

AP MATHEMATICS
GRADE 12
PRELIM EXAMINATION
PAPER 2
28 July 2016

QUESTION 1

1.1 (a) $z = \frac{90-100}{15} \checkmark$ and $z = \frac{120-100}{15} \checkmark$
 $= -0,67 \checkmark$ $= 1,33 \checkmark$

$$P(-0,67 < z < 1,33)$$
$$= 0,2486 + 0,4082$$
$$= 0,6568 \checkmark \checkmark$$

(b) $P(0 < z < 2,05) = 0,48 \checkmark \checkmark$

$$\frac{p-100}{15} = 2,05 \checkmark \checkmark$$
$$p = 130,75 \checkmark \checkmark$$

1.2 $z \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} < 0,05 \checkmark$

$$1,645 \sqrt{\frac{0,1(0,9)}{n}} < 0,05 \checkmark$$

$$\sqrt{\frac{0,09}{n}} < 0,03039 \checkmark$$

$$\therefore n \geq 98 \checkmark \checkmark$$

(6)

[20]

QUESTION 2

$$2.1 \quad \int_0^4 kt(16-t^2) dt = 1 \quad \checkmark \checkmark$$

$$k \int_0^4 (16t - t^3) dt = 1 \quad \checkmark \checkmark$$

$$k \left[\frac{16t^2}{2} - \frac{t^4}{4} \right]_0^4 = 1$$

$$k \left(8(4)^2 - \frac{4^4}{4} \right) = 1 \quad \checkmark \checkmark$$

$$k = \frac{1}{64}$$

$$2.2 \quad P(0 \leq t < 1) = \frac{1}{64} \int_0^1 (16t - t^3) dt \quad \checkmark \checkmark \quad (8)$$

$$= \frac{1}{64} \left(8(1)^2 - \frac{1^4}{4} \right) \quad \checkmark \checkmark$$

$$= 0,1211 \quad \checkmark \checkmark$$

$$2.3 \quad \frac{1}{64} \int_0^M (16t - t^3) dt = 0,5 \quad \checkmark \quad (6)$$

$$8M^2 - \frac{M^4}{4} = 32 \quad \checkmark$$

$$M^4 - 32M^2 + 128 = 0 \quad \checkmark$$

$$M^2 = 16 \pm 8\sqrt{2} \quad \checkmark$$

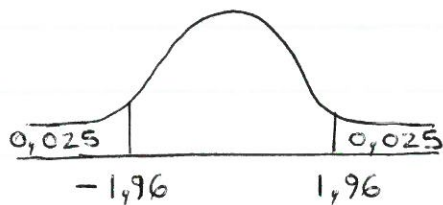
$$M = 2,1648 \quad \checkmark \checkmark$$

(6)
[20]

QUESTION 3

3.1 $H_0 : \mu = 21,2$ ✓

$H_1 : \mu \neq 21,2$ ✓



Reject H_0 if:
 $z < -1,96$ or $z > 1,96$ ✓

Test Statistic: $z = \frac{19,4 - 21,2}{\frac{7,3}{\sqrt{90}}}$ ✓
 $= -2,3392$ ✓

Since $z < -1,96$ we reject H_0 at 5% level of significance and suggest sufficient evidence to reject Stephanus' claim. ✓✓

(8)

3.2

z $< -2,3392$

z $< -2,34$ ✓

$P(z < -2,34) = 0,5 - 0,49036$ ✓
 $= 0,00964$ ✓

∴ At a 1,928% level of significance. ✓✓

(6)
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QUESTION 4

$$4.1 \quad P(X=x) = \binom{18}{x} (0,15)^x (0,85)^{18-x}$$

$$P(X=3) = \binom{18}{3} (0,15)^3 (0,85)^{15} \checkmark\checkmark\checkmark$$

$$= 0,2406 \checkmark\checkmark\checkmark$$

(6)

$$4.2 \quad P(R=2) = \frac{\binom{6}{2} \binom{2}{2}}{\binom{8}{4}} \checkmark\checkmark\checkmark$$

$$= 0,2143 \checkmark\checkmark\checkmark$$

(6)

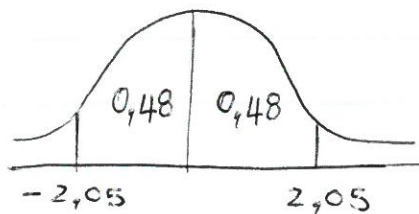
[12]

QUESTION 5

$$5.1 \quad (a) \quad \frac{52+68}{2} = 60 \checkmark\checkmark$$

(2)

(b)



$$-2,05 = \frac{60-68}{\frac{\sigma}{\sqrt{80}}} \checkmark\checkmark$$

$$2,05 \times \frac{\sigma}{\sqrt{80}} = 8 \checkmark\checkmark$$

$$\sigma = 34,9045$$

(7)

$$5.2 \quad P(B|A) = \frac{P(B \cap A)}{P(A)}$$

$$= \frac{0,9 \times 0,85}{(0,9 \times 0,85) + (0,1 \times 0,3)} \checkmark\checkmark$$

$$= \frac{0,765}{0,795}$$

$$= 0,9623 \checkmark$$

(4)

(4)

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QUESTION 6

$$6.1 \quad (a) \quad 7! \checkmark \times (2!)^7 \checkmark \checkmark$$

$$= 5040 \times 128$$

$$= 645120 \quad \checkmark$$

(4)

$$(b) \quad 7! \checkmark \times 7! \checkmark \times 2 \checkmark$$

$$= 50803200 \quad \checkmark$$

(4)

$$6.2 \quad (a) \quad \binom{7}{2} = 21 \quad \checkmark \checkmark$$

(2)

$$(b) \quad \binom{4}{4} \checkmark + \binom{5}{4} \checkmark$$

$$= 1 + 5$$

$$= 6 \quad \checkmark \checkmark$$

$$(c) \quad \binom{3}{2} \checkmark \times \binom{6}{2} \checkmark + \binom{3}{3} \checkmark \times \binom{6}{1} \checkmark$$

(4)

$$= 45 + 6$$

$$= 51 \quad \checkmark$$

(5)
[19]