1. Truly random should mean that the roulette wheel spins in such a way that each outcome is equally likely. Each space must also be the same size for this to be true.

5. Each at bat should be independent of previous attempts (except for maybe a feeling of depression for not hitting the ball). Therefore the player had an equal chance each time of getting a hit so his comment is misleading (rubbish really).

\[
\begin{array}{cc}
\text{1 sem Cal} & 0.32 \\
\text{2+ sem Cal} & 0.13 \\
\text{No Cal} & 0.55
\end{array}
\]

Groups of three:

a) \( P(2+ \text{ sem Cal}) = 0.13 \) [13%]

b) \( P(\text{some Cal}) = P(1 \text{ sem Cal U 2+ sem Cal}) = 0.32 + 0.13 = 0.45 \) [45%]

c) \( P(\text{No more than 1 sem Cal}) = P(1 \text{ sem Cal or less}) = P(1 \text{ sem Cal U No Cal}) = 0.32 + 0.55 = 0.87 \) [87%]

14) \( P(\text{No Cal } \cap \text{ No Cal}) = P(\text{Cal}', \text{ Cal}') = (0.55)(0.55) = 0.3025 \) [30.25%]

b) \( P(\text{at least 1 sem } \cap \text{ at least 1 sem}) = (1 - P(\text{cal}'))(1 - P(\text{cal}')) = (1 - 0.55)(1 - 0.55) = (0.45)(0.45) = 0.2025 \) [20.25%]

c) \( 1 - P(\text{less than 2 sem Cal } \cap \text{ less than 2 sem Cal}) = 1 - (0.87)(0.87) = 1 - 0.7569 = 0.2431 \) [24.3%]
More explanation on #14c:

Consider the sample space for the 2 partners

<table>
<thead>
<tr>
<th></th>
<th>1 Sem</th>
<th>2+ Sem</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Cal</td>
<td>No Cal ∩ No Cal</td>
<td>1 Sem ∩ No Cal</td>
</tr>
<tr>
<td>1 Sem</td>
<td>No Cal ∩ 1 Sem</td>
<td>1 Sem ∩ 1 Sem</td>
</tr>
<tr>
<td>2+ Sem</td>
<td>No Cal ∩ 2+Sem</td>
<td>1 Sem ∩ 2+Sem</td>
</tr>
</tbody>
</table>

So of these 9 possibilities we need the 5 that have at least one person with 2+ sem of Cal. (**)

So it becomes:

\[ P(\text{No Cal} \cap 2+\text{Sem}) \cup \text{1 Sem} \cap 2+\text{Sem} \cup \text{2+ Sem} \cap 2+\text{Sem} \times 2 \times 2 \]

\[ = 2(.55)(.13) + 2(.32)(.13) + (.13)(.13) \]

\[ = 0.2431 \]

**ALTERNATELY**

The only combination(s) we don’t want are when both partners have less than 2 sem Cal. \( P(\text{Less than 2 sem Cal}) = P(\text{No Cal} \cup 1\text{sem Cal}) = .55 + .32 = .87 \)

Hence, two of these partners would be \((.87)(.87) = .7569\) and .7569 is what we want to exclude: \(1-.7569 = 0.2431\)
17) a) $P(\text{more production}) = \frac{382}{1005} = .3803 \text{ or } 38\%$

b) $P(\text{Both U No Opinion}) = \frac{80+30}{1005} = \frac{110}{1005} = .1095 \text{ or } 11\%$

18) a) $P(\text{Definitely not read it}) = \frac{382}{1005} = .3801 \text{ or } 38\%$

b) $P(\text{Probably U Definitely read}) = \frac{211+90}{1005} = \frac{301}{1005} = .2995 \text{ or } 30\%$

23) Yellow = .20  Red = .20  Orange = .10  
Blue = .10  Green = .10  Brown = .30

a) 1) $P(\text{Brown}) = .30$
   2) $P(\text{Yellow U Orange}) = .20 + .10 = .30$
   3) $P(\text{Green'}) = 1 - P(\text{Green}) = 1 - .10 = .90$
   4) $P(\text{striped}) = 0\% \text{ (what?!?) }$

b) 1) $P(\text{Brown N Brown N Brown}) = (.30)(.30)(.30) = .027$
   2) $P(\text{Red' N Red' N Red}) = (.80)(.80)(.20) = .128$
   3) $P(\text{Yellow' N Yellow' N Yellow'}) = (.80)(.80)(.80) = .512$
   4) $P(\text{at least 1 Green}) = 1 - P(\text{no Greens}) =$
      $1 - P(G'N G'N G') =$
      $1 - (.90)(.90)(.90) = 1 - .729 = .271$
a) If you are only drawing one M+M, then you can only get one color at a time. Therefore the events "Red" and "Orange" are disjoint because they can't both happen. They are not independent because drawing one automatically excludes the possibility of the other (thus affecting whether or not you can get it). Independent events are ones that do NOT affect the outcome of the other.

b) (This question, along with #23, is assuming that you are drawing them from a perfectly representative bag of M+M's AND that you put the M+M back after you draw it. Who would actually do that?!?!?! Anyway...) Red first and then another red would be independent because the first one doesn't affect the chances of the second one.

c) No, disjoint events CANNOT be independent! Independent = one event does not affect the other
Disjoint = choosing one affects the other because it automatically means it can't happen (in essence the opposite of independent... almost)