Entrance Exam Preparation - Twelfth Grade

Expected time for testing: 2 hours (Higher-level math students may take longer)

Subject	Assessment Content	Approx. Time
Math	Mastery of Math Facts test:	10 minutes
	Addition, subtraction, multiplication & division (two minutes for each test)	
	Math Concepts test:	20 – 30 minutes (depending on
	Four-digit addition and subtraction, decimals, long-division, fractions, rounding, algebra 1, algebra 2, trigonometry, geometry, square root, Pythagorean Theorem	level being assessed)
Reading &	Reading and comprehension (3 tests, 3 minutes per story):	10 minutes
Comprehension	Read 3 short stories and answer questions in multiple-choice format	
Spelling	Spelling test	10 minutes
Grammar	Grammar test: Identifying parts of speech: verb, noun, pronoun, adverb, adjective, conjunction, preposition, appositives, plurals, articles; Dissecting sentences: identify subjects, verbs and modifiers; Showing understanding of capitalization, punctuation and use of synonyms, antonyms, homonyms and homophones	No time limit (most students complete within 20 minutes)
Writing	Composition:	10 minutes
	Student is required to write a paragraph or more in cursive on a topic of his/her choice.	



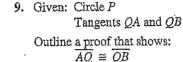
Intake Academic Assessment Summary

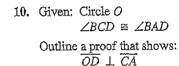
Student Name	Age	e Grade L	Level (Current)	Date
Teacher Conducting Assess	ment	A	dministration Review	1
Subject Assessed	Time Allocation	Score	Λ	lotes
Math Facts				
Addition				
Subtraction				
Multiplication				
Division				
Math Concepts				
Reading Comprehension				
Word Decoding				
Spelling				
Orthography				
Composition				
Pagammandationa				
Recommendations:				

Note to Parents: The results of this Intake Academic Assessment are based upon performance standards and expectations of American Heritage School students for the age or grade level indicated above. This assessment is intended to measure current performance only and is used as one of various considerations in the School's intake process to make admission and grade level placement decisions. Thank you for your interest in American Heritage School. Our mission is to serve you in developing the hearts, minds, and bodies of your children as we strive together to magnify the divine potential of students and families.

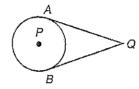
- 1. A man is 7 times as old as his son. In 9 years he will be 2 years older than 3 times his son's age then. How old are they now?
- 2. The sum of the digits of a two-digit counting number is 10. When the digits are reversed, the new number is 13 less than one-half the original number. What is the number?
- 3. Sasha rows her boat 5 miles per hour in still water. She travels 48 miles downstream in twice the time it takes to travel 6 miles upstream. What is the speed of the current?
- 4. Construct a triangle whose sides are 4 cm, 5 cm, and 6 cm long.
- 5. Use a ruler to draw a line segment 6 cm long. Construct a perpendicular to the line at a point 2 cm from the left endpoint.
- 6. Draw a line segment and a point outside the line. Construct a perpendicular to the line that passes through the point.
- 7. Use a protractor to draw a 48° angle. Then use a straightedge and compass to construct the bisector of the angle.
- 8. Given: $\overline{AD} \cong \overline{DC}$ $\angle ADB \cong \angle CDB$

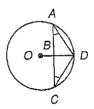
Outline a proof that shows: $\overline{AB} \cong \overline{BC}$











- 11. Given: $A = \{1, 3, 5, 7, 9\}$ and $B = \{1, 2, 3, 6, 10, 13\}$
 - (a) Find $A \cup B$.

(b) Find $A \cap B$.

Graph the solution on a number line:

12.
$$\{x \in \mathbb{R} \mid |x+1| < 2\}$$

13.
$$1 \le \frac{-3}{x-2}$$
; $D = \{\text{Reals}\}$

- 14. Denise deposited \$3140 at 7 percent interest compounded continuously. How much money did she have after 6 years? $(A_t = Pe^{rt})$
- 15. How many 4-letter signs can be made from the letters in the word TOPOLOGY if no repetition is permitted?
- 16. Show that $1.0\overline{23}$ is a rational number by writing it as a fraction of integers.
- 17. Solve for x: $4 \log_5 x = \log_5 81$

- 18. Complete the square as an aid in graphing: $y = x^2 + 6x + 8$
- 19. Solve for x: $\log_3(x + 5) \log_3(x 3) = \log_3 9$
- 20. Use M and N to represent positive numbers and write:
 - (a) the product rule for logarithms.
 - (b) the quotient rule for logarithms.
 - (c) the power rule for logarithms.

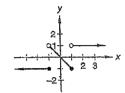
SHOW YOUR WORK

Test 31, Form B

Name: _____

1. The lab assistant calibrated t thermometers in h hours, but still got off work 3 hours late. What should her rate of calibration have been to get off work on time if she had to calibrate t + 2 thermometers?

- 2. Graph the piecewise function: $\begin{cases} y = 3 & \text{if } -\infty < x \le 1 \\ y = x & \text{if } 1 < x \le 3 \\ y = -x + 1 & \text{if } 3 < x < \infty \end{cases}$
- 3. Graph the hyperbola: xy = 9
- 4. Sketch the graph of f(x) = [x] 1.
- 5. Find the roots of the polynomial equation $x^3 2x^2 + 2x 15 = 0$.
- 6. Find the radius of a circle that circumscribes a regular hexagon whose perimeter is 30 inches.
- 7. Use Descarte's rule of signs to determine the possible number of:
 - (a) Positive real roots of $6x^3 2x^2 3x + 7 = 0$
- (b) Negative real roots of $6x^3 2x^2 3x + 7 = 0$
- 8. Write the equations for the function shown.



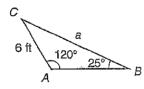
9. Sketch the graph of the following function showing clearly all x-intercepts, holes, and asymptotes.

$$y = \frac{x^2 + 4x}{(x+2)(x-1)(x+4)}$$

10. Jif has a bucket containing 5 red balls and 7 green balls. Two balls are drawn at random. What is the probability that both are green?

11. Solve this triangle for

- (a) angle C
- (b) side a
- (c) area



12. Listed below are the equations of conic sections, none of which are degenerate. Indicate whether each equation represents a circle, a parabola, an ellipse, or a hyperbola.

(a)
$$x^2 - 4y^2 = 4$$

(b)
$$2x^2 - 4x + y^2 = 0$$

(c)
$$x^2 + y^2 - 6x + 4y + 9 = 0$$

(d)
$$xy = 8$$

(e)
$$x^2 + 4x - 4y - 2 = 0$$

13. Write equation (c) of problem 12 in standard form and graph the conic section that the equation represents.

14. Find the coordinates of the point that lies two thirds of the way between (1, 3) and (7, 6).

15. Determine the radius of the "region of interest" of the polynomial function $y = 3x^3 - 9x$. Determine the coordinates of some points on the graph and sketch the graph.

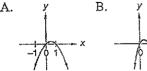
16. Solve for x: $\log_{1/2}(x-3) > 3$

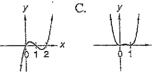
17. Solve $\sin 2x - \sin x = 0$ given that $0 \le x < 2\pi$.

18. Show: $\sin 3x = 3 \sin x - 4 \sin^3 x$ [Hint: $\sin 3x = \sin (2x + x)$]

19. One root of $x^4 + 3x^2 - 4 = 0$ is 2i. What are the other three roots?

20. Which of the following graphs most resembles the graph of $f(x) = x^2(x + 1)^2$?









Limited Warranty

The Nomistake Electric Typewriter is guaranteed for the period of six months from the date of original purchase to be free from defects in material and workmanship, with the following conditions: that the typewriter has been used as directed by its operating instructions; that no repairs have been made except by factory approved repair workers.

This warranty does not cover damage caused by carelessness or rough handling.

In the event that this typewriter is resold within six months of the original purchase, the warranty can be transferred to the new owner.

Upon notification, the Nomistake Corporation will replace, free of charge, any defective parts if all conditions of this warranty have been met. Should your typewriter require repairs, contact your local Nomistake Repair Center.

The Nomistake Corporation, Boston, MA.

- 1. The Nomistake Electric Typewriter is guaranteed for ® all time ® one year © six months © three months
- 2. The Nomistake Electric Typewriter is guaranteed to be operate

 B put together properly

 C unbreakable

 D fool proof
- 3. For this guarantee to be good, the buyer must

 pay extra money

 fill in a card

 follow the operating instructions

 be a good typist
- 4. If something goes wrong with the typewriter, you are supposed to

 write the company in Boston
 take it back to where you bought
 contact the local Nomistake Repair Center
- 5. If something is wrong with the way this typewriter was made, the company will ® replace the defective parts ® give you a new typewriter © give you your money back © loan you a new typewriter
- 7. If you try to repair the typewriter yourself, the company will ® never repair it ® charge you to repair it © give you new parts free ® tell you how to repair it correctly

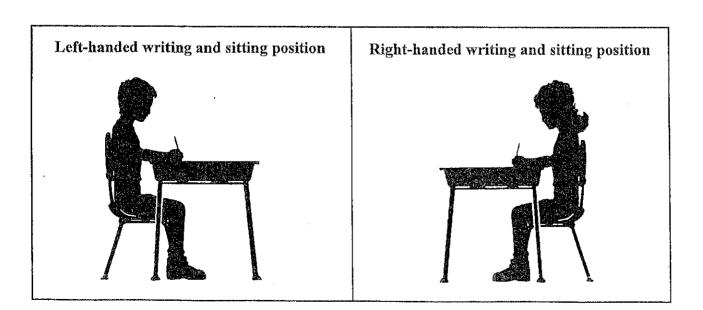
No. right 1 2 3 4 5 6 7 8 C score 5.2 6.1 7.1 8.1 9.4 10.5 11.8 12.9+



1. Improper and uncomfortable seating arrangements in classrooms probably cause a large number of inattention and hyperactivity problems. The chair should be *ergonomically* correct to support the child's back and general posture. Schools should give as much attention to the physical needs of children in a classroom as large corporations do for their employees. This is for productivity, comfort and safety.



- 2. Though sitting and lounging about on the floor, or in beanbag chairs, bathtubs, etc., has become quite popular in some classrooms, we do not think it affords the comfort or physical ease needed for accurate writing and spelling. The sketches below show correct seating for this method to work as prescribed.
- B. Prepare to teach letter strokes beginning in the next section.
 - 1. Have students clear all materials from the desk top except name tag, dotted-line paper and a No. 2, six-sided, black lead pencil.
 - 2. Desks are already adjusted for proper height for each student's feet to be flat on the floor, spines straight against the back rest, head held high and arm position as shown in the pictures below for left and right-handed students.
 - a. A student's head should not be allowed to fall forward because this causes strain on the back and neck muscles.
 - b. Both arms should rest comfortably on the desk; elbows should be just off the edge.
 - c. The body should not touch the front edge of the desk. This causes a tendency to lean on the desk, which places strain on the neck and shoulder muscles.



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