## Practice Exercises

A. Write *Yes* if the sequence is harmonic. Otherwise, write *Not*.

1. $\frac{1}{5}, \frac{1}{8}, \frac{1}{11}$
2. $\frac{1}{5}, \frac{1}{10}, \frac{1}{15}$
3. $\frac{1}{2}, \frac{3}{8}, \frac{3}{10}$
4. $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}$
5. $-\frac{1}{2}, \frac{1}{2}, \frac{1}{6}$

B. Find the specified term of each harmonic sequence

1. $\frac{4}{3}, 2, 4, \ldots a_7$

2. $\frac{1}{3}, \frac{3}{10}, \frac{3}{11}, \ldots a_9$

3. $a_1 = \frac{1}{6}, a_2 = \frac{1}{7}, a_n = \frac{1}{25}, n = ?$

4. $a_1 = \frac{1}{15}, a_{10} = \frac{1}{27}, a_7 = ?$

5. $a_8 = 4, a_{14} = \frac{4}{19}, a_{13} = ?$

C. Find the harmonic mean between the two given numbers.

1. 40 and 60

2. 80 and 120

3. -30 and 60

4. $-\frac{3}{7}$ and $\frac{5}{6}$

## Problem Set

A. Write *Yes* if the sequence is harmonic. Otherwise, write *Not*.

1. $\frac{1}{3}, \frac{2}{3}, 1$
2. $\frac{1}{4}, \frac{1}{7}, \frac{1}{9}$
3. $\frac{1}{8}, \frac{3}{8}, \frac{5}{11}$
4. $\frac{4}{7}, \frac{1}{2}, \frac{3}{2}$
5. $\frac{1}{5}, \frac{6}{5}, \frac{11}{5}$

B. Find the specified term of each harmonic sequence

1. $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \ldots a_7$
2. $\frac{1}{5}, \frac{1}{10}, \frac{1}{15}, \ldots a_{10}$
3. $\frac{1}{4}, \frac{1}{11}, \frac{1}{18}, \ldots a_9$
4. $-\frac{1}{10}, -\frac{1}{3}, \frac{1}{4}, \ldots a_{14}$
5. $1, \frac{2}{3}, \frac{1}{2}, \frac{2}{5}, \ldots a_{10}$

C. Find the harmonic mean between the two given numbers.

1. 20 and 4
2. 10 and 5

3. 15 and 45
4. 9 and 25

## Problem Set

**A.**

1. $3, \frac{3}{2}, 1$

   $d = \frac{3}{2} - 3 = -\frac{3}{2}$

   $d = 1 - \frac{3}{2} = -\frac{1}{2}$

   **No**

2. $4, 7, 9$

   $d = 7 - 4 = 3$

   $d = 9 - 7 = 2$

   **No**

3. $8, \frac{8}{3}, \frac{11}{5}$

   $d = \frac{8}{3} - 8 = -\frac{16}{3}$

   $d = \frac{11}{5} - \frac{8}{3} = -\frac{7}{15}$

   **No**

4. $\frac{7}{4}, 2, \frac{2}{3}$

   $d = 2 - \frac{7}{4} = \frac{1}{4}$

   $d = \frac{2}{3} - 2 = -\frac{4}{3}$

   **No**

5. $5, \frac{5}{6}, \frac{5}{11}$

$$d = \frac{5}{6} - 5 = -\frac{25}{6}$$

$$d = \frac{5}{11} - \frac{5}{6} = -\frac{25}{66}$$

No

B.

1. $2, 4, 6, \ldots a_7$

$$d = 4 - 2 = 2$$
$$a_n = a_1 + (n-1)d$$
$$a_7 = 2 + (7-1)(2)$$
$$a_7 = 2 + (6)(2)$$
$$a_7 = 14$$
$$a_7 = \frac{1}{14}$$

2. $5, 10, 15, \ldots a_{10}$

$$d = 10 - 5 = 5$$
$$a_n = a_1 + (n-1)d$$
$$a_{10} = 5 + (10-1)(5)$$
$$a_{10} = 5 + (9)(5)$$
$$a_{10} = 50$$
$$a_{10} = \frac{1}{50}$$

3. $4, 11, 18, \ldots a_9$

$$d = 11 - 4 = 7$$
$$a_n = a_1 + (n-1)d$$
$$a_9 = 4 + (9-1)(7)$$
$$a_9 = 4 + (8)(7)$$
$$a_9 = 60$$
$$a_9 = \frac{1}{60}$$

4. $-10, -3, 4, \ldots a_{14}$

$$d = -3 - (-10) = 7$$
$$a_n = a_1 + (n-1)d$$

$$a_{14} = -10 + (14-1)(7)$$
$$a_{14} = -10 + (13)(7)$$
$$a_{14} = 81$$
$$a_{14} = \frac{1}{81}$$

5. $1, \frac{3}{2}, 2, \frac{5}{2}, \ldots a_{10}$

$$d = \frac{3}{2} - 1 = \frac{1}{2}$$
$$a_n = a_1 + (n-1)d$$
$$a_{10} = 1 + (10-1)\left(\frac{1}{2}\right)$$
$$a_{10} = 1 + (9)\left(\frac{1}{2}\right)$$
$$a_{10} = \frac{11}{2}$$
$$a_{10} = \frac{2}{11}$$

C.

1. $\frac{1}{20}$ and $\frac{1}{4}$

$$A.M. = \frac{\frac{1}{20} + \frac{1}{4}}{2}$$
$$A.M. = \frac{\frac{1+5}{20}}{2}$$
$$A.M. = \frac{\frac{6}{20}}{2}$$
$$A.M. = \left(\frac{6}{20}\right)\left(\frac{1}{2}\right)$$

$$A.M. = \frac{3}{20}$$

$$H.M. = \frac{20}{3}$$

$$A.M. = \left(\frac{3}{10}\right)\left(\frac{1}{2}\right)$$

$$A.M. = \frac{3}{20}$$

$$H.M. = \frac{20}{3}$$

2. $\frac{1}{10}$ and $\frac{1}{5}$

$$A.M. = \frac{\frac{1}{10}+\frac{1}{5}}{2}$$

$$A.M. = \frac{\frac{1+2}{10}}{2}$$

$$A.M. = \frac{\frac{3}{10}}{2}$$

3. $\frac{1}{15}$ and $\frac{1}{45}$

$$A.M. = \frac{\frac{1}{15}+\frac{1}{45}}{2}$$

$$A.M. = \frac{\frac{3+1}{45}}{2}$$

$$A.M. = \frac{45}{2}$$

$$A.M. = \frac{\frac{4}{45}}{2}$$

$$A.M. = \left(\frac{4}{45}\right)\left(\frac{1}{2}\right)$$

$$A.M. = \frac{2}{45}$$

$$H.M. = \frac{45}{2}$$

4. $\frac{1}{9}$ and $\frac{1}{25}$

$$A.M. = \frac{\frac{1}{9}+\frac{1}{25}}{2}$$

$$A.M. = \frac{\frac{25+9}{225}}{2}$$

$$A.M. = \frac{\frac{34}{225}}{2}$$

$$A.M. = \left(\frac{34}{225}\right)\left(\frac{1}{2}\right)$$

$$A.M. = \frac{17}{225}$$

$$H.M. = \frac{225}{17}$$