1) **Analysis of a Decay Experiment** - A student in the lab measured the number of Geiger Counter hits for a time of 1 minute from his Tl-204 source. He repeated this experiment a number of times and fit his results to the Gaussian curve

\[ f(x) = A \exp \left[ -\frac{(x-\mu)^2}{2\sigma^2} \right] \]

as shown in Illustration 1:

![Gaussian fit of results from the trials of a Tl-204 experiment](Illustration 1)

Illustration 1: Gaussian fit of results from the trials of a Tl-204 experiment

a) Approximate the fit values for \( A, \mu, \) and \( \sigma \) **from the curve** shown in Illustration 1 [3 pts]

<table>
<thead>
<tr>
<th>( A )</th>
<th>( \mu )</th>
<th>( \sigma ) (approx.)</th>
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b) If the time of each run was halved, how would you expect the mean to change? [1 pt]

c) In this experiment, what would Poisson Statistics predict the uncertainty to be? [2 pts]

c) Do you think this is a probable outcome? Why or why not? [2 pts]

2) How is radiation intensity proportional to radius? [2 pts]

   a) $r^2$
   
   b) $r$
   
   c) 1
   
   d) $r^{-1}$
   
   e) $r^{-2}$