9.2 Answers to 9.1 Test

GCSE Mathematics
Iteration

Answer 1

$$U_1 = 37, \quad U_{n+1} = \frac{U_n + 5}{2}$$

U_1	U_2	U_3	U_4	U_5	U_6
37	21	13	9	7	6

[7 marks]

Answer 2

(i) $11 \times \left(\frac{5}{11} + 1 \right)$

$= 5 + 11$

$= 16$

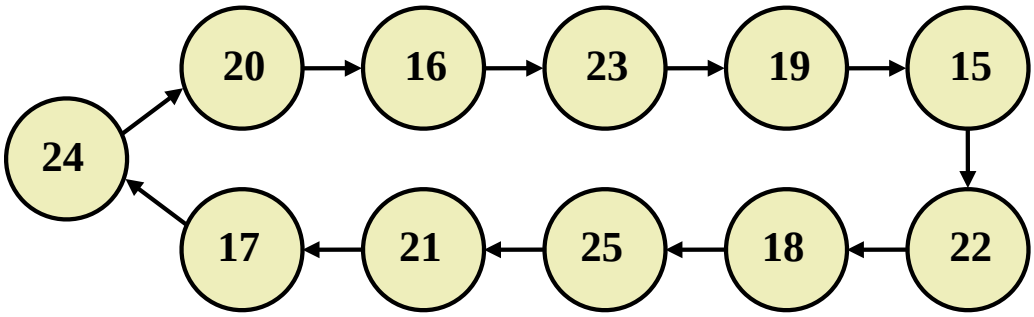
(ii) $\left(6 + \frac{2}{5} \right) \times 5$

$= 30 + 2$

$= 32$

[4 marks]

Answer 3



[8 marks]

Answer 4

(i) $\left(2 + \frac{5}{6} \right) \times 6 = 12 + 5 = 17$

[2 marks]

(ii) $\frac{\left(4 + \frac{3}{7} \right)}{1} \times \frac{7}{7} = \frac{28 + 3}{7} = \frac{31}{7}$

[2 marks]

Answer 5

$A_1 = \frac{1}{8} \qquad A_{n+1} = \frac{2}{3} A_n$

$A_2 = \frac{2}{3} \times \frac{1}{8} = \frac{1}{12}$

$A_3 = \frac{2}{3} \times \frac{1}{12} = \frac{1}{18}$

$A_4 = \frac{2}{3} \times \frac{1}{18} = \frac{1}{27}$

$A_5 = \frac{2}{3} \times \frac{1}{27} = \frac{2}{81}$

$A_6 = \frac{2}{3} \times \frac{2}{81} = \frac{4}{243}$

A_1	A_2	A_3	A_4	A_5	A_6
$\frac{1}{8}$	$\frac{1}{12}$	$\frac{1}{18}$	$\frac{1}{27}$	$\frac{2}{81}$	$\frac{4}{243}$

[7 marks]

Answer 6

(i) $\frac{\left(\frac{3}{10} + 2\right)}{5} \times \frac{10}{10} = \frac{3 + 20}{50} = \frac{23}{50}$

[2 marks]

(ii) $\frac{\left(4 + \frac{7}{5}\right)}{11} \times \frac{5}{5} = \frac{20 + 7}{55} = \frac{27}{55}$

[2 marks]

(iii) $\frac{\left(8 + \frac{5}{3}\right)}{4} \times \frac{3}{3} = \frac{24 + 5}{12} = \frac{29}{12}$

[2 marks]

Answer 7

(i) $\dfrac{\left(5 - \frac{3}{2}\right)}{2} \times \dfrac{2}{2} = \dfrac{10 - 3}{4} = \dfrac{7}{4}$

[2 marks]

(ii) $B_1 = 1,\ B_{n+1} = \dfrac{5 - B_n}{2}$

$B_2 = \dfrac{5 - 1}{2} = \dfrac{4}{2} = 2$

$B_3 = \dfrac{5 - 2}{2} = \dfrac{3}{2}$

$B_4 = \dfrac{7}{4}$ (from part (i))

$B_5 = \dfrac{\left(5 - \frac{7}{4}\right)}{2} \times \dfrac{4}{4} = \dfrac{20 - 7}{8} = \dfrac{13}{8}$

$B_6 = \dfrac{\left(5 - \frac{13}{8}\right)}{2} \times \dfrac{8}{8} = \dfrac{40 - 13}{16} = \dfrac{27}{16}$

B_1	B_2	B_3	B_4	B_5	B_6
1	2	$\frac{3}{2}$	$\frac{7}{4}$	$\frac{13}{8}$	$\frac{27}{16}$

[7 marks]

Answer 8

(i) $\dfrac{1}{\left(\frac{5}{6} + 2\right)} \times \dfrac{6}{6} = \dfrac{6}{5 + 12} = \dfrac{6}{17}$

[2 marks]

(ii) $\dfrac{3}{\left(\frac{7}{9} + 2\right)} \times \dfrac{9}{9} = \dfrac{27}{7 + 18} = \dfrac{27}{25}$

[2 marks]

(iii) $\dfrac{11}{\left(\frac{7}{3} - 1\right)} \times \dfrac{3}{3} = \dfrac{33}{7 - 3} = \dfrac{33}{4}$

[2 marks]

Answer 9

(i) $\dfrac{1}{\left(2 + \frac{1}{3}\right)} \times \dfrac{3}{3} = \dfrac{3}{6 + 1} = \dfrac{3}{7}$

[2 marks]

(ii) $Z_1 = -1,\ Z_{n+1} = \dfrac{1}{2 + Z_n}$

$Z_2 = \dfrac{1}{2 + (-1)} = 1$

$Z_3 = \dfrac{1}{2 + 1} = \dfrac{1}{3}$

$Z_4 = \dfrac{3}{7}$ (from part (i))

$Z_5 = \dfrac{1}{\left(2 + \frac{3}{7}\right)} \times \dfrac{7}{7} = \dfrac{7}{14 + 3} = \dfrac{7}{17}$

$Z_6 = \dfrac{1}{\left(2 + \frac{7}{17}\right)} \times \dfrac{17}{17} = \dfrac{17}{34 + 7} = \dfrac{17}{41}$

Z_1	Z_2	Z_3	Z_4	Z_5	Z_6
-1	1	$\frac{1}{3}$	$\frac{3}{7}$	$\frac{7}{17}$	$\frac{17}{41}$

[7 marks]