1. The treatments in this experiment are sugar pill, and 0.5g pill, so $\boxed{A = 2}$. The blocking factors are just the factors used to separate the randomly chosen participants into groups, so age is the only blocking factor, and $\boxed{B = 1}$. Including 54, there are 36 years from 54-89 inclusive, and between 18-89 there are 72 years, so there is a $\frac{1}{2}$ chance of being in the 54+ age group. There is a $\frac{1}{3}$ chance of being in one of the three treatment groups, so multiplying the two probabilities gives $\boxed{C = \frac{1}{6}}$. The trend described in D is called Simpson's Paradox, and there are 10 distinct letters in both words, so $\boxed{D = 10}$.
   Our final answer is $2 + \frac{1}{\frac{1}{6}} - 1 + 10 \implies \boxed{17}$.

2. Using 1-Var Stats, the mean of this dataset is $\boxed{A = 16.7}$. Since this dataset represents a sample of our population (the population being all the members of the baseball team, and our dataset only includes the players with the most home runs) we can also use 1-Var Stats to find the sample standard deviation, with is $\boxed{B = 11.0}$. This dataset is already likely right skewed, because the mean, 16.7, is greater than the median, 12, so the value needed to make the distribution right skewed is $\boxed{C = 0}$. Of (mean, median, standard deviation, and range). mean is always an unbiased estimator of the population, median is a biased estimator when the population is not normal, and the standard deviation and range are always biased estimators, so $\boxed{D = 3}$.
   Our final answer is $16.7 \times 11.0 \times 0 \times 3 \implies \boxed{0}$.

3. For any two independent random variables X and Y, with means and variances of μ_X, σ_X^2, μ_Y, σ_Y^2, respectively, $X \pm Y$ will result in a mean of $\mu_X \pm \mu_Y$, and a variance of $\sigma_X^2 + \sigma_Y^2$. Additionally, a linear transformation of $aX \pm b$ will result in a mean of $a\mu \pm b$ and a variance of $a^2\sigma^2$, for any random variable X. Finally, $\mu_{X^2} = {\mu_X}^2 + {\sigma_X}^2$, and $\sigma_{X+Y} = \sqrt{{\sigma_X}^2 + {\sigma_Y}^2 - 2p\sigma_X\sigma_Y}$ when X and Y are not independent and have a correlation coefficient of p. Given this information, we can solve each part. $\sqrt{(2^2)(16) + (3^2)(25)}$ gives us that $\boxed{A = 17}$. $16 + 25$ gives us that $\boxed{B = 41}$. $(9^2)(16) + (7^2)(25)$ gives us that $\boxed{C = 171}$. $X^2 + Y^2 + 2XY \implies (X + Y)^2$. So, $\mu_{X+Y} = 9 + 7 \implies 16$, and ${\sigma_{X+Y}}^2 = 16 + 25 \implies 41$. So, $\mu_{X+Y^2} = (16^2) + 41$, which gives us that $\boxed{D = 297}$. $\mu_{X+Y} = 9 + 7 \implies 16$, and $\sigma_{X+Y} = \sqrt{16 + 25 - 2(0.54)(4)(5)} \implies 4.40$, and $\mu_{X+Y} - \sigma_{X+Y}$ gives us $\boxed{E = 11.60}$.
   Our final answer is $17 + 41 - (171 + 297 - 11.60) \implies \boxed{-398.4}$.

4. The first statement is false - there is either a 0% or 100% chance the mean percentage is within this interval. The second statement is false - the interval is an estimate of the mean not a boundary of population values. The third statement is true. The fourth statement is false - we cannot be sure there are exactly 990. Finally, the fifth statement is also false - we cannot be certain there are exactly 10.
   Since the third statement is the only correct interpretation (true statement), our final answer is $\boxed{7}$.

5. The probability of finishing a 10 question team test from a set number of 15 written questions, where each question is independent and has success/fail is a binomial distribution, so $P(X = 10) =$ binompdf(15, 0.65, 15), which gives us $\boxed{A = 0.212}$. The probability of finding one question on the 5th trial when continuously going through questions until one is found with the same conditions as in part A is a geometric distribution, so $P(X = 5) =$ geometpdf(0.65, 5), which gives us $\boxed{B = 0.010}$. The probability of finishing a 10 question team test on the 13th question written with the same conditions as in part A is a negative binomial distribution, where the probability of failing 3 times before 10 successes $= \binom{3+10-1}{3} \times 0.65^{10}0.35^3$, which gives us $\boxed{C = 0.127}$. Part D describes all the possible derangements of a 10 element set, which is given by $10! \times \sum_{k=0}^{10} \frac{-1^k}{k!}$, which gives us $\boxed{D = 1334961}$.
   Our final answer is $(0.212 + 0.010 + 0.127) \times 1334961 \implies \boxed{465901.389}$.

6. The first 6 triangular numbers are 1, 3, 6, 10, 15, and 21. Students could not have scored a 12, and so, $\boxed{A = 0}$. Multiplying each score by its frequency then summing those products results in $\overline{x} = 8.28 \implies \boxed{B = 8.28}$. The quartiles can be found easily by looking at the cumulative distribution - the first (at 25%) lies between 0.2414 and 0.3793 so it is a 3. The third quartile (75%) lies between 0.4483 and 0.8276 so it is a 10. Therefore the IQR is 7, $\implies \boxed{C = 7}$. 1-Var Stats tells us the standard deviation of the distribution is 6.480, and *variance* $=$ *standard deviation*^{2}. Therefore, $\boxed{D = 41.99}$.
   Our final answer is $0 + 2(8.28) + 3(7) + 4(41.99) \implies \boxed{205.52}$.

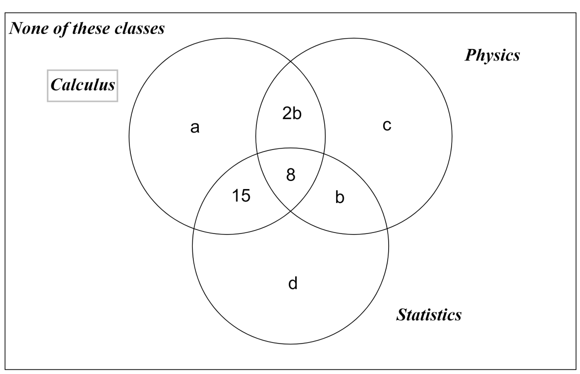
7. Performing the test for the pitch type data with 3 degrees of freedom gives a χ^2 value of 56.9085. Performing the test for the pitch speed data with 3 degrees of freedom gives a χ^2 value of 0.1513.
   By multiplying these two values, we get that the final answer is $\boxed{8.6103}$.

8. Performing linear regression on this data tells us that the slope $= 55.050 \implies \boxed{A = 55.050}$. Performing a *LinReg* T-Test on this data tells us that $r = 0.976 \implies \boxed{B = 0.976}$. It is a known rule within bivariate statistics that the sum of all the residuals of a least squares regression line is 0. Therefore $\boxed{C = 0}$. Graphing the data or trying to approximate a nonlinear relation equation between the length and the amount of times, gives that the amount of likes is always approximately $2(length)^2$. This shows a power model, and the amount of letters in power, is $5 \implies \boxed{D = 5}$.
Our final answer is $5 + 0.976 + \frac{0}{55.050} \implies \boxed{5.976}$.

9. Using *normalcdf*, we calculate *normalcdf*$(0, 35, 65, 15)$, which gives us that $\boxed{A = 0.02}$. Next, calculating normalcdf(100, 120, 65, 15) gives us that $\boxed{B = 0.01}$. The Z-Score is calculated as the difference between the observed value and the mean, divided by the standard deviation. Plugging in those values here results in $\frac{-22-65}{15} \implies \boxed{C = -5.80}$. Finding the proportion of students who scored from a 90 to a 120 can be found using *normalcdf*$(90, 120, 65, 15)$, which is 0.0477. Multiplying this proportion by the number of students, 200, yields 9.5334, and by rounding, $\boxed{D = 10}$.
Our final answer is $0.02(-5.8) + 0.01(10) \implies \boxed{-0.016}$.

10. Since, by definition, the area under a pdf function is equal to 1, the equation $y = 2x$ creates a triangle with area 1 on the interval $[0, A]$, with base A, and length 2A. Using $\frac{1}{2}bh$, $\boxed{A = 1}$. Since X is a continuous random variable, the probability of X taking on a single value is 0, so $P(X = 0) + P(X = 0.5) = 0 \implies \boxed{B = 0}$. The median can be found by splitting the triangle in half, where the left side is a smaller triangle and the right side is a trapezoid. This smaller triangle has base x, and height 2x (from the equation $y = 2x$), so area x^2. The trapezoid has bases $2x$ and 2, and height of $1 - x$, so area $1 - x^2$. Since the two shapes have to have the same area, $x = 0.707 \implies \boxed{C = 0.707}$. $P(X > 0.75 \mid X < 0.99) = \frac{P(0.75<X<0.99)}{P(X<0.99)}$. $P(0.75 < X < 0.99)$ creates a trapezoid with bases 1.5 and 1.98, with height 0.24, which gives an area of 0.4176. $P(X < 0.99)$ creates a triangle with base 0.99 and height 1.98, which gives an area of 0.9801. $\frac{0.4176}{0.9801} = 0.4261$. $P(X < 0.88 \mid X > 0.3) = \frac{P(0.3<X<0.88)}{P(X>0.3)}$. $P(0.3 < X < 0.88)$ creates a trapezoid with bases 0.6 and 1.76, and height 0.58, which gives an area of 0.6844. $P(X > 0.3)$ creates a trapezoid with bases 2 and 0.6, and height 0.7, which gives an area of 0.91. $\frac{0.6844}{0.91} = 0.7521$. $0.4261 \times 0.7521 = 0.320 \implies \boxed{D = 0.320}$.
Our final answer is $1^{0+0.707} \times 0.320 \implies \boxed{0.320}$.

11. To start solving each of the parts, one must find out how many people take each combination of Calculus, Statistics, and Physics. Drawing a Venn diagram using the information found in the question gives the following:



Using this, we can create a system of equations:

$$\begin{aligned} a + c + d &= 72 \\ c + 3b + 8 &= 57,\ so\ c + 3b = 49 \\ b + d + 15 + 8 &= 53,\ so\ b + d = 30 \\ a + 2b + 23 &= 40,\ so\ a + 2b = 17 \end{aligned}$$

Adding equation 2 and 3 gives $c + 4b + d = 79$, and subtracting that from equation 1, gives $a - 4b = -7$. Adding that to 2 times equation 4 gives $3a = 27$, and $a = 9$. $b = 4$, $2b = 8$, $c = 37$, and $d = 26$ by

using the value of a in all the equations in the system above. $a = 9 \implies \boxed{A = 9}$. Adding all the values in the Venn diagram gives 107, and subtracting that from the 112 total seniors gives $5 \implies \boxed{B = 5}$. $P(3\ classes \mid takes\ Calculus) = \frac{8}{40} \implies \boxed{C = 0.20}$, because everyone who takes 3 classes takes Calculus. $P((takes\ Calculus \cup takes\ Physics\ and\ Statistics\ only) \mid 2\ classes) = 1 \implies \boxed{D = 1}$, because the union contains everyone who takes 2 classes, according to the Venn diagram.
Our final answer is $9 + 5 + 0.20 + 1 \implies \boxed{15.20}$.

12. The Z value for a 95% confidence interval is 1.96. Using $z\frac{\sigma}{\sqrt{n}}$ to find the uncertainty and multiplying that by 2, we get that $\boxed{A = 1.26}$. Using $InvNorm$, we find that the Z value for a 99.9% confidence interval is 3.2905. Using $z\frac{\sigma}{\sqrt{n}}$ to find the uncertainty and multiplying that by 2, we get that $\boxed{B = 2.11}$. Solving $z\frac{2.27}{\sqrt{50}} = 0.4$ gives us a z value of 1.246, which we find corresponds to a confidence % of 78.72, so $\boxed{C = 78.72}$. Solving $0.2 = 1.96\frac{2.27}{\sqrt{n}}$ results in a n value of 494.8845, which, when rounded to a whole numbered sample size, yields $\boxed{D = 495}$.
Our final answer is $1.2584 + 2.1127 + 78.72 + 495 \implies \boxed{577.09}$.

13. $\frac{2}{9} \cdot \frac{1}{5} \cdot \frac{7}{10} \cdot \frac{4}{15} = \frac{28}{3375} \implies \boxed{A = 0.008}$. $\frac{7}{9} \cdot \frac{4}{5} \cdot \frac{7}{10} \cdot \frac{11}{15} = \frac{1078}{3375} \implies \boxed{B = 0.319}$. $\frac{2}{9} \cdot \frac{4}{5} \cdot \frac{3}{10} \cdot \frac{11}{15} = \frac{44}{1125} \implies \boxed{C = 0.039}$. $\frac{7}{9} \cdot \frac{4}{5} \cdot \frac{7}{10} \cdot \frac{4}{15} + \frac{7}{9} \cdot \frac{4}{5} \cdot \frac{3}{10} \cdot \frac{11}{15} + \frac{7}{9} \cdot \frac{1}{5} \cdot \frac{7}{10} \cdot \frac{11}{15} + \frac{2}{9} \cdot \frac{4}{5} \cdot \frac{7}{10} \cdot \frac{11}{15} = \frac{2863}{6750} \implies \boxed{D = 0.424}$.
Our final answer is $\frac{0.008(0.319)}{0.039(0.424)} \implies \boxed{0.154}$

14. Statement A is false. A Bernoulli trial is one where the probability of success (and failure) is constant, each and every time the experiment is conducted. Statement B is false. The equation that represents Bayes' theorem is slightly different from what is written in the problem; it actually states that $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$. However, this does indeed give us the probability of event A occurring given that event B occurs, as said in the statement. Statement C is true. It is impossible to completely remove bias from all aspects of an experiment. Statement D is false. The standard deviation and interquartile range are measures of spread, but the median is a measure of center, and the upper quartile is neither a measure of spread or measure of center. Finally, the number of assumptions/conditions for a Bernoulli trial is 3, which are the existence of only two possible outcomes, a fixed probability of each outcome occurring (p and $1 - p$), and complete independence between each trial. Thus, the final answer would be $(\frac{3^4}{2})^2$, which is equal to $\boxed{1640.250}$.

15. $\frac{13}{52} \cdot \frac{12}{51}$ gives us $\boxed{A = \frac{1}{17}}$. $\frac{12}{52} \cdot \frac{40}{51}$ gives us $\boxed{B = \frac{40}{221}}$. Since there is only one King of Hearts in a normal deck, $\boxed{C = 0}$. $\frac{26}{52} \cdot \frac{2}{51}$ gives us $\boxed{D = \frac{1}{51}}$.
Our final answer is $\frac{1}{17} \cdot \frac{40}{221} \cdot \frac{1}{\frac{1}{51}} + 0 = \boxed{\frac{120}{221}}$.