F.IF.A.3: Sequences 1

1 What is the common difference of the arithmetic sequence $5, 8, 11, 14$?
1) $\frac{8}{5}$
2) -3
3) 3
4) 9

2 In an arithmetic sequence, the first term is 4 and the third term is -2. What is the common difference?
1) -1
2) -2
3) -3
4) -6

3 The first term in a sequence is 5 and the fifth term is 17. What is the common difference?
1) 2.4
2) 12
3) 3
4) 4

4 Determine the common difference of the arithmetic sequence in which $a_1 = 3$ and $a_4 = 15$.

5 Find the common difference in the arithmetic sequence, a_n, in which $a_1 = 16$ and $a_9 = 36$.

6 What is the common difference of the arithmetic sequence below?
$$-7x, -4x, -x, 2x, 5x, \ldots$$
1) -3
2) $-3x$
3) 3
4) $3x$

7 What is the common difference in the sequence $2a + 1, 4a + 4, 6a + 7, 8a + 10, \ldots$?
1) $2a + 3$
2) $-2a - 3$
3) $2a + 5$
4) $-2a + 5$

8 Given the sequence: $x, (x + y), (x + 2y), \ldots$
Which expression can be used to determine the common difference of this sequence?
1) $x - (x + y)$
2) $(x + 2y) - (x + y)$
3) $\dfrac{x}{(x + y)}$
4) $\dfrac{(x + 2y)}{(x + y)}$

9 Given the following three sequences:
　　I.　$2, 4, 6, 8, 10 \ldots$
　　II.　$2, 4, 8, 16, 32 \ldots$
　　III.　$a, a + 2, a + 4, a + 6, a + 8 \ldots$
Which ones are arithmetic sequences?
1) I and II, only
2) I and III, only
3) II and III, only
4) I, II, and III

10 Which arithmetic sequence has a common difference of 4?
1) $\{0, 4n, 8n, 12n, \ldots\}$
2) $\{n, 4n, 16n, 64n, \ldots\}$
3) $\{n + 1, n + 5, n + 9, n + 13, \ldots\}$
4) $\{n + 4, n + 16, n + 64, n + 256, \ldots\}$

11 A geometric sequence with a common ratio of -3 is
1) $-10, -7, -4, -1, \ldots$
2) $14, 11, 8, 5, \ldots$
3) $-2, -6, -18, -54, \ldots$
4) $4, -12, 36, -108, \ldots$

12 Consider the following patterns:
　　I.　　$16, -12, 9, -6.75, \ldots$
　　II.　　$1, 4, 9, 16, \ldots$
　　III.　　$6, 18, 30, 42, \ldots$
　　IV.　　$\dfrac{1}{2}, \dfrac{2}{3}, \dfrac{3}{4}, \dfrac{4}{5}, \ldots$
Which pattern is geometric?
1) I
2) II
3) III
4) IV

13 Which situation could be modeled using a geometric sequence?
1) A cell phone company charges $30.00 per month for 2 gigabytes of data and $12.50 for each additional gigabyte of data.
2) The temperature in your car is 79°. You lower the temperature of your air conditioning by 2° every 3 minutes in order to find a comfortable temperature.
3) David's parents have set a limit of 50 minutes per week that he may play online games during the school year. However, they will increase his time by 5% per week for the next ten weeks.
4) Sarah has $100.00 in her piggy bank and saves an additional $15.00 each week.

14 Determine and state whether the sequence $1, 3, 9, 27, \ldots$ displays exponential behavior. Explain how you arrived at your decision.

15 A geometric sequence is shown below.
$$\frac{1}{2}, 2, 8, 32, \ldots$$
What is the common ratio?
1) $\frac{1}{4}$
2) 2
3) $\frac{1}{2}$
4) 4

16 What is the common ratio of the geometric sequence shown below?
$$-2, 4, -8, 16, \ldots$$
1) $-\frac{1}{2}$
2) 2
3) -2
4) -6

17 The common ratio of the sequence $-\frac{1}{2}, \frac{3}{4}, -\frac{9}{8}$ is
1) $-\frac{3}{2}$
2) $-\frac{2}{3}$
3) $-\frac{1}{2}$
4) $-\frac{1}{4}$

18 If $x \neq 0$, then the common ratio of the sequence $x, 2x^2, 4x^3, 8x^4, 16x^5, \ldots$ is
1) $2x$
2) 2
3) x
4) $\frac{1}{2}x$

19 What is the common ratio of the sequence $\frac{1}{64}a^5b^3, -\frac{3}{32}a^3b^4, \frac{9}{16}ab^5, \ldots$?
1) $-\frac{3b}{2a^2}$
2) $-\frac{6b}{a^2}$
3) $-\frac{3a^2}{b}$
4) $-\frac{6a^2}{b}$

20 What is a common ratio of the geometric sequence whose first term is 5 and third term is 245?
1) 7
2) 49
3) 120
4) 240

21 The third term in a sequence is 25 and the fifth term is 625. Which number could be the common ratio of the sequence?
1) $\frac{1}{5}$
2) 5
3) $\frac{1}{25}$
4) 25

22 What is the common ratio of the geometric sequence whose first term is 27 and fourth term is 64?
1) $\frac{3}{4}$
2) $\frac{64}{81}$
3) $\frac{4}{3}$
4) $\frac{37}{3}$

F.IF.A.3: Sequences 1
Answer Section

 1 ANS: 3   REF: 061001a2

 2 ANS: 3

$$\frac{-2-4}{3-1} = \frac{-6}{2} = -3$$

   REF: 062223ai

 3 ANS: 3

$$\frac{17-5}{5-1} = \frac{12}{4} = 3$$

   REF: 062215ai

 4 ANS:

$$\frac{15-3}{4-1} = \frac{12}{3} = 4$$

   REF: 012328ai

 5 ANS:

$$\frac{36-16}{9-1} = \frac{20}{8} = 2.5$$

   REF: 081630a2

 6 ANS: 4   REF: 061411a2

 7 ANS: 1

$$(4a+4) - (2a+1) = 2a+3$$

   REF: 011401a2

 8 ANS: 2   REF: 011610a2

 9 ANS: 2   REF: 061919ai

10 ANS: 3   REF: 011110a2

11 ANS: 4   REF: 082419ai

12 ANS: 1

$$\frac{-12}{16} = \frac{9}{-12} = \frac{-6.75}{9}$$

   REF: 012017aii

13 ANS: 3   REF: 061910aii

14 ANS:
   Yes, because the sequence has a common ratio, 3.

   REF: 081726ai

15 ANS: 4

$$\frac{8}{2} = 4$$

   REF: 012503ai

16 ANS: 3

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

REF: 011304a2

17 ANS: 1

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

REF: 011508a2

18 ANS: 1

$$\frac{2x^2}{x} = 2x$$

REF: 082202ai

19 ANS: 2

$$\frac{-\frac{3}{32}a^3 b^4}{\frac{1}{64}a^5 b^3} = -\frac{6b}{a^2}$$

REF: 061326a2

20 ANS: 1

$$5r = a_2 \quad a_2 r = 245 \quad 5r = \frac{245}{r}$$

$$a_2 = \frac{245}{r} \quad 5r^2 = 245$$

$$r^2 = 49$$

$$r = \pm 7$$

REF: 081924ai

21 ANS: 2

$$25r^2 = 625$$

$$r^2 = 25$$

$$r = \pm 5$$

REF: 062412ai

22 ANS: 3

$$27r^{4-1} = 64$$

$$r^3 = \frac{64}{27}$$

$$r = \frac{4}{3}$$

REF: 081025a2