

1.
$$\begin{array}{r} a b \\ x c d \\ \hline 2 3 7 \\ + \cdot \cdot 8 \\ \hline x y z t \end{array}$$

$237 = 3.79 \Rightarrow \boxed{d=3}$, $ab = 79$
 $\boxed{a=7}$, $\boxed{b=9}$
 $c.b = c.9 = 18 \Rightarrow \boxed{c=2}$

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

Cevap: E

2.
$$\begin{array}{r} x3y2 \mid 29 \\ - \\ \hline 11 \end{array} \qquad \begin{array}{r} x5y1 \mid 29 \\ - \\ \hline ? \end{array}$$

$x3y2 + 200 - 1 = x5y1$
yüzler basamağı 2 artmış,
Birler basamağı 1 azalmış.

$$\begin{array}{r} x3y2 + 199 = x5y1 \\ \swarrow \quad \searrow \\ \text{29'a bölümünden} \quad \text{29'a bölümünden} \\ \text{kalan "11"} \quad \text{kalan "25"} \end{array}$$

$$11 + 25 = 36$$

↓
29'a bölümünden kalan "7"

Cevap: A

3.
$$\begin{array}{r} (11)_{2a} + (21)_a = 18 \\ \downarrow \downarrow \quad \downarrow \downarrow \\ 1 \quad 1 \\ 2a \quad a \end{array}$$

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

Cevap: D

4. $-6 < x < 1 \Rightarrow 0 \leq x^2 < 36$
$$+ \frac{-24 < 4x < 4}{-24 < x^2 + 4x < 40}$$

↓
En küçük tamsayı değeri = -23
En büyük tamsayı değeri = 39
 $39 - 23 = 16$

Cevap: D

5. $m, n, p \in \mathbb{Z}^+$
 $A = 3m + 2 = 9n + 14 = 5p + 11$ (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. $a, b, c \in \mathbb{Z}^+$
$$\left. \begin{array}{l} b^2 = a \\ b + c = a \\ c = 5b \end{array} \right\} \Rightarrow b^2 = b + c \Rightarrow b^2 = 6b$$

 $b \cdot b = 6b$
 $\boxed{b=6}$
 $\Rightarrow c = 5b = 5.6 = \boxed{30}$

Cevap: D

7.
$$\left. \begin{array}{l} x > 0 \\ 2x = 3y = 6z \\ x + y = yz \end{array} \right\} \Rightarrow x + z = ?$$

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

$x + y = yz \Rightarrow 3z + 2z = 2z.z \Rightarrow 5.z = 2.z.z \Rightarrow z = \frac{5}{2}$

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

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

Cevap: C

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

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

↓	↓
1	10
2	6
③	2

$\Rightarrow \max(a) = 3$

Cevap: A

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

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

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

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

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

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

Cevap: C

10. $\frac{A}{0} \mid 12$ $\frac{A}{0} \mid 18$ $\frac{A}{0} \mid 20$

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

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

$\Rightarrow \text{OKEK}(12, 18, 20) = 2^2 \cdot 3^2 \cdot 5 = 180$

Cevap: C

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

$$\left. \begin{array}{l} a^2 - 4 = 12 \Rightarrow a^2 = 16 \Rightarrow a = 4 \\ 12 - b^2 = 8 \Rightarrow b^2 = 4 \Rightarrow b = 2 \end{array} \right\} \Rightarrow a + b = 4 + 2 = 6$$

Cevap: B

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

↓	↓	↓	↓	↓	↓	↓	↓
5	1	5	1	4	1	4	1
5 ²		5 ²		4 ²		4 ²	
				4 ³			

$1.5^2 + 0.5 + 0.1 + 3.5^2 + 1.5 + 0.1$
 $= 1.4^3 + 0.4^2 + 0.4 + 2.1 + 2.4^2 + a.4 + b.1$

$25 + 75 + 5 = 64 + 2 + 32 + 4a + b$

$105 = 98 + 4a + b \Rightarrow 4a + b = 7 \Rightarrow a + b = 1 + 3 = 4$

Cevap: C

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

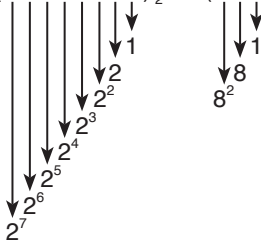
$\frac{44}{n} \mid \frac{m}{t} \Rightarrow 44 = m.t \mp n$ } $13 = m.(s - t) = 13.1$
 $\frac{57}{n} \mid \frac{m}{s} \Rightarrow 57 = m.s + n$ } $\frac{m}{n} = 13, s - t = 1$

44'ün 13'e bölümünden kalan 5
 57'nin 13'e bölümünden kalan 5
 $n = 5$

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

Cevap: C

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



$$1 \cdot 2^7 + a \cdot 2^6 + 1 \cdot 2^5 + 0 \cdot 2^4 + 1 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2 + 0 \cdot 1$$

$$= 2 \cdot 8^2 + a \cdot 8 + 2 \cdot 1$$

$$128 + 32 + 8 + 2 = 128 + 8a + 2$$

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

Cevap: C

15. $x, y \in \mathbb{Z}$

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

x ve y tamsayı olduğu için değer vererek sonuca ulaşırız.

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

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

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

$$\Rightarrow \max(2x - 3y) = 2 \cdot 6 - 3 \cdot (-4) = 12 + 12 = \boxed{24}$$

Cevap: E

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

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

$$-8 < x^2 - 2y \leq 22$$

$$\downarrow$$

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

Cevap: B

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

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

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

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

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

Cevap: C

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

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

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

$$\downarrow \downarrow$$

$$x \quad y$$

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

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

$$\downarrow \downarrow$$

$$x \quad x$$

$$x \cdot y = 4 \cdot 4 = 16 \rightarrow \min(x + y, x \cdot y) = \boxed{8}$$

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

$$\downarrow \downarrow$$

$$x \quad y$$

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

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

Cevap: D

$$19. \quad \begin{array}{r} K \\ - \\ \hline 3 \end{array} \Bigg| \frac{5}{M} \Rightarrow \boxed{K = 5M + 3}$$

$$\begin{array}{r} K+2 \\ - \\ \hline L \end{array} \Bigg| \frac{M+1}{5} \Rightarrow \boxed{K} + 2 = 5 \cdot (M+1) + L$$

$$\Rightarrow 5M + 3 + 2 = 5M + 5 + L$$

$$\Rightarrow \boxed{L = 0}$$

Cevap: A

$$20. \quad \begin{array}{c} (ab2)_4 = (ba3)_5 \Rightarrow 16a + 4b + 2 = 25b + 5a + 3 \\ \downarrow \downarrow \downarrow \quad \downarrow \downarrow \downarrow \\ \downarrow 1 \quad \downarrow 1 \\ \downarrow 4 \quad \downarrow 5 \\ 4^2 \quad 5^2 \end{array} \Rightarrow \boxed{11a - 21b = 1} \Rightarrow \boxed{a = 2}, \boxed{b = 1}$$

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

$$\downarrow \downarrow \quad \downarrow \downarrow \\ \downarrow 1 \quad \downarrow 1 \\ 5 \quad 4$$

$$\Rightarrow x = 6 \cdot 2 + 5 \cdot 1 = 12 + 5 = \boxed{17}$$

Cevap: C