1.

$$\begin{array}{r} \quad a\ b \\ x\quad c\ d \\ \hline \quad 2\ 3\ 7 \\ +\quad \bullet\ \bullet\ 8 \\ \hline x\ y\ z\ t \end{array}$$

$237 = 3.79 \Rightarrow \boxed{d = 3}$, $\underbrace{ab = 79}$

$\boxed{a = 7}$, $\boxed{b = 9}$

$c.b = c.9 = 18 \Rightarrow \boxed{c = 2}$

$$\begin{array}{r} \quad 7\ 9 \\ x\quad 2\ 3 \\ \hline \quad 2\ 3\ 7 \\ +\quad 1\ 5\ 8 \\ \hline 1\ 8\ 1\ 7 \end{array} \Rightarrow \boxed{xyzt = 1817}$$

Cevap: E

2.

$$\begin{array}{r|l} x3y2 & 29 \\ - & \\ \hline 11 & \end{array} \qquad \begin{array}{r|l} x5y1 & 29 \\ - & \\ \hline ? & \end{array}$$

$x3y2 + \underbrace{200 - 1} = x5y1$

yüzler basamağı 2 artmış,

Birler basamağı 1 azalmış.

$\underbrace{x3y2} + \underbrace{199} = x5y1$

29'a bölümünden kalan "11"

29'a bölümünden kalan "25"

$11 + 25 = \underbrace{36}$

↓

29'a bölümünden kalan "7"

Cevap: A

3.

$(11)_{2a} + (21)_{a} = 18$

$1 \cdot 1$

$2a \quad a$

$2a + 1 + 2a + 1 = 18 \Rightarrow 4a + 2 = 18 \Rightarrow 4a = 16 \Rightarrow \boxed{a = 4}$

Cevap: D

4. $-6 < x < 1 \Rightarrow$

$$\begin{array}{r} \quad 0 \le x^2 < 36 \\ +\quad -24 < 4x < 4 \\ \hline -24 < \underbrace{x^2 + 4x} < 40 \end{array}$$

↓

En küçük tamsayı değeri = –23

En büyük tamsayı değeri = 39

39 – 23 = 16

Cevap: D

5. $m, n, p \in Z^+$

$A = 3m + 2 = 9n + 14 = 5p + 11$ (Her tarafa 4 ekleyelim.)

$A + 4 = 3m + 6 = 9n + 18 = 5p + 15$

$A + 4 = 3.(m + 2) = 9.(n + 2) = 5.(p + 3)$

$OKEK(3, 9, 5) = 45$

$A + 4 = 45 \Rightarrow A = 41 \Rightarrow \boxed{\min(A) = 41}$

Cevap: C

6. $a, b, c \in Z^+$

$$\left.\begin{array}{l} b^2 = a \\ b + c = a \\ c = 5b \end{array}\right\} \Rightarrow b^2 = \underbrace{b + c}_{5b} \Rightarrow b^2 = 6b$$

$b.\not{b} = 6\not{b}$

$\boxed{b = 6}$

$\Rightarrow c = 5b = 5.6 = \boxed{30}$

Cevap: D

7.

$$\left.\begin{array}{l} x > 0 \\ 2x = 3y = 6z \\ x + y = yz \end{array}\right\} \Rightarrow x + z = ?$$

$2x = 3y = 6z \Rightarrow x = 3z, \quad y = 2z$

$x + y = y.z \Rightarrow 3z + 2z = 2z.z \Rightarrow 5.\not{z} = 2.z.\not{z} \Rightarrow z = \frac{5}{2}$

$x = 3z = 3 \cdot \frac{5}{2} = \frac{15}{2}$

$\Rightarrow x + z = \frac{15}{2} + \frac{5}{2} = \frac{17}{2}$

Cevap: C

8. $a,b \in Z^+$; $a + \frac{b}{4} = 3,5 \Rightarrow \max(a) = ?$

$a + \frac{b}{4} = 3,5 \Rightarrow \frac{4a+b}{4} = \frac{7}{2} \Rightarrow 4a + b = 14$

↓	↓
1	10
2	6
③	2

$\Rightarrow \boxed{\max(a) = 3}$

Cevap: A

9. $a, c \in Z$; $b \in Z^+$
$c < 0$
$a < 2c$
$a + b + c = -19$
$\Rightarrow \min(b) = ?$

$a + b + c = -19 \rightarrow \min(b)$ için $\max(a + c)$ olmalı.

$c < 0$, $a < 2c$ $\Rightarrow \boxed{c = -6}$ için $a < -12 \Rightarrow \boxed{a = -13}$

$a + b + c = -19 \Rightarrow -13 + b - 6 = -19 \Rightarrow b = 0$ olmaz! $(b \in Z^+)$

$\Rightarrow \boxed{c = -7}$ için $a < -14 \Rightarrow \boxed{a = -15}$

$a + b + c = -19 \Rightarrow -7 + b - 15 = -19$
$\Rightarrow -22 + b = -19$
$\Rightarrow b = -19 + 22 = 3$
$\Rightarrow \boxed{\min(b) = 3}$

Cevap: C

10.

A | 12	A | 18	A | 20
–	–	–
0	0	0

$\Rightarrow \min(A) = OKEK(12, 18, 20)$

12	18	20	2
6	9	10	2
3	9	5	3
1	3	5	3
1	1	5	5
1	1	1	

$\Rightarrow OKEK(12, 18, 20) = 2^2.3^2.5 = \boxed{180}$

Cevap: C

11. $(a^2 - 4,12 - b^2) = (12,8)$; $a, b \in Z^+$; $a + b = ?$

$a^2 - 4 = 12 \Rightarrow a^2 = 16 \Rightarrow \boxed{a = 4}$
$12 - b^2 = 8 \Rightarrow b^2 = 4 \Rightarrow \boxed{b = 2}$
$\Rightarrow a + b = 4 + 2 = \boxed{6}$

Cevap: B

12. $(100)_5 + (310)_5 = (1002)_4 + (2ab)_4 \Rightarrow a + b = ?$

$(100)_5$: 1, 5, 5^2 — $(310)_5$: 3, 1, 0 → 1, 5, 5^2 — $(1002)_4$: 1, 0, 0, 2 → 1, 4, 4^2, 4^3 — $(2ab)_4$: 2, a, b → 1, 4, 4^2

$1.5^2 + 0.5 + 0.1 + 3.5^2 + 1.5 + 0.1$
$= 1.4^3 + 0.4^2 + 0.4 + 2.1 + 2.4^2 + a.4 + b.1$
$25 + 75 + 5 = 64 + 2 + 32 + 4a + b$
$105 = 98 + 4a + b \Rightarrow 4a + b = 7 \Rightarrow a + b = 1 + 3 = 4$

↓	↓
1	3

Cevap: C

13. $m, n, s, t, k, p \in Z^+$,

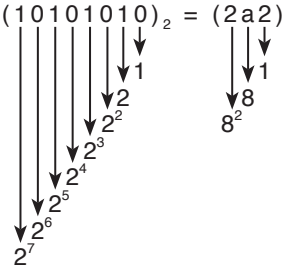
$44 = m.t + n \Rightarrow 13 = m.(s - t) = 13.1$
$\boxed{m = 13}$, $s - t = 1$
↓
44'ün 13'e bölümünden kalan 5

$57 = m.s + n$
57'nin 13'e bölümünden kalan 5
$\boxed{n = 5}$

$m = n.k + p \Rightarrow \underline{13 = 5.k + p}$
13'ün 5'e bölümünden kalan 3
$\Rightarrow \boxed{p = 3}$

Cevap: C

14. $(10101010)_2 = (2a2)_8 \Rightarrow a = ?$



$1.2^7 + a.2^6 + 1.2^5 + \cancel{0.2^4} + 1.2^3 + \cancel{0.2^2} + 1.2 + \cancel{0.1}$

$= 2.8^2 + a.8 + 2.1$

$\cancel{128} + 32 + 8 + \cancel{2} = \cancel{128} + 8a + \cancel{2}$

$40 = 8a \Rightarrow \boxed{a = 5}$

Cevap: C

15. $x, y \in Z$

$\left.\begin{array}{l} -2 \le x < 7 \\ -5 < y \le 13 \end{array}\right\} \Rightarrow \max(2x - 3y) = ?$

x ve y tamsayı olduğu için değer vererek sonuca ulaşırız.

$\max(2x - 3y)$ için $x \to \max$, $y \to \min$ olmalı.

$-2 \le x < 7 \Rightarrow \max(x) = 6$

$-5 < y \le 13 \Rightarrow \min(y) = -4$

$\Rightarrow \max(2x - 3y) = 2.6 - 3.(-4) = 12 + 12 = \boxed{24}$

Cevap: E

16. $-4 \le x \le 3 \Rightarrow \quad 0 \le x^2 \le 16$

$-3 \le y < 4 \Rightarrow \quad + \quad -8 < -2y \le 6$

$-8 < \underbrace{x^2 - 2y}_{\downarrow} \le 22$

$\max(x^2 - 2y) = \boxed{22}$

Cevap: B

17. $-1 \le a \le \frac{1}{2} \Rightarrow 0 \le a^4 \le (-1)^4 \Rightarrow 0 \le a^4 \le 1$

$-2 < b \le -\frac{1}{2} \Rightarrow (-2)^3 < b^3 \le \left(-\frac{1}{2}\right)^3 \Rightarrow + \quad -8 < b^3 \le -\frac{1}{8}$

$0 - 8 < a^4 + b^3 \le 1 - \frac{1}{8}$

$-8 < a^4 + b^3 \le \frac{7}{8}$

$\left(-8, \frac{7}{8}\right]$

Cevap: C

18. $f, g : R^2 \to R$; $f(x,y) = \max\left(x - y, \frac{x}{y}\right)$

$g(x, y) = \min(x + y, x.y)$

$f(-1, 3) \to x - y = -1 - 3 = -4$,
$\downarrow\ \downarrow$
$x\ \ y$

$\frac{x}{y} = -\frac{1}{3} \to \max\left(x - y, \frac{x}{y}\right) = \boxed{-\frac{1}{3}}$

$g(4, 4) \to x + y = 4 + 4 = 8$,
$\downarrow\ \downarrow$
$x\ \ x$

$x.y = 4.4 = 16 \to \min(x + y, x.y) = \boxed{8}$

$f\left(-\frac{1}{3},\ 8\right) \to x - y = -\frac{1}{3} - 8 = -\frac{25}{3}$, $\frac{x}{y} = \frac{-\frac{1}{3}}{8} = -\frac{1}{24}$
$\downarrow\ \downarrow$
$x\ \ y$

$\max\left(x - y, \frac{x}{y}\right) = \boxed{-\frac{1}{24}}$

$f(f(-1, 3), g(4,4)) = f\left(-\frac{1}{3}, 8\right) = -\frac{1}{24}$

Cevap: D

19.

$$\begin{array}{r|l} K & 5 \\ - & \hline & M \\ \hline 3 & \end{array} \Rightarrow \boxed{K = 5M + 3}$$

$$\begin{array}{r|l} K+2 & M+1 \\ - & \hline & 5 \\ \hline L & \end{array}$$

$\Rightarrow \boxed{K} + 2 = 5.(M + 1) + L$

$\Rightarrow \cancel{5M} + \cancel{3} + \cancel{2} = \cancel{5M} + \cancel{5} + L$

$\Rightarrow \boxed{L = 0}$

Cevap: A

20. $(ab2)_4 = (ba3)_5 \Rightarrow 16a + 4b + 2 = 25b + 5a + 3$

$\Rightarrow \boxed{11a - 21b = 1} \Rightarrow \boxed{a = 2}, \boxed{b = 1}$

$(ab)_5 + (ba)_4 = (x)_{10} \Rightarrow 5a + b + 4b + a = \boxed{6a + 5b = x}$

$\Rightarrow x = 6.2 + 5.1 = 12 + 5 = \boxed{17}$

Cevap: C