Name: _____ School: _____

Medley – Team Event
Math Field Day 2025

Write answers in the form indicated or in simplified exact form: π not 3.14; $3\sqrt{2}$ not $\sqrt{18}$. Fractions should be simplified.

_____ 1. Solve for n: $3^5 * 4^4 * 5^3 * n = 15!$ (* indicates multiplication)

_____ 2. Find all the solutions, real and complex, for the equation: $|x^2| = 25$.

_____ 3. Find all the zeros for the polynomial: $P(x) = 2x^3 - 7x^2 - 17x + 10$.

_____ 4. Two automobiles start at the same town to go to a city 90 miles away. One car averages 4 miles per hour faster than the other car and arrives 8 minutes sooner. Find the time for the FASTER car, in minutes.

_____ 5. Write a polynomial with integral coefficients and of lowest possible degree that has the given zeros: 3, $2i$.

_____ 6. Find two consecutive odd integers whose product is 783.

_____ 7. Solve for x: $6x^2 - 5x = 6$.

_____ 8. A box contains 6 black balls, 7 white balls, and 8 red balls. If 3 balls are drawn, what is the probability that they will be 1 black and 2 white balls?

_____ 9. Divide: $(-3 - 7i) \div (1 + i)$.

_____ 10. Solve the following system of equations. Write your answer(s) as an ordered pair (x, y).
$x - y + 3 = 0$
$x^2 + y = 9$

_____ 11. A boy rows upstream for 3 hours and returns downstream in 2 hours and 15 minutes. If he can row 2 miles per hour in still water, what must be the rate of the current? (Answer must be in fractional form.)

_____ 12. Solve for x: $\log_9 5x = \log_9 6 + \log_9(x - 2)$.

_____ 13. Find the center and radius for the given circle equation:
$x^2 + y^2 + 6x - 10y - 2 = 0$.

_____ 14. Milk containing 6% butterfat is added to milk containing 9% butterfat to make 100 gallons of 7% butterfat milk. How many gallons of 6% butterfat milk are used?

_____ 15. Find the limit: $\lim_{x \to 0} \frac{\tan x}{x}$

_____ 16. Given $F'(x) = 4x\text{-}1$ and $F(3) = 20$, find $F(x)$.