Arithmetic progression

1) ~~1, 2~~

~~2) 1, 220~~

$a_1 = 2(1) + 1$

$= 3$

3) $a_2 = 2(2) + 1$

$= 5$

4) $d = a_2 - a_1$

5) $5 - 3 = 2$

6) 2)

$59 = 2 + (n-1)3$

7)

$3n = 57 + 3$

8)

$3n = 60$

9) $n = 20$

10)

3) $a_1 = -11$

$a_2 = -8$ $\quad d = -8 - (-11) = 3$

$$a_n = -11 + 3(n-1)$$

$$= 3n - 14$$

~~$3n - 14 > 0$~~

$$3n - 14 = 0$$

$$3n = 14$$

$$n = \frac{14}{3} = 5 \text{ (approx)}$$

So, 1st positive term is 1

4) $a_n = a + (n-1)d$

$$35 = 2 + (n-1)3$$

$$35 - 2 = (n-1)3$$

$$\frac{33}{3} = n - 1$$

$$n = 11 + 1 = 12$$

$$a_8 = 2 + (8-1)3$$

$$2 + 7 \times 3$$

$$= 23$$

5) $a_{11} = 35$ $\quad a_{13} = 41$

$a_n = a + (n-1)d$

$35 = a_{11} = a + 10d$ ---- ①

$41 = a_{13} = a + 12d$ ---- ②

Subtracting ① by ②

$6 = 2d$

$d = \frac{6}{2} = 3$

6) $\sqrt{8}, \sqrt{18}, \sqrt{32}$ .....

$2\sqrt{2}, 3\sqrt{2}, 4\sqrt{2}$, ...

Difference $= \sqrt{2}$

So, another will be $5\sqrt{2}$

7) $a_5 = a_{10} = 5a$

$a + 4d = a + 9d = 5a$ ---①

$a + 4d = a + 9d$

$0 = 5d$

$d = 0$ ---②

$5a = a + 4d$

$5a - a = 4d$

$4a = 4d$

$a = d = 0$

$a_{15} = a + 14d$

$0 + 14 \times 0$

$= 0$

8) 1, 4, 7, ...

Difference = 3

3, 7, 12, 18 ...

Difference = unequal

So, this is not AP.

9) 1, 3, 5, 7, 9 ..., 39

$a = 1$

$d = 2$

$n = 20$

$S = \frac{n}{2}(2a + (n-1)d)$

$= \frac{20}{2}.(2 \times 1 + (20-1)2)$

$= 400$

10) 1, 2, 3 20

$a = 1$

$d = 1$

$n = 20$

$$S_n = \frac{n}{2}(2a + (n-1)d)$$

$$\frac{20}{2}(2 \times 1 + (20-1)d)$$

$$10 \times 21 = 210$$