MATH FIELD 2023 **School**_____

ALGEBRA I (10th Grade) **Name**_____

Show all work for credit. Give exact answers whenever possible.

_____1. Simplify the expression: $\frac{|3-6|-|-12+7|}{-|5-4|}$

_____2. Solve for x: $\frac{1}{2}x - 2(1 - \frac{4}{5}x) = 10 - 18x$

_____3. A car radiator contains 10 liters of a 30% antifreeze solution. How many liters of pure antifreeze will have to be added if the resulting solution is to be 50% antifreeze?

_____4. Solve for b. $A = \frac{l+3b}{4}$

_____5. Factor completely. $6x^3y^3 + 24x^2y^2 - 192xy$

_____6. Find the inverse of $g(x) = 4x^2 - 9$.

_____7. Simplify $\frac{4a^2-1}{a^2-4} \cdot \frac{a^2-2a}{2a-1} \div \frac{a}{2}$

_____8. Given the polynomial $x^3 - 8x^2 + x + 42$, 7 is a zero. Find the other remaining zeros.

_____9. Determine *c* so the line $4cx - 3y = 15$ has slope $m = 8$.

_____10. The sum of a number and its cube is the same as twice the square of the number. Find all possible values of the number.

_____11. Simplify. $\sqrt{144x^8y^{22}z^{13}}$

_____12. Solve the equation: $\log_4(4x - 6) = \log_4(x) + \log_4(x - 1)$

_____13. Solve the inequality. $-\frac{5}{6} \le \frac{2-x}{9} + 4 < \frac{1}{4}$

_____14. Solve $(x + 4)(x - 1) = 7x + 8$

_____15. Find the greatest common factor of the following expressions.

$$24\left(x^2 - 4x + 4\right),\ 16\left(x^2 - 5x + 6\right),\ 9\left(x^2 - 4\right)$$