

7.2 Answers

GCSE Mathematics Iteration

Answer 1

$$U_1 = 35, \quad U_{n+1} = \frac{U_n + 3}{2}$$

U_1	U_2	U_3	U_4	U_5	U_6
35	19	11	7	5	4

[7 marks]

Answer 2

$$(i) \quad 9 \times \left(\frac{5}{9} + 3 \right)$$

$$= 5 + 27$$

$$= 32$$

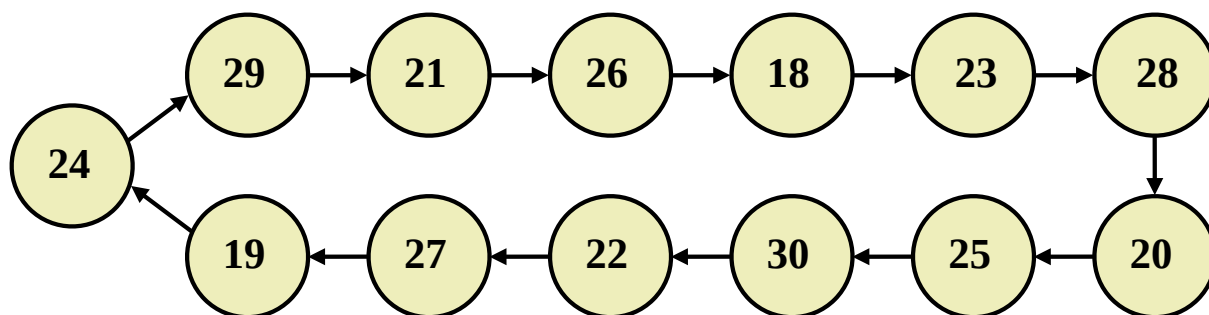
$$(ii) \quad \left(8 + \frac{3}{4} \right) \times 4$$

$$= 32 + 3$$

$$= 35$$

[4 marks]

Answer 3



[8 marks]

Answer 4

$$(i) \quad \left(3 + \frac{2}{7} \right) \times 7 = 21 + 2 = 23$$

[2 marks]

$$(ii) \quad \frac{\left(3 + \frac{2}{7} \right)}{1} \times \frac{7}{7} = \frac{21 + 2}{7} = \frac{23}{7}$$

[2 marks]

Answer 5

$$A_1 = \frac{1}{9} \quad A_{n+1} = \frac{3}{2} A_n$$

$$A_2 = \frac{3}{2} \times \frac{1}{9} = \frac{1}{6}$$

$$A_3 = \frac{3}{2} \times \frac{1}{6} = \frac{1}{4}$$

$$A_4 = \frac{3}{2} \times \frac{1}{4} = \frac{3}{8}$$

$$A_5 = \frac{3}{2} \times \frac{3}{8} = \frac{9}{16}$$

$$A_6 = \frac{3}{2} \times \frac{9}{16} = \frac{27}{32}$$

A_1	A_2	A_3	A_4	A_5	A_6
$\frac{1}{9}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{9}{16}$	$\frac{27}{32}$

[7 marks]

Answer 6

$$(i) \quad \frac{\left(\frac{3}{11} + 2\right)}{6} \times \frac{11}{11} = \frac{3 + 22}{66} = \frac{25}{66}$$

[2 marks]

$$(ii) \quad \frac{\left(5 + \frac{7}{9}\right)}{7} \times \frac{9}{9} = \frac{45 + 7}{63} = \frac{52}{63}$$

[2 marks]

$$(iii) \quad \frac{\left(4 + \frac{3}{7}\right)}{7} \times \frac{7}{7} = \frac{28 + 3}{49} = \frac{31}{49}$$

[2 marks]

Answer 7

$$(i) \quad \frac{\left(4 - \frac{3}{2}\right)}{2} \times \frac{2}{2} = \frac{8 - 3}{4} = \frac{5}{4}$$

[2 marks]

$$(ii) \quad B_1 = 1, \quad B_{n+1} = \frac{4 - B_n}{2}$$

$$B_2 = \frac{4 - 1}{2} = \frac{3}{2}$$

$$B_3 = \frac{5}{4} \quad (\text{from part (i)})$$

$$B_4 = \frac{\left(4 - \frac{5}{4}\right)}{2} \times \frac{4}{4} = \frac{16 - 5}{8} = \frac{11}{8}$$

$$B_5 = \frac{\left(4 - \frac{11}{8}\right)}{2} \times \frac{8}{8} = \frac{32 - 11}{16} = \frac{21}{16}$$

$$B_6 = \frac{\left(4 - \frac{21}{16}\right)}{2} \times \frac{16}{16} = \frac{64 - 21}{32} = \frac{43}{32}$$

B_1	B_2	B_3	B_4	B_5	B_6
1	$\frac{3}{2}$	$\frac{5}{4}$	$\frac{11}{8}$	$\frac{21}{16}$	$\frac{43}{32}$

[7 marks]**Answer 8**

$$(i) \quad \frac{1}{\left(\frac{5}{3} + 1\right)} \times \frac{3}{3} = \frac{3}{5 + 3} = \frac{3}{8}$$

[2 marks]

$$(ii) \quad \frac{4}{\left(\frac{2}{7} + 3\right)} \times \frac{7}{7} = \frac{28}{2 + 21} = \frac{28}{23}$$

[2 marks]

$$(iii) \quad \frac{2}{\left(\frac{7}{10} + 5\right)} \times \frac{10}{10} = \frac{20}{7 + 50} = \frac{20}{57}$$

[2 marks]

Answer 9

$$(i) \quad \frac{2}{\left(\frac{2}{5} + 1\right)} \times \frac{5}{5} = \frac{10}{2 + 5} = \frac{10}{7}$$

[2 marks]

$$(ii) \quad Z_1 = 4, \quad Z_{n+1} = \frac{2}{Z_n + 1}$$

$$Z_2 = \frac{2}{4 + 1} = \frac{2}{5}$$

$$Z_3 = \frac{10}{7} \quad (\text{from part (i)})$$

$$Z_4 = \frac{2}{\left(\frac{10}{7} + 1\right)} \times \frac{7}{7} = \frac{14}{10 + 7} = \frac{14}{17}$$

$$Z_5 = \frac{2}{\left(\frac{14}{17} + 1\right)} \times \frac{17}{17} = \frac{34}{14 + 17} = \frac{34}{31}$$

$$Z_6 = \frac{2}{\left(\frac{34}{31} + 1\right)} \times \frac{31}{31} = \frac{62}{34 + 31} = \frac{62}{65}$$

Z_1	Z_2	Z_3	Z_4	Z_5	Z_6
4	$\frac{2}{5}$	$\frac{10}{7}$	$\frac{14}{17}$	$\frac{34}{31}$	$\frac{62}{65}$

[7 marks]