Since $p \leq 4$ and $z \leq 1$, the inequality clearly holds for $z \leq 1/2$. For $z > 1/2$, we have

$$2p(1-2z) + z(5z+3) \geq 8(1-2z) + z(5z+3) = (1-z)(8-5z) \geq 0.$$

It now follows that the only time equality can occur is if $a = 1$ and $x = y = z = 1$, or $a = 1$ and $z = 0$, $x = y = 2$.

Case 2. Here $p > 4$. Let $y = z = \varepsilon$. Then $x \approx p/2\varepsilon$, so that (2) holds. Now let $z = 0$, $x = y$. Then $x = y = \sqrt{p}$, so that the inequality sign in (2) is reversed.

That completes the *Corner* for this issue. Send me your Olympiad Contest materials and your nice solutions to problems from the *Corner*.

Mathematical Poems

1. no solution

   my mind is a matrix
   that has been reduced
   into row echelon form
   and proven to be
   - inconsistent

2. i'm tired of being a zero vector

   i'm tired of being a zero vector
   with no direction
   no dimension
   and no magnitude;
   what i need is another element
   - but that would be
   a contradiction
   of my definition

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