#0 Theta Ciphering
MAΘ National Convention 2019

If the two lines below are parallel, what is the value of $7n$?

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#2 Theta Ciphering
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Compute the sum of the 3 largest prime divisors of the following number: $15! - 13!$

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The ordered pair (L, U) satisfies both equations:

$$\frac{3L-4U}{LU}=-8$$

$$\frac{2L+7U}{LU}=43$$

What is $\frac{1}{L \bullet U}$?

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#9 Theta Ciphering
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Triangle ZLU has side lengths $ZU = 27$, $LU = 21$, and $ZL = 15$. The line through the incenter (the intersection of the angle bisectors) of triangle ZLU parallel to $\overline{LU}$ intersects $\overline{ZL}$ at W and $\overline{ZU}$ at F. What is the perimeter of triangle ZWF?

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#10 Theta Ciphering
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The ratio of the area of a square inscribed in a semicircle to the area of a square inscribed in the entire circle is $\frac{M}{U}$, in simplest form. What is $M + U$?

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The vertices of a parallelogram are (L,U), (0,0), (3,0), and (4,4). What is the sum of the *x*-coordinates of the possible solutions for (L,U)?

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