENTS

PROPOTION make sure ratios match

Percent Proportion

$$\frac{Part}{Total} = \frac{Percent}{100}$$

FORMULA

PLUG INTO FORMULAS & SOLVE; I = PRT

SEQUENCES

Count items in each picture and LIST – continue the pattern

If adding same number, continue the pattern or find nth term by using

$a_n = a_1 + (n-1)d$

If adding different number, list and look for pattern

Draw a picture

CHARTS

Plug in the numbers to see which work, Be careful, avoid using 0 or 1.

ALGEBRA

Solving Equations

Linear (Order of Operations in reverse)

Quadratics – Quad Form or Factor)

Systems (2 equations) – (Elimination)

Literal

Absolute Value; 2 solutions

Graphing

Slope Intercept, $y = mx + b$ Use for graphing
General; $Ax + By = C$ Use for graphing
Point Slope; $y - y_1 = m(x - x_1)$ Use for finding an equation

Word Problems

Word translations (don't read literally, 4 less than x is x – 4
REREAD WORD PROBLEMS TO GET INFORMATION

Formulas / Expressions– rewrite and plug in numbers

SLOPE

Thinking of getting paid – POSITIVE 
PARALLEL LINES – same slope
PERPENDICULAR LINES – negative (opposite) reciprocal slope
Number in front of x is slope; $y = 4x + 3$; slope is 4
Slope = $\Delta y/\Delta x$

FACTORING

Always use Distributive Property First
Binomial – Try Difference of 2 Squares
Trinomial, $a = 1$, Use Add Method
Trinomial, $a \neq 1$, Use the ac Method

RADICALS

Simplifying, Rewrite radicand as a product of a PERFECT Square and some number

MATRICES

Addition, Add row 1 column 1 to row 1 column 1, add row 2 column 2 to row 2 column 2, etc
Multiply by scalar, multiply every number in the matrix by that number

PROPERTIES of REAL NUMBERS

Recognize Commutative, Associative, Distributive, and Inverses

VENN DIAGRAMS

Read and interpret