S475/1

**Subsidiary Mathematics**

December 2020

Paper 1

INTERNAL ASSESSMENT EXAMINATIONS

Uganda Advanced Certificate of Uganda.

**Subsidiary Mathematics**

**MARKING GUIDE**

**SECTION A: (40 MARKS)**

1. 2 – 12*x* + 4 = 0

= = 6

= = = 2 **B1 for both**

Required: – ( + )*x +*  . = 0

+ = ( + ) **M1**

= 2(6)

= 12 **A1**

. = (

=

= 8 **M1**

**–** 12*x* + 8 = 0 **A1**

1. (i) P(M) = P(MnN) + P(Mn)

P(MnN) = P(M) – P(Mn) **M1 for Substituting**

**in formula**

= -  **A1**

**=**

(ii) P = **M1**

= **B1**

**= A1**

1. a + 3d = 10 …………………… (1) **M1**

a + 5d = 14 …………………… (2) **M1**

(2) – (1)

2d = 4 d = 2

a = 10 – 3 x 2

a = 4

S10 = **A1 for a**

= 5 x 26

**= 130 A1**

1. Weighted index =

For Kampala = **M1 B1**

**= 125.5**  **A1**

For Mbarara = **M1**

= **121.5 A1**

1. 3x – 5sec*x* + 1 = 0

3(*x* – 1) – 5sec*x* + 1 = 0 **M1**

3*x* – 5sec*x* - 2 = 0 (-6, 1)

3sec*x* (sec*x* – 2) + 1(sec*x* – 2 ) = 0 **M1**

(sec*x* – 2) (3secx + 1) = 0

Sec*x* = 2 or secx = A1

Cos*x* = cos*x* = -3(Discand)

*x* = =

1. If a and b are perpendicular

Then a . b = 0 **M1**

(3x + 9j). ( – 12j) = 0 **M1**

3x - 108 = 0 **M1**

3x = 108 **B1**

**x = 36 A1**

1. X N(,

= 60, = 25, = 5

( x 52.5) = P **M1**

= 0.4332 + 0.5 **B1**

= 0.9332

%percentage = 0.9332 x 100

**= 93.32%**

T

S

2N

5N

300

6N

U

Q

R

P

4N



= **m1**

= **m1**

**= A1**

Magnitude = + (

**=**

**= 11.0646 B1**

**= =** 61.200 above positive Horizontal **B1**

**SECTION B: 60 MARKS**

Choose only **4** questions

1. = 68 = = 4

(a) **M1**

= P( Z1.75 **M1**

1.75

P( x ) = 0.5 – P(0 1.75)

= 0.5 – 0.4599

**= 0.0401 A1**

(b) P(65 = **M1M1**

= P(0.75) **M1M1**

0 1

**B1**

P(65 = P(0 + P(0) **m1m1**

= 0.2734 + 0.3413  **m1m1**

**= 0.6147** **A1 = (15 marks)**

1514 1 g5555 15i

1. (a) y = 3 – 2x

**= -2 – 2*x***

For turning points = -2 – 2*x* = 0

x = -1 **m1**

y = 3 – 2(-1) – ( = 4

Turning point is (-1, 4)

**A1**

**LHS** **x = 1** **RHS**

+ 0 \_\_\_\_\_ **m1**

**max**

max

11. (a)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **J1(k)** | **J2(y)** | **Rx** | **Ry** | **d** |  |
| 72 | 50 | 2.5 | 5 | -2.5 | 6.25 |
| 50 | 40 | 5.5 | 7.5 | -2 | 4 |
| 50 | 62 | 5.5 | 4 | 1.5 | 2.75 |
| 55 | 70 | 4 | 1 | 3 | 9 |
| 35 | 40 | 8 | 7.5 | 0.5 | 0.25 |
| 38 | 48 | 7 | 6 | 1 | 1 |
| 82 | 67 | 1 | 2.5 | -1.5 | 2.25 |
| 72 | 67 | 2.5 | 2.5 | 0 | 0 |
| 25 |

**B1 for Rx**

**B1 for Ry**

**B1 for d**

**B1 for**

**B1 for ∑**  
 = 1 -

= 1 - **M1 M1**

= **0.70 A1**

**There is a high positive correction between J1 and J2 B1 = (15 marks)**

(b) When x = 0, y= 3

When y = 0, + 2x - 3 = 0 (3, -1)

+ 3x – x – 3 = 0

x(x + 3) – 1(x + 3) = 0

(x + 3) (x – 1) = 0

x =-3 **OR** x = 1

Intercepts are (-3, 0) (1, 0) and (0, 3) **B1**

-4 -3 -2 -1 1 2 3 4 y = 0

⋆

⋆

*Y* = 3 – 2x – x2

4

3

2

1

A = +

= dx + )dx **m1 m1**

= 3x = - + 3x - - **A1 A1**

= + **m1 m1**

= + **m1 m1**

**= square units.** **A1**

12. 3() – 8() + 4 = 0

3( – 8() + 4 = 0 **B1 for (2x)2**

3 – 8y + 4 = 0 **B1 quadratic eqn**

3 – 2y – 6y + 4 = 0 **M1**

y(3y – 2) – 2(3y – 2) = 0 **B1**

(y – 2) (3y – 2) = 0

y = 2 or y =

When y = 2 **M1**

= 2 x = 1 **A1**

When y =

**= = X = = 0.585 M1 A1**

b(i) = (p + q) (p + q) **m1A1** correct examples

= + 2pq +

= 20 + 2pq **m1 substitution**

2pq = 25 – 20 **A1 pq =**

=

Pq =

(ii) Sum of roots p +q = 5

Product of roots pq =

– x + = 0 **B1 Both sum and**

**product**

**2x – 10x + 5 = 0 A1 equation.**

13. (a) 0.02 + 0.34 + d + 0.41 + 0.10 + 0.06 = 1 **M1 for adding product**

d + 0.93 = 1

d = 1 – 0.93 **B1 equating to I**

**= 0.07 A1 for d = 0.07**

(b)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | P(x = x) | XP(x = x) |  | P(x = x) |
| 0 | 0.02 | 0.00 | 0 | 0.00 |
| 1 | 0.34 | 0.34 | 1 | 0.34 |
| 2 | 0.07 | 0.14 | 4 | 0.28 |
| 3 | 0.41 | 1.23 | 9 | 3.69 |
| 4 | 0.10 | 0.40 | 16 | 1.60 |
| 5 | 0.06 | 0.30 | 25 | 1.50 |

B1  
 **∑(x) = ∑xp(x = x) = 2.41 A1**

(c)**Var x** = P(x = x) – ( **M1 B1**

= 7.41 – ( **B1**

= 1.6019

s.d = **M1**

**= 1.266 A1**

(d) P(x3) = 0.02 + 0.34 + 0.07 + 0.41 **M1**

**= 0.84** **A1 = (15 marks )**

14. V = 0 + 2.5 X 20 = 50m/s **M1 A1**

V = 50 + 1.4 X 50 = 120m/s **M1 A1**

0 = 120 + 15 a = 8ms-2 **M1 A1**

**V**

120

100

80

60

B2 for sketch

40

20

**A1 A1 A3**

0 10 20 30 40 50 60 70 80 90

**Time(s)**

s = A1 + A2 + A3

= ( x 20 x 50) + (50 + 120) + ( x 15 x 120) m1 m1 m1

= 500 + 4250 + 900 m1 m1 m1

**= 5650 A1 = (15 marks)**