

UPANGA MATHEMATICS ASSOCIATION - 2021
TERM THREE EVALUATION
FORM ONE M1.

SECTION 50 MARKS

Answer ALL the questions in the spaces provided.

1. All even numbers between 0 and 10 are arranged in an ascending order to form a number X and all prime numbers in the same interval are arranged in a descending order to form a number Y. Evaluate $Y - X$. (3 marks)

$$X = 2468 \quad \text{---} \quad B_1$$

$$Y = 7532 \quad \text{---} \quad B_1$$

$$Y - X = 7532 - 2468$$

$$= 5064. \quad \text{---} \quad \frac{B_1}{03}$$

2. Express as a mixed number $4.\dot{4}\dot{1}$ (3 marks)

$$\text{Let } x = 4.4141 \dots$$

$$100x = 441.4141 \dots \quad \text{---} \quad M_1$$

$$- \quad x = \quad \underline{4.4141} \quad \text{---}$$

$$99x = 437 \quad \text{---} \quad M_1$$

$$\frac{99x}{99} = \frac{437}{99}$$

$$x = 4\frac{41}{99} \quad \text{---} \quad \frac{A_1}{03}$$

3. Use squares and square root tables to evaluate, to 4 significant figures, the expression:

$$\sqrt{256.7} + (0.887)^2 \quad (4 \text{ marks})$$

$$\sqrt{256.7}$$

$$= \sqrt{2.567} \times \sqrt{100}$$

$$= 1.6022 \times 10 \quad \text{---} \quad M_1$$

$$= 16.022$$

$$(0.887)^2$$

$$= (8.87)^2 \times \left(\frac{1}{10}\right)^2$$

$$= 78.68 \times \frac{1}{100} \quad \text{---} \quad M_1$$

$$= 0.7868$$

$$= 16.0220$$

$$\underline{0.7868} \quad \text{---} \quad M_1$$

$$16.8088$$

$$= 16.81 \text{ (4sf)} \quad \text{---} \quad A_1$$

$$\underline{04}$$

4. Evaluate $\frac{-8 \div 2 + 12 \times 9 - 4 \times 6}{56 \div 7 \times 2}$

(3 marks)

$$= \frac{-4 + 108 - 24}{8 \times 2} \quad - M_1$$

$$= \frac{80}{16} \quad - M_1$$

$$= 5. \quad \underline{A_1}$$

5. Mary bought 3 plates and 2 mugs for a total of Kshs. 500. Jane bought 4 plates and 5 mugs for a total of Kshs 900, find the total cost of 1 plate and 3 mugs. (4 marks)

$$\begin{aligned} 3p + 2m &= 500 \\ 4p + 5m &= 900 \end{aligned} \quad \} - M_1 = 1(100) + 3(100)$$

$$= \text{Sh. } 400. \quad - B_1$$

$$\begin{aligned} 12p + 8m &= 2000 \\ - 12p + 15m &= 2700 \quad - M_1 \\ \hline -7m &= -700 \\ -7 & \quad -7 \end{aligned}$$

$$\begin{aligned} m &= \text{Sh. } 100. \\ n &= \text{Sh. } 100. \end{aligned} \quad \} A_1$$

6. A number m is such that when it is divided by 30, 36, and 45 the remainder is always 7, find the smallest possible value of m . (3 marks)

2	30	36	45
2	15	18	45
3	15	9	45
3	5	3	15
5	5	1	5
	1		1

$$= 180 + 7$$

$$= 187. \quad - B_1$$

3 | Page $\text{LCM} = 2^2 \times 3^2 \times 5 = 180. \quad A_1$

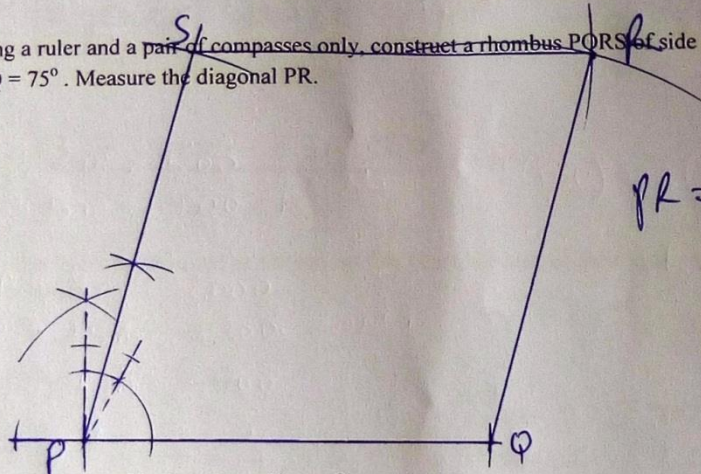
7. The area of the sector of circle radius r units is 61.6 cm^2 . If the angle subtended at the centre of the circle is 36° , determine the value of r . (Take $\pi = \frac{22}{7}$). (3 marks)

$$61.6 = \frac{36}{360} \times \frac{22}{7} \times r^2 \quad - M_1$$

$$\sqrt{r^2} = \sqrt{196} \quad - M_1$$

$$r = 14 \text{ cm.} \quad - \frac{A_1}{03}$$

8. Using a ruler and a pair of compasses only, construct a rhombus PQRS of side 7 cm and angle $SPQ = 75^\circ$. Measure the diagonal PR. (3 marks)



$$PR = 11 \pm 0.1 \text{ cm.}$$

B_1 - Constructing 75°

B_1 - Complete diagram

B_1 - PR.

03 .

9. Evaluate $\frac{3}{8}$ of $\{7\frac{3}{5} - \frac{1}{3}(1\frac{1}{4} + 3\frac{1}{3}) \times 2\frac{2}{5}\}$ (3 marks)

$$= \frac{3}{8} \text{ of } \left(\frac{38}{5} - \frac{1}{3} \left(\frac{55}{12} \right) \times \frac{12}{5} \right)$$

$$= \frac{3}{8} \text{ of } \left(\frac{38}{5} - \frac{55}{36} \times \frac{12}{5} \right) \quad - M_1$$

$$= \frac{3}{8} \text{ of } \left(\frac{38}{5} - \frac{11}{3} \right)$$

$$= \frac{3}{8} \text{ of } \frac{59}{15} \quad - M_1$$

$$= 1 \frac{19}{40} \quad - \frac{A_1}{03}$$

10. A Kenyan bank buys and sells foreign currencies as shown below:

	Buying (Kenya Shillings)	Selling (Kenya Shillings)
1 Euro	117.30	117.40
1 Chinese Yuan	15.10	15.20

A Chinese travelling from Paris arrives in Kenya with 10 000 Euros. She converts all the money into Kenyan Shillings at the bank. While in Kenya she spends Ksh 835 560 and converts the remaining Kenya shillings to Chinese Yuan at the bank. Calculate the amount in Chinese Yuan that she receives. (3 marks)

$$\begin{aligned}
 &= 10,000 \times \text{Sh. } 117.30 - M_1 = 22,200 \text{ Yuan. } \frac{M_1}{03} \\
 &= \text{Sh. } 1,173,000 \\
 &= \frac{1,173,000 - 835,560}{15.20} - M_1
 \end{aligned}$$

11. A mother is six times as old as her son. In five years, the sum of their ages will be 45. Calculate their present ages. (3 marks)

$$\begin{aligned}
 \text{Let son's age} &= x & x &= 5 \text{ } - A_1 \\
 \text{Mother} &= 6x \\
 x + 5 + 6x + 5 &= 45 - M_1 & \text{Son} &= 5 \text{ yr} \\
 7x + 10 &= 45 & \text{Mother} &= 30 \text{ yr. } \frac{B_1}{03} \\
 7x &= 35
 \end{aligned}$$

12. 1,600 cm³ of fresh water of density 1g/cm³ is mixed with 1,400 cm³ of sea water of density 1.25g/cm³. Determine the density of the mixture. (3 marks)

$$\begin{aligned}
 \text{Mass of mix} &= (1600 \times 1) + (1400 \times 1.25) - M_1 \\
 &= 3350 \\
 \rho \text{ of mix} &= \frac{3350}{1600 + 1400} - M_1 \\
 &= 1.167 \text{ g/cm}^3 \text{ or } 1\frac{7}{60} \text{ g/cm}^3 \frac{M_1}{03}
 \end{aligned}$$

13. Arrange the following fractions in ascending order.

(2 marks)

$$\frac{11}{12}, \frac{5}{6}, \frac{2}{3}, \frac{5}{12}$$

$$\left. \begin{array}{l} \frac{11}{12} \times 12 = 11 \\ \frac{5}{6} \times 12 = 10 \\ \frac{2}{3} \times 12 = 8 \\ \frac{5}{12} \times 12 = 5 \end{array} \right\} M_1$$

$$\Rightarrow \frac{5}{12}, \frac{2}{3}, \frac{5}{6}, \frac{11}{12} \quad \underline{A_1}$$

$$\underline{03}$$

14. Abel sells his car to Bill and makes a profit of 15%. Bill sells the same car to Chad at Ksh 621 000 making a loss of 10%. Determine the price at which Abel bought the car.

(3 marks)

$$\text{Bill's Bp} = \frac{100}{90} \times \text{sh. } 621,000 - M_1$$

$$= 690,000 -$$

$$\text{Abel's Bp} = \frac{100}{115} \times 690,000 - M_1$$

$$= \text{sh. } 600,000 - \underline{A_1}$$

$$\underline{03}$$

15. The exterior and the interior angles of a regular polygon are $(x+10)^\circ$ and $(3x+50)^\circ$ respectively.

Calculate the sum of the interior angles of the polygon.

(4 marks)

$$x+10+3x+50=180 - M_1 = 180(9-2) - M_1$$

$$x = 30^\circ$$

$$n = \frac{360^\circ}{40^\circ} - M_1 = 1260^\circ - \underline{A_1}$$

$$= 9$$

$$\underline{04}$$

16. A school with 840 students has enough food to last them 91 days. If an extra 70 students join the school, how many days less will the food last?

(3 marks)

$$= \frac{840}{910} \times 91 - M_1 = 91 - 84 - M_1$$

$$= 7 \text{ less days} - \underline{A_1}$$

$$\underline{03}$$

SECTION II (50 Marks)

Answer ONLY FIVE Questions in the spaces provided.

17. Kinyua spent $\frac{1}{4}$ of his net January salary on school fees. He spent $\frac{1}{4}$ of the remainder on electricity and water bills. He spent $\frac{1}{9}$ of what remained on transport. If he finally had sh.3,400, calculate

a) His net January salary.

(4 marks)

School fees = $\frac{1}{4}$.

Elec and water = $\frac{1}{4} \times \frac{3}{4} = \frac{3}{16}$ M1

Remainder = $1 - \left(\frac{1}{4} + \frac{1}{4}\right) = \frac{1}{2}$

Remainder = $1 - \left(\frac{1}{4} + \frac{3}{16}\right) = \frac{9}{16}$

Salary = $\frac{2}{1} \times 3400 = \text{M1}$
= sh. 6800. - A1

Transport = $\frac{1}{9} \times \frac{9}{16} = \frac{1}{16}$ M1

b) Money spent on school fees.

(2 mark)

= $\frac{1}{4} \times 6800 = \text{M1}$
= sh. 1700 - A1

c) Money spent on transport.

(2 marks)

= $\frac{1}{16} \times 6800 = \text{M1}$
= sh. 425. - A1

d) Money spent on electricity and water bills.

(2 marks)

= $\frac{3}{16} \times 6800 = \text{M1}$
= sh. 1275. - A1
10

18. A minibus had 23 passengers at the beginning of a journey. Twelve passengers alighted at the first stop while 9 boarded. Six of those who boarded at the first stop alighted at the second stop and 12 got in. The minibus should not stop again up to the final destination. The charges from the starting point were sh. 50 up to the first stop, sh. 70 up to the second stop and sh. 85 up to the final destination.

a) How many passengers alighted at the final destination?

(2 marks)

$$= 23 - 12 + 9 - 6 + 12 \quad \text{--- M1}$$

$$= 26. \quad \text{--- A1}$$

b) How many passengers were ferried by the minibus through the journey?

(2 marks)

$$= 23 + 9 + 12 \quad \text{--- M1}$$

$$= 44. \quad \text{--- A1}$$

c) How much money was collected during the trip?

(6 marks)

Number from starting to end

$$= 23 - 12$$

$$= 11$$

$$\text{Amount} = 11 \times 85 = 935 \quad \text{--- M1}$$

$$\text{Start to 1st stop} = 12 \times 50 = 600 \quad \text{--- M1}$$

$$1^{\text{st}} \text{ to } 2^{\text{nd}} \text{ stop} = 6 \times 20 = 120 \quad \text{--- M1}$$

$$1^{\text{st}} \text{ stop to end} = 3 \times 35 = 105 \quad \text{--- M1}$$

$$\text{2nd stop to end} = 12 \times 15 = 180 \quad \text{--- M1}$$

$$= 935 + 600 + 120 + 105 + 180$$

$$= \text{sh. } 1,940. \quad \frac{\text{A1}}{10}$$

19. The ratio of Rachel's salary to Hassan's salary is 5:3. Rachel's salary rose by 12% to sh. 22,400. Hassan's salary also rose by x%. The total of their new salary was sh. 36,200.

Calculate:

a) Rachel's salary before the increase.

(2 marks)

$$= \frac{100}{112} \times \text{sh. } 22,400 \text{ — M}_1$$

$$= \text{sh. } 20,000 \text{ — A}_1$$

b) Hassan's salary before the increase.

(2 marks)

$$\frac{3}{5} \times 20,000 \text{ — M}_1$$

$$= \text{sh. } 12,000 \text{ — A}_1$$

c) Hassan's salary after the increase.

(2 marks)

$$= 36,200 - 22,400 \text{ — M}_1$$

$$= \text{sh. } 13,800 \text{ — A}_1$$

d) Percentage increase in Hassan's salary.

(2 marks)

$$= \frac{13,800 - 12,000}{12,000} \times 100 \text{ — M}_1$$

$$= 15\% \text{ — A}_1$$

e) Combined percentage increase in their salary.

(2 marks)

$$\text{Salary before} = 20,000 + 12,000$$

$$= 32,000$$

$$= \frac{36,200 - 32,000}{32,000} \times 100 \text{ — M}_1$$

$$= 13\frac{1}{8}\% \text{ — A}_1$$

20. A sales woman is paid a commission of 4 % on sale of goods worth up to Ksh 150, 000 and a commission of 7 % on sale of goods worth over Ksh 150, 000. She is also paid a monthly salary of Ksh 18, 000. In a certain month she sold 600 bags at Ksh 1, 250 each.

(a) Calculate her earnings that month.

(3 marks)

$$\text{Sales} = 600 \times 1250 \quad \text{--- M1} \\ = \text{Sh. } 750,000$$

$$\text{Comm} = \frac{4}{100} \times \text{Sh. } 150,000 + \frac{7}{100} \times 600,000 \quad \text{--- M1} \\ = \text{Sh. } 48,000$$

$$\text{Total Earning} = 18,000 + 48,000 \\ = \text{Sh. } 66,000 \quad \text{--- A1}$$

(b) The following month the sales woman's monthly salary was increased by 15 %. Her total earnings that month were Ksh 79, 200. Calculate the:

i) Total amount of money received from the sales of bags that month.

(5 marks)

$$\text{Salary} = \frac{115}{100} \times 18,000 \quad \text{--- M1} \quad = \text{Sh. } 20,700 \\ = \text{Sh. } 20,700$$

$$\text{Comm} = 79,200 - 20,700 \quad \text{--- M1} \quad \text{Sales} = 150,000 + 750,000 \\ = \text{Sh. } 58,500 \quad = \text{Sh. } 900,000 \quad \text{--- A1}$$

$$\text{Comm on goods worth over 150,000} \\ = 58,500 - 6000 \quad \text{--- M1} \\ = \text{Sh. } 52,500$$

$$\text{Sales above 150,000} = \frac{100}{7} \times 52,500 \quad \text{--- M1}$$

ii) Number of bags sold that month.

(2 marks)

$$= \frac{900,000}{1250} \quad \text{--- M1}$$

$$= 720 \text{ bags.} \quad \text{--- A1} \\ \underline{\underline{10}}$$

21. Five companies had 2340, 3455, 675, 960 and 1350 workers. The first two companies laid off 1 worker for every 5 workers, while the other three recruited 2 new workers for every 3.

a) What was the total number of workers at the beginning?

(2 marks)

$$\begin{array}{r}
 2340 \\
 3450 \\
 675 \\
 960 \\
 1350 \\
 \hline
 8780
 \end{array}$$

— M1
— A1

a) How many people:

i) Lost job

(3 marks)

$$\begin{aligned}
 &= \frac{2340}{5} \times 1 + \frac{3455}{5} \times 1 \quad \text{— M1} \\
 &= 468 + 691 \quad \text{— M1} \\
 &= 1159 \quad \text{— A1}
 \end{aligned}$$

ii) Got job

(3 marks)

$$\begin{aligned}
 &\frac{675}{3} \times 2 + \frac{960}{3} \times 2 + \frac{1350}{3} \times 2 \quad \text{— M1} \\
 &= 450 + 640 + 900 \quad \text{— M1} \\
 &= 1990 \quad \text{— A1}
 \end{aligned}$$

b) What was the total number of workers finally?

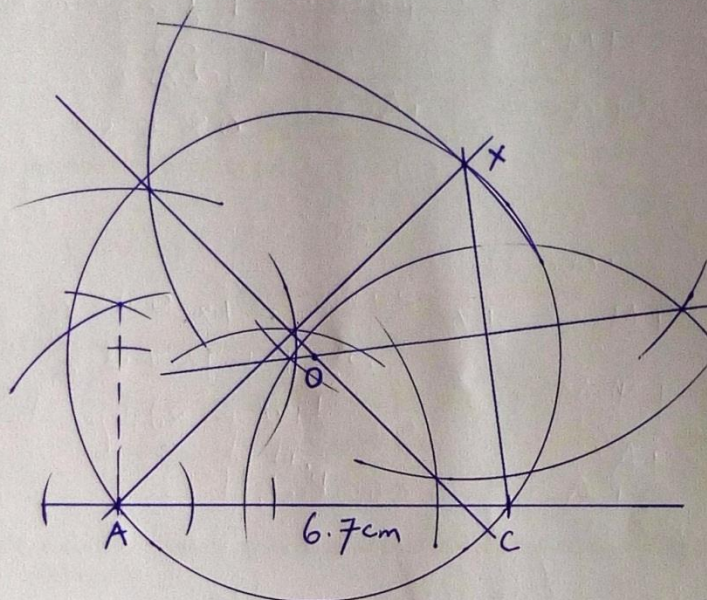
(2 marks)

$$\begin{aligned}
 &= 8780 - 1159 + 1990 \quad \text{— M1} \\
 &= 9611 \quad \text{— A1}
 \end{aligned}$$

22. Use ruler and compasses only for all constructions in this question.

- (a) Construct triangle ACX such that $AC = 6.7\text{cm}$, $AX = 8.4\text{cm}$ and $\angle CAX = 45^\circ$. Measure angle AXC.

(5mks)



B_1 - Line AC/AX

B_1 - $\angle CAX$ constructed

B_1 - X located

B_1 - Complete diagram.

$\angle AXC = 52^\circ \pm 1^\circ. B_1$

B_1 - 2 sides bisected

B_1 - Circle drawn accurately.

- (b) On the same diagram above, Construct a circle touching the three vertices A, C and X and measure the radius.

(3mks)

$$R = 4.2 \pm 0.1 \text{ cm.} \quad \text{--- } B_1$$

- (c) Find the area of the circle

(2mks)

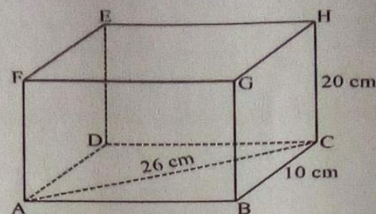
$$A = \frac{22}{7} \times 4.2^2 = 54.44 \text{ cm}^2. \quad M_1, A_1$$

OR

$$3.142 \times 4.2^2 = 55.42 \text{ cm}^2 \quad M_1, A_1$$

10.

23. The figure below represents a solid cuboid ABCDEFGH with a rectangular base ABCD. Given that AC = 26 cm, BC = 10 cm and CH = 20 cm;



- a) Determine the length of AB.

(1 mark)

$$= \sqrt{26^2 - 10^2} \\ = 24 \text{ cm} \quad \text{---} \quad B_1$$

- b) Calculate the surface area of the cuboid.

(3 marks)

$$= 2(24 \times 10) + 2(10 \times 20) + 2(24 \times 20) \quad \text{---} \quad M_1 \\ = 480 + 400 + 960 \quad \text{---} \quad M_1 \\ = 1840 \text{ cm}^2 \quad \text{---} \quad A_1$$

- c) Given that the density of the material used to make the cuboid is 7.9 g/cm^3 , calculate its mass in kilograms

(4 marks)

$$V = 24 \times 10 \times 20 \quad \text{---} \quad M_1 \\ = 4800 \text{ cm}^3 \\ m = 4800 \times 7.9 \quad \text{---} \quad M_1 \\ = 37920 \text{ g} \quad \text{---} \quad M_1 \\ = \frac{37920}{1000} = 37.92 \text{ kg} \quad \text{---} \quad A_1$$

- d) Determine the number of such cuboids that can fit exactly in a container measuring 1.2m by 0.4m by 0.7m.

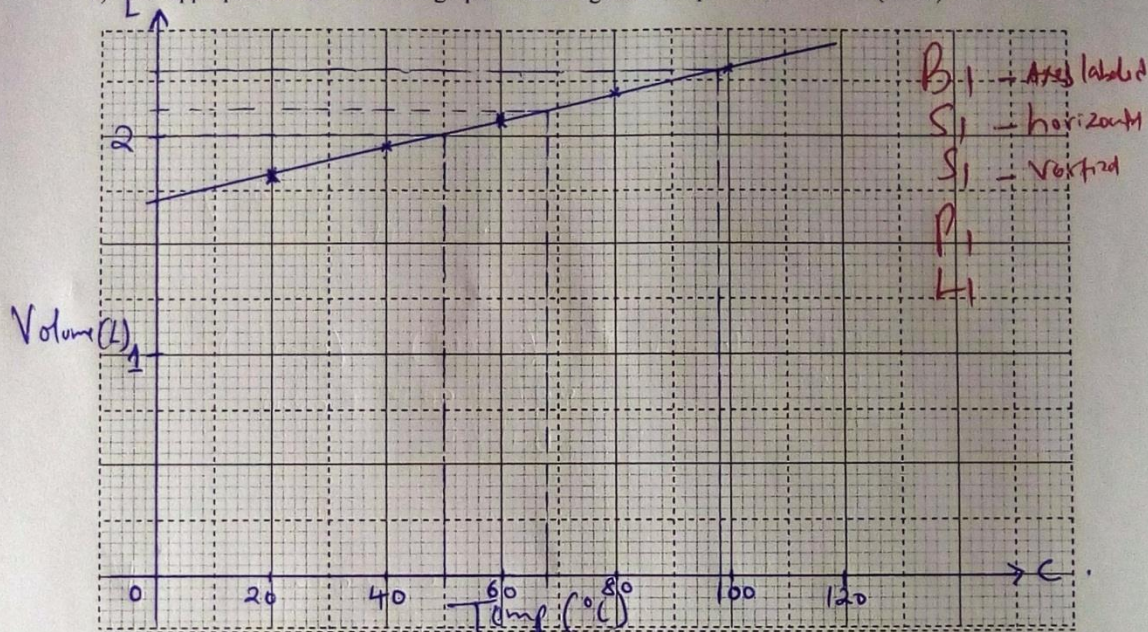
(2 marks)

$$= \frac{120 \times 40 \times 70}{4800} \quad \text{---} \quad M_1 \\ = 70 \text{ cuboids} \quad \text{---} \quad \frac{A_1}{10}$$

24. A Form one class heated a certain amount of gas in a chemistry practical lesson from a temperature of 0°C and recorded its volume at different temperatures. The results were as in the table below.

Temperature($^{\circ}\text{C}$)	20	40	60	80	100
Volume (Litres)	1.82	1.95	2.07	2.20	2.32

- a) Use appropriate scale to draw a graph Volume against Temperature. (5mks)



(b). Use your graph to find:

- i. The initial volume of gas. (1mk)

$$1.70 \pm 0.05 \text{ L.}$$

B1

- ii. The volume of gas when temperature was 50°C and 64°C . (2mks)

$$50^{\circ}\text{C} - 2.0 \pm 0.05 \text{ L}$$

B1

$$64^{\circ}\text{C} - 2.15 \pm 0.05 \text{ L.}$$

B1

- i. The temperature of the gas when the volume is 2 litres and 2.3 litres. (2mks)

$$2 \text{ L} - 50 \pm 2^{\circ}\text{C}$$

B1

$$2.3 \text{ L} - 98 \pm 2^{\circ}\text{C.}$$

B1

10