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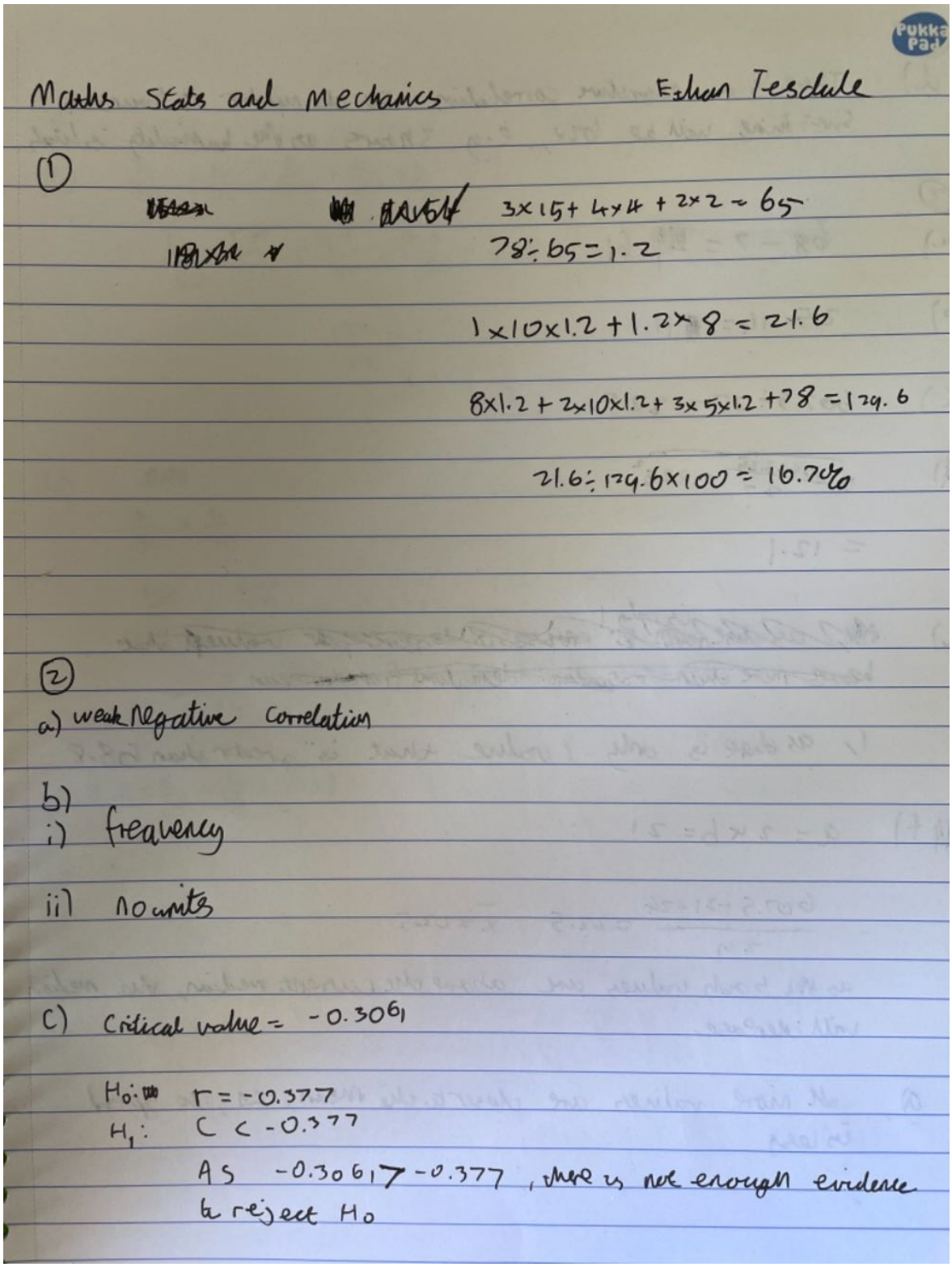
A Level Maths Mock Applied (Paper 2)

Word count: 0



d) There is a negative correlation, so the number of hours of sunshine will be low, e.g 3 hours as the humidity is high

(3)

a) $68 - 7 = 61$

b) $25 - 14 = 11$

c) $607.5 \div 27 = 22.5$

d) $\sqrt{\frac{17623.25}{27} - 22.5^2}$

$= 12.1$

e) ~~2 as there is only 1 value that is greater than 3 standard deviations from the mean~~

1, as there is only 1 value that is greater than 58.8

f) $a = 2 \times b = 21$

$\frac{607.5 + 21 + 24}{29} = 22.5 \quad \bar{x} = 22.5$

as the both values are above the current median, the median will increase

g) more values are closer to the mean, so, the spread is less

④

a) $\frac{k}{10} + \frac{k}{20} + \frac{k}{30} + \frac{k}{40} + \frac{k}{50} = 1$

$\frac{5k}{50} + \frac{2.5k}{50} + \frac{5/3\,k}{50} + \frac{5/4\,k}{50} + \frac{k}{50} = 1$

$\frac{137}{12}k = 50$

$k = \frac{600}{137}$

b)

$\frac{k}{50} \times \frac{k}{30}$

$\frac{\frac{600}{137}}{50} \times \frac{\frac{600}{137}}{30} = 0.0128$

c) $a_n = \frac{k}{10} + d(n-1)$

$a_n = \frac{k}{10} + [redacted](n-1)$

$a_n =$

(5) $p(x \geq 3)$

a) $x \sim B(9, 1/6)$

$(px \geq 3) = 1 - p(x \leq 2)$

$= 0.178$

b) $0.178^1 \times 0.822^4 = 0.0812$

c) H_0 : $p = 1/6$

H_1 : $p > 1/6$

$x \sim B(35, 1/6)$

$p(x \geq 7/11) = p(x \leq 10)$

$=$

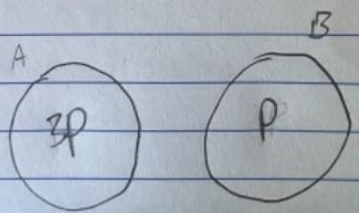
$0.023 < 0.05$

There is sufficient evidence to reject H_0. Rowan is more successful

(6)

i)

a)



b) all positive real values

ii)

a) They are not, as there is a probability that C occurs given that D occurs. Knowing that P(C|D) occurs changes P(C)

b)

$P(C' \cap D') = P(C'|D') \times P(D')$

$\frac{7}{10} = P(C'|D') \times P(D')$

$P(C \cap D) = \frac{1}{2} \times P(C)$

$P(C) \times P(D|C) = \frac{1}{2} P(C)$

$P(C) \times \frac{P(D \cap C)}{P(C)} = \frac{1}{2} P(C)$

Pukka Pad

①

a) $v = 7t - 2t^2 + 14 - 4t$

$v = -2t^2 + 3t + 14$

$\frac{dv}{dt} = -4t + 3$

$0 = -4t + 3$

$4t = 3$

$t = 3/4\,s$

b) $s = -2/3\,t^3 + 3/2\,t^2 + 14t + C$

$\frac{d^2v}{dt^2} = -4\ ms^{-1}$

$4 \times 3/4 = 3\ m$

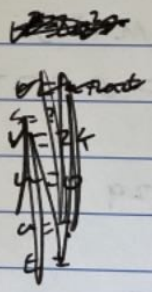
(2)

a) 2×60×16 = 1920 m

15×60×16 = 14400 m 10×60×16 = 9600

1920 + 14400 + 9600 = 25920 M

b)



24×60×2 = 2880

25920 − 2880 = 23040 m

23040 = 24 × t

t = 960 s

960 + 2 = 962

962 ÷ 60 = 16 minutes

c) There are no other trains on the track

③

a) $R = 20 \times \frac{12}{15} + 30 \times \frac{5}{13}$

$R = 27.5N$

b) $F = 30 \times \frac{12}{13} + \frac{5}{13} \times 20$

$F = 35.38$

$35.38 = \mu 27.5 \quad F = \mu R$

$\mu = 1.29$

$F = 30 \times \frac{12}{13} - \frac{5}{13} \times 20$

$F = 20$

$20 = \mu 27.5$

$\mu = 0.727$

$0.727 \leq \mu \leq 1.29$

c) $R = 20 \times \frac{12}{15}$

$F = \mu R \quad F = \frac{1}{3} \times 16$

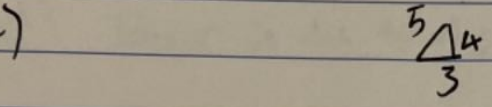
$F = 16/3$

$20 \times \frac{5}{13} - 16/3 = \frac{20}{9.8} \times a \quad F = ma$

$a = 1.16 ms^{-2}$

④

a)



$4/5 = \frac{4a}{H}$

$H = 5a \quad AC = 5a$

m(A) ↺:

$3a \times Mg \times 3/5 = N \times 5a \times 4/5$

$\frac{3a \times Mg \times 3/5}{5a \times 4/5} \rightarrow N$

$N = \frac{9Mg}{20}$

b) $N = F \quad F = MR$

$R = Mg$

$\frac{9Mg}{25} = \mu \times Mg$

$\mu = 9/25$

⑤ a) $s = 25$

$u = u\sin 45$

$v = ?$

$a = +9.81$

$t = ?$

$-25 = u\sin 45\, t + \frac{1}{2} 9.81 t^2$

$\rightarrow$

$t = 100 \div u\cos 45$

$-25 = u\sin 45 \times \frac{100}{u\cos 45} + -4.9 \times \left(\frac{100}{u\cos 45}\right)^2$

$-25 = 100\tan(45) + -4.9 \times \frac{10000}{u^2\cos^2 45}$

$-125 = -4.9 \times \frac{10000}{u^2\cos^2 45}$

$u^2\cos^2 45 = 392$

$u^2 = 784$

$u = 28$

b) $s = ?$

$u = 28\sin 45$

$v = 0$

$a = -9.81$

$t = ?$

$0^2 = 28\times\sin 45^2 + 2\times -9.8 \times s$

$s = 0.714$

$0.714 + 25 = \underline{25.7\,m}$

c) u would be lower

d) factor in the spin of the ball