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Problem-solving

BRONZE:

Body weight, x (kg)	53.6	0.01	250	519	3.38	0.55	1.45
Brain weight, y (g)	450	0.48	510	680	42.5	3.2	14.9

$\Rightarrow r = 0.870$ (3.sf)

$H_0: \rho = 0$, $H_1: \rho > 0$ (positive correlation; one-tailed test; SL: 0.05)

$\rightarrow p = 0.8745 > 0.870$. Accept H_0: there is no evidence of positive correlation between x and y at the 0.5% level of significance.

SILVER:

a) The data points do not fit a straight line.

b) $r = 0.992$ (3.sf)

Temperature, t (°C) $= x$	3	4	7	9	10	12
Growth rate, g	1.09	1.28	1.91	2.75	3.64	5.61

$y = \log g \Rightarrow 0.0374 \rightarrow 0.1072 \rightarrow 0.2810 \rightarrow 0.4393 \rightarrow 0.5611 \rightarrow 0.7490$

c) $H_0: \rho = 0$, $H_1: \rho > 0$ (positive correlation; one-tailed test; SL: 0.05)

$p = 0.7293 < 0.992$. Reject H_0: there is evidence of positive correlation at the 5% level of significance.

GOLD:

a) $\bar{x} + 2\sigma \Rightarrow \bar{x} = \frac{\sum x}{n} = \frac{63+65+69+62+86+68+73}{7} = 69.4$ (Spanish result) $\quad \sigma = \sqrt{\frac{\sum fx^2}{n} - (\bar{x})^2} = 7.61$

$\Rightarrow 69.4 + 2(7.61) = 84.62 < 86$

b) $H_0: \rho = 0$ $H_1: \rho \neq 0$ (two-tailed test, SL: 0.05)

$r = -0.2313$. $n = 7$.

$\Rightarrow p = -0.6994 < -0.2313$. Accept H_0: there is no evidence of correlation between the marks, so claim would be incorrect.

Remove E from the data:

$r = 0.8185$, $n = 6$

$\Rightarrow p = 0.7293 < 0.8185$. Reject H_0: there is evidence of correlation between marks, so claim would be correct.

The removal of the outlier would affect the conclusion.

c) Point E is likely to be an incorrect data entry. It would be reasonable to remove this data point and conclude that there is evidence of correlation between the marks in two tests.