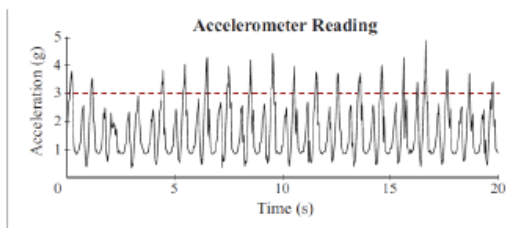


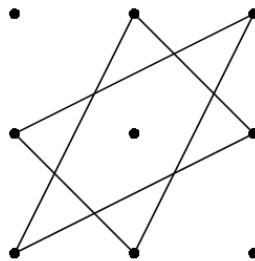
Thinking Feet Competition Math L2. Sample Problems.

_____ M and N are both perfect squares less than 100. If $M - N = 27$, what is the value of $\sqrt{M} + \sqrt{N}$?

_____ Jen's phone uses a simple algorithm to count the number of strides she takes. The algorithm looks at the phone's accelerometer measurements, and counts a stride each time the acceleration goes from below to above 3 g. Based on the number of strides counted in the 20-second window shown here, and assuming that Jen travels 140 cm per stride, what was Jen's average walking speed, in meters per second, over the 20-second window? Express your answer as a decimal to the nearest hundredth.



_____ The nine points of this grid are equally spaced horizontally and vertically. The distance between two neighboring points is 1 unit. What is the area, in square units, of the region where the two triangles overlap?



_____ Consecutive powers of 2 are arranged in a triangular pattern, as shown. The first row consists of the single entry, 2^1 . Each row has one more entry than the row above it. The product of the right-most entries (first three are bolded) of the first six rows can be expressed in the form 2^m for a natural number m . What is the value of m ?

$$\begin{array}{cccc} & & \mathbf{2^1} & \\ & & & \\ & 2^2 & & \mathbf{2^3} \\ 2^4 & & 2^5 & \mathbf{2^6} \\ & & \vdots & \\ & & & \end{array}$$

_____ What percent of the interval with endpoints -5 and 5 consists of real numbers x satisfying the inequality $x + 1 > \frac{8}{x-1}$?

_____ For what base, b , is $14_b + 24_b = 41_b$ true?

_____ If the volume of a sphere inscribed in a cube is $\frac{\pi}{6}$ cubic inches, what is the number of cubic inches in the volume of the cube?