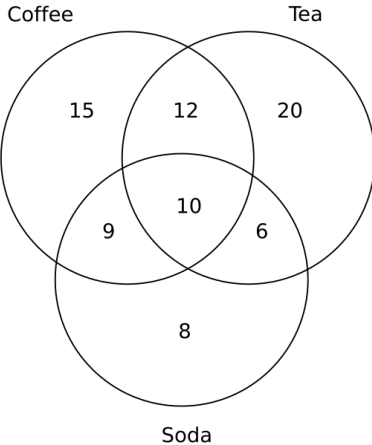
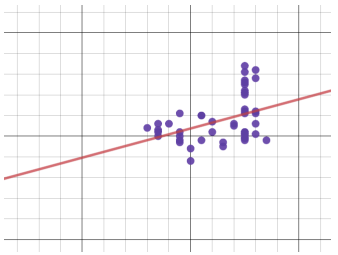
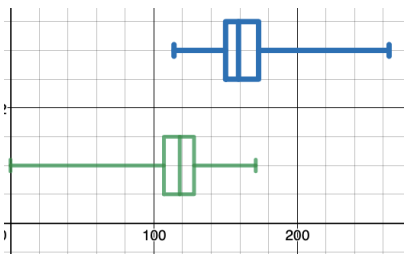
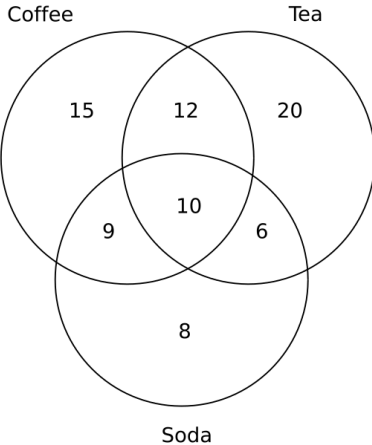
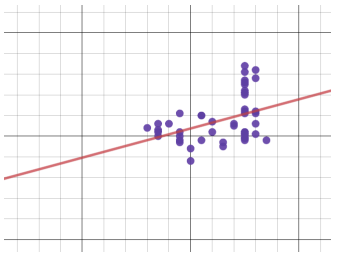
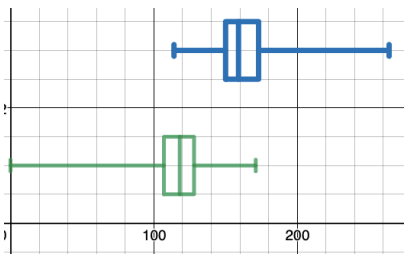


AQA A-Level Mathematics Warmup - Paper 1 2019

<p>What is the difference between the population correlation coefficient and Pearsons Product Moment Correlation Coefficient?</p>	<p>Determine the number of real roots of the quadratic equation $3x^2 + 2x - 5 = 0$.</p>	<p>Let $X \sim B(15, 0.3)$, calculate</p> <p>a) $P(X = 4)$ b) $P(X \leq 11)$ c) $P(X > 5)$</p>	<p>Find the equation of the tangent to the circle $x^2 - 6x + y^2 - 4y = 0$ at the point $(5, 5)$. Find also where this tangent intersects the x- axis.</p>	<p>Two events A and B are independent if</p>
	<p>Using the Venn diagram to the left, What is the probability a randomly chosen person:</p> <p>a) Likes coffee? b) Likes tea and soda? c) Likes coffee or tea but not both? d) Likes soda given they like coffee?</p>		<p>If $X \sim B(n, p)$ then when can this distribution be approximated by a normal distribution? And what are the mean and variance of this approximation?</p>	<p>Find the area between the curves of $y = \cos(x)$ and $y = \sin(x)$ over the interval $\left[0, \frac{\pi}{2}\right]$.</p>
<p>What is a convex curve?</p>	<p>For a savings account subject to compound interest the rate at which amount in the account grows is directly proportional to the amount in the account at a given time. Formulate a differential equation for this situation.</p>	<p>How would you describe the correlation in the above scatter plot?</p>	<p>Prove $\sin(2x) = 2 \sin(x)\cos(x)$</p>	<p>Use the Newton-Raphson method with $x_0 = 1.5$ to find the approximations x_1 and x_2 to the solution of $e^{\sin(x)} + 2x - 4 = 0$.</p>
<p>What is the median? Name some advantages and disadvantages to using the median as a statistic.</p>	<p>Evaluate $\frac{dy}{dx}$ for the implicitly defined function $3xy + 3x^2 = 8y$ at the point $(2, 4)$</p>	<p>For a normal distribution X, complete the following statements:</p> <ol style="list-style-type: none"> The points of inflection are standard deviation away from the mean. Total area under the curve is ~..... % of values lie within σ of the mean. ~ of values lie within 3σ of the mean. $P(X > \mu + a) = P(X < \dots)$ for any constant a. 	<p>Find the Cartesian form of the parametric equation given by $x = 2 + \sin(\theta)$ and $y = 3 + \cos(\theta)$.</p>	<p>Let $X \sim N(65, 4^2)$, calculate $P(54 \leq X \leq 72)$.</p>
<p>What is the median? Name some advantages and disadvantages to using the median as a statistic.</p>	<p>Evaluate $\frac{dy}{dx}$ for the implicitly defined function $3xy + 3x^2 = 8y$ at the point $(2, 4)$</p>	<p>For a normal distribution X, complete the following statements:</p> <ol style="list-style-type: none"> The points of inflection are standard deviation away from the mean. Total area under the curve is ~..... % of values lie within σ of the mean. ~ of values lie within 3σ of the mean. $P(X > \mu + a) = P(X < \dots)$ for any constant a. 		<p>The box plots to the left display data concerning CO₂ emissions of cars registered in 2002 (top) and registered in 2016 (bottom). Compare these emissions.</p>

AQA A-Level Mathematics Warmup - Paper 1 2019

<p>The population correlation coefficient ρ describes how correlated two variables are. Pearson's Product Moment Correlation Coefficient, r, is a statistics that estimates ρ.</p>	<p>Discriminant is $b^2 - 4ac = 64 > 0$ and so there are two real roots.</p>	<p>a) 0.2186 b) 0.9999 c) 0.2784</p>	<p>Circle has centre (3,2) and radius $\sqrt{13}$. Equation of tangent at (5,5) is $2x + 3y = 25$. The tangent meets the x-axis at (12.5,0).</p>	<p style="text-align: center;">$P(A B) = P(A)$</p>
	<p>a) $\frac{46}{80}$ b) $\frac{16}{80}$ c) $\frac{50}{80}$ d) $\frac{19}{46}$</p>		<p>n is large. Mean: np Variance: $np(1 - p)$</p>	$\int_0^{\pi/4} \cos(x) - \sin(x) \, dx + \int_{\pi/4}^{\pi} \sin(x) - \cos(x) \, dx$ $= 2\sqrt{2}$
<p>Using partial fractions</p> $4 \ln x + 3 - 2 \ln x + 1 $	<p style="text-align: center;">Weak positive correlation.</p>	<p>Consider the LHS</p> $\begin{aligned} \sin(2x) &= \sin(x + x) \\ &= \sin(x)\cos(x) + \cos(x)\sin(x) \\ &= 2 \sin(x)\cos(x) \end{aligned}$	<p>Let $f(x) = e^{\sin(x)} + 2x - 4$ then $f'(x) = e^{\sin(x)} \cos(x) + 2$. The N-R iteration is</p> $x_{n+1} = x_n - \frac{e^{\sin(x_n)} + 2x_n - 4}{e^{\sin(x_n)} \cos(x_n) + 2}$ <p>$x_1 = 0.7191445372$ and $x_2 = 0.9013623019$.</p>	
<p>A curve is convex if any line segment joining two points on the curve stays above the curve.</p>	$\frac{dM}{dt} = kM$	<ol style="list-style-type: none"> 1) The points of inflection are 1 standard deviation away from the mean. 2) Total area under the curve is 1. 3) $\sim .68$ % of values lie within σ of the mean. 4) $\sim .99.8$ of values lie within 3σ of the mean. 5) $P(X > \mu + a) = P(X < \mu - a)$ for any constant a. 	$(x - 2)^2 + (y - 3)^2 = 1$	<p style="text-align: center;">0.9569</p>
<p>The median is a measure of central tendency. It is the middle value when data is listed in size order.</p>	$\frac{dy}{dx} = \frac{4x + 3y}{8 - 3x}$ <p>At (2,4), $\frac{dy}{dx} = 10$</p>		<p>Emissions are in general significantly less in 2016 than they were in 2002 as the median is lower. The spread of emissions is also slightly less as evidenced in the IQR. In 2016 there were also cars with zero emissions.</p>	