KEYSTONE
National High School
Dream. Connect. Achieve.

Keystone National High School Placement Exam **_Math Level III_**

1. Graph the equation $y = \lvert x + 4 \rvert$.	2. Simplify $\begin{bmatrix} -3 & 0 \\ 5 & -7 \end{bmatrix} + \begin{bmatrix} -4 & 2 \\ -1 & 8 \end{bmatrix}$ a. $\begin{bmatrix} -1 & 2 \\ -4 & 1 \end{bmatrix}$ b. $\begin{bmatrix} -7 & -2 \\ 4 & -15 \end{bmatrix}$ c. $\begin{bmatrix} -7 & 2 \\ 4 & 1 \end{bmatrix}$ d. $\begin{bmatrix} -7 & 2 \\ 4 & -1 \end{bmatrix}$
3. Graph the equation $y = -2(x-2)^2 - 4$.	4. Identify the vertex and the *y*-intercept of the graph of the function $y = -3(x+2)^2 + 5$. a. vertex: (–2, 5); *y*-intercept: –7 b. vertex: (2, –5); *y*-intercept: –12 c. vertex: (2, 5); *y*-intercept: –7 d. vertex: (–2, –5); *y*-intercept: 9

SCORE_____

5. Write the number in the form *a* + *bi*. $\sqrt{-4}+10$	6. Simplify the expression $(-6i)(-6i)$. a. 36 b. -36 c. -36***i*** d. 36***i***
7. Write the expression (*x* + 6)(*x* – 4) as a polynomial in standard form. a. $x^2 - 10x + 2$ b. $x^2 + 10x - 24$ c. $x^2 + 2x - 24$ d. $x^2 + 10x - 10$	8. Divide using synthetic division. $\left(x^4+15x^3-77x^2+13x-36\right)\div\left(x-4\right)$

SCORE_____

9. Find the real-number root.

$$\sqrt[3]{\frac{-125}{343}}$$

a. $\frac{25}{49}$

b. $\frac{-125}{343}$

c. $-\frac{125}{1029}$

d. $-\frac{5}{7}$

10. Solve the equation for x

$$\sqrt{x+10}-7=-5$$

a. 14
b. -8
c. 4
d. -6

11. Solve the equation for y

$$3y+20=3+2y$$

12. Solve the equation $|3x+5|=1$.

SCORE_____

13. Solve the equation for y

$3(y + 6) = 30$

a. 5
b. 16
c. 4
d. -16

14. Write the equation in logarithmic form.

$6^4 = 1{,}296$

a. $\log_6 1{,}296 = 4$
b. $\log 1{,}296 = 4$
c. $\log 1{,}296 = 4 \cdot 6$
d. $\log_4 1{,}296 = 6$

15. Simplify

$$\frac{4a^5}{7b^4} \times \frac{2b^2}{2a^4}$$

16. Solve the following $\frac{-2}{x+4} = \frac{4}{x+3}$.

SCORE_____

17. Evaluate the expression 5a + 5b given a = -6 and b = -5.

a. -55
b. 55
c. 5
d. -5

18. A bag contains 6 red marbles, 6 white marbles, and 4 blue marbles. Find P(red or blue).

a. 2/3
b. 3/2
c. 5/8
d. ¾

19. Simplify $(-2.7)^0$

a. 0
b. -1
c. 1
d. -2.7

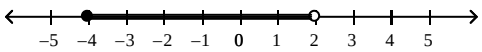
20. Find the solution to the following system of equations.
-5x + y = -5
-4x + 2y = 2

a. (–8, –15)
b. (–2, –15)
c. (0, 1)
d. (2, 5)

SCORE_____

21. Solve the inequality $-5x - 7 < 28$
a. $x > -7$
b. $x < -7$
c. x>21/5
d. x<-21/5

22. Write a compound inequality that the graph could represent.



a. $-2 \leq x < 4$
b. $-4 < x \leq 2$
c. $x \geq -4$ or $x < 2$
d. $-4 \leq x < 2$

23. Simplify $(4)^{-2}$

24. Simplify $7a^{-5}b^{3}$

SCORE_____

25. Simplify $\left(3xy^3\right)^2\left(xy\right)^6$	26. Simplify $\frac{x^{14}}{x^7}$
27. Solve $\frac{3}{7}x + 5 = 8$	28. Solve $3p - 1 = 5(p - 1) - 2(7-2p)$

SCORE_____

29. Find the zeros of y = x(x - 3)(x – 2)

30. Add $\frac{3}{m+5}+\frac{8}{m^2-25}$

31. Evaluate the expression $|4b-4|+|3-b^2|+2b^3$ using $b = 2$

32. Solve $s = 5r^2t$, for *t*.

SCORE_____

33. Solve $2r - 9 \geq -6$.	34. Solve $\lvert 2x + 10 \rvert < 26$
35. Simplify $\dfrac{p^2 - 4p - 32}{p + 4}$	36. Simplify $\sqrt[3]{128a^{13}b^6}$. Assume that all variables are positive

SCORE_____

37. Solve $3x^2 = 21$	38. Factor the expression $8x^2 + 12x - 16$
39. Factor the expression $x^2 + 14x + 48$	40. Factor the expression $x^2 - 6x + 8$

SCORE_____

41. Factor $9x^2 - 16$	42. Solve by factoring $4x^2 + 28x - 32 = 0$
43. Use the Quadratic Formula to solve $5x^2 + 9x - 2 = 0$.	44. Find the value for x and y in $\begin{bmatrix} 4 & 3 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 4 & y \\ x & 2 \end{bmatrix}$

SCORE_____

45. Solve the system $5x - y = 5$ $5x - 3y = 15$	46.Solve the system by graphing $y \leq -3x - 1$ $y > 3x - 2$
47. If f(x)=5x+2, find f(-4).	48. Graph the equation $y = -\frac{1}{4}x - 3$

SCORE_____

49. Write in standard form an equation of the line passing through the point (-2,-2) with the slope of -8.	50. Simplify (-1 + 6*i*) + (-4 + 2*i*).
51. Divide $3x^3 - 3x^2 - 4x + 3$ by $x + 3$.	52. Write the exponential expression in radical form $3x^{\frac{3}{8}}$

SCORE_____

53.Multiply and Simplify $(7-\sqrt{2})(8+\sqrt{2})$	54. Simplify $2\sqrt[4]{2x}+6\sqrt[4]{2x}$.
55. Multiply and simplify $\sqrt{6}\cdot\sqrt{2}$.	56. Solve $\frac{4}{-x}=2$.

SCORE_____