

1. $x\Delta y = (3x+y)\star(x-2y)$
 $(-2)\Delta 1 = (3\cdot(-2)+1)\star(-2-2\cdot 1)$
 $(-2)\Delta 1 = (-6+1)\star(-2-2)$
 $(-2)\Delta 1 = (-5)\star(-4)$
 $x\star y = 2x-y+1$
 $(-5)\star(-4) = 2\cdot(-5)-(-4)+1$
 $(-5)\star(-4) = -10+4+1$
 $(-5)\star(-4) = -5$

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2. $a\Delta b = a^b-b^a$
 $3\Delta x = 1$
 $3^x-x^3=1 \Rightarrow x=2$

CEVAP: E

3. $(a-1)\square(b+1)=a^2-b^2$
 $2\square 3 = 3^2-2^2$, $(a=3, b=2)$
 $2\square 3 = 9-4$
 $2\square 3 = 5$
 $(a-1)\square(b+1)=a^2-b^2$
 $1\square 5 = 2^2-4^2$ $(a=2, b=4)$
 $1\square 5 = 4-16$
 $1\square 5 = -12$

CEVAP: A

4. $a\star b = a^2-b^2$
 $a\star 8 = 36 \Rightarrow a^2-8^2 = 36$
 $a^2-64 = 36$
 $a^2 = 100$
 $a = \pm 10$

CEVAP: C

5.

★	a	b	c	d	e
a	c	d	e	a	b
b	d	e	a	b	c
c	e	a	b	c	d
d	a	b	c	d	e
e	b	c	d	e	a

Birim eleman $\rightarrow d$

$a^{-1}=b, b^{-1}=a, c^{-1}=e, d^{-1}=d, e^{-1}=c$

$(a^{-2}\star b)^{-1}\star(e\Delta c)^{-1} = ((a^{-1})^2\star b)^{-1}\star(e\Delta c)$

$= (b^2\star b)^{-1}\star(e\star b)^{-1}$

$= (b\star b\star b)^{-1}\star(c)^{-1}$

$= (e\star b)^{-1}\star e$

$= c^{-1}\star e$

$= e\star e$

$= a$

CEVAP: A



$$6. \quad a \Delta b = \begin{cases} a^2 - b^2, & a < b \\ a^2 + b^2, & a \geq b \end{cases}$$

$$\begin{aligned} (-2) \Delta 1 &= (-2)^2 - 1^2 && (-2 < 1) \\ &= 4 - 1 \\ &= 3 \end{aligned}$$

$$\begin{aligned} 1 \Delta 2 &= 1^2 + 2^2 && ,(1 < 2) \\ &= 1 + 4 \\ &= 5 \end{aligned}$$

$$\begin{aligned} 3 \Delta (-3) &= 3^2 + (-3)^2 && ,(3 > -3) \\ &= 9 + 9 \\ &= 18 \end{aligned}$$

CEVAP: E

$$\begin{aligned} 7. \quad a \Delta b &= 3a - 2b + 1 \\ 2x \Delta x &= 17 \\ 3.2x - 2.x + 1 &= 17 \\ 6x - 2x + 1 &= 17 \\ 4x &= 16 \\ x &= 4 \end{aligned}$$

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$$8. \quad a \Delta b = (a+b)^2 - 3ab$$

$$\begin{aligned} \sqrt{27} \Delta \sqrt{3} &= (\sqrt{27} + \sqrt{3})^2 - 3 \cdot \sqrt{27} \cdot \sqrt{3} \\ &= (3\sqrt{3} + \sqrt{3})^2 - 3 \cdot \sqrt{81} \\ &= (4\sqrt{3})^2 - 3 \cdot 9 \\ &= 48 - 27 \\ &= 21 \end{aligned}$$

CEVAP: E

$$9. \quad a \star b = 3a + 2b - 6$$

$$\begin{aligned} x \star y = 5 &\quad \Rightarrow 3x + 2y - 6 = 5 \\ &\quad 3x + 2y = 11 \end{aligned}$$

$$a \star b = 3a + 2b - 6$$

$$\begin{aligned} y \star x = 3 &\quad \Rightarrow 3y + 2x - 6 = 3 \\ &\quad 3y + 2x = 9 \end{aligned}$$

$$\begin{array}{r} 3x + 2y = 11 \\ 3y + 2x = 9 \\ \hline + \\ \hline 5x + 5y = 20 \\ 5(x + y) = 20 \\ x + y = 4 \end{array}$$

CEVAP: A



10. $4 \star 2 = 0$, $\frac{20}{20} \left| \frac{5}{4} \right.$, $(4^2 + 2^2 = 20)$
 $0 \star 3 = 4$, $\frac{9}{5} \left| \frac{5}{1} \right.$, $(0^2 + 3^2 = 9)$

CEVAP: E

11. $x \star y = x^{y+1} - 1$
 $2 \star x = 63$
 $2^{x+1} - 1 = 63$
 $2^{x+1} = 64$
 $2^{x+1} = 2^6 \Rightarrow x+1 = 6$
 $x = 5$

CEVAP: D

12.
 $\frac{3}{a \Delta b} = \frac{2}{a} + \frac{1}{b}$
 $\frac{3}{3 \Delta \frac{1}{2}} = \frac{2}{3} + \frac{1}{\frac{1}{2}}$
 $\frac{3}{3 \Delta \frac{1}{2}} = \frac{2}{3} + 2$
 $\frac{3}{3 \Delta \frac{1}{2}} = \frac{8}{3}$
 $\frac{3 \Delta \frac{1}{2}}{3} = \frac{3}{8}$
 $3 \Delta \frac{1}{2} = \frac{9}{8}$

CEVAP: A

13.

$$(-1) \Delta \frac{1}{3} = \frac{2 \cdot (-1) - \frac{1}{3}}{-1 + \frac{1}{3}}, \left((-1) \cdot \frac{1}{3} < 0 \right)$$

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

$$= \frac{-\frac{7}{3}}{-\frac{2}{3}} = \frac{7}{2}$$

$$\frac{1}{2} \Delta \frac{7}{2} = \frac{\frac{1}{2} + 2 \cdot \frac{7}{2}}{\frac{1}{2} - \frac{7}{2}}, \left(\frac{1}{2} \cdot \frac{7}{2} > 0 \right)$$

$$= \frac{\frac{1}{2} + 7}{-\frac{6}{2}}$$

$$= \frac{\frac{15}{2}}{-3} = \frac{15}{2} \cdot \left(-\frac{1}{3} \right)$$

$$= -\frac{5}{2}$$

CEVAP: A

14. $(x,y) \star (z,t) = (x \cdot y - zt, x \cdot z - yt)$
 $(1,-1) \star (2,0) = (1 \cdot (-1) - (2,0), 1 \cdot 2 - (-1) \cdot 0)$
 $= (-1-0, 2-0)$
 $= (-1,2)$

CEVAP: A



$$15. a \star \left(a - \frac{4}{b}\right) = 3a - 2b + 1$$

$$3 \star 1 = 3 \cdot 3 - 2 \cdot 2 + 1, (a=3, b=2)$$

$$3 \star 1 = 9 - 4 + 1$$

$$3 \star 1 = 6$$

CEVAP: B

$$16. 2 \Delta 3 = 2 \cdot 2 - 3, (2 - 3 = -1(\text{tek}))$$

$$2 \Delta 3 = 4 - 3$$

$$2 \Delta 3 = 1$$

$$4 \Delta 2 = 2 \cdot 4 + 2, (4 - 2 = 2(\text{çift}))$$

$$4 \Delta 2 = 8 + 2$$

$$4 \Delta 2 = 10$$

$$1 \Delta 10 = 2 \cdot 1 - 10, (1 - 10 = -9(\text{tek}))$$

$$1 \Delta 10 = 2 - 10$$

$$1 \Delta 10 = -8$$

CEVAP: B

17.

★	a	b	c	d	e
a	b	c	d	e	a
b	c	d	e	a	b
c	d	e	a	b	c
d	e	a	b	c	d
e	a	b	c	d	e

Birim eleman $\rightarrow e, b^{-1} = c$

$$(a \star x) \star b^{-1} = c$$

$$(a \star x) \star c = c$$

e

$$a \star x = e$$

↓

$$x = d$$

CEVAP: D

18. $a \star b = (a-2)^2 + (b+1)^2$

$$a \star b = 10$$

$$(a-2)^2 + (b+1)^2 = 10$$

a ve b birer tam sayı olduğu için

a-2 = ±1 ve b+1 = ±3 olabilir.

$$a-2 = 1, \quad \left| \begin{array}{l} a-2 = -1 \\ a = 3 \end{array} \right. \quad \left| \begin{array}{l} b+1 = 3 \\ b = 2 \end{array} \right. \quad \left| \begin{array}{l} b+1 = -3 \\ b = -4 \end{array} \right.$$

veya

a-2 = ±3 ve b+1 = ±1 olabilir.

$$a-2 = 3, \quad \left| \begin{array}{l} a-2 = -3 \\ a = 5 \end{array} \right. \quad \left| \begin{array}{l} b+1 = 1 \\ b = 0 \end{array} \right. \quad \left| \begin{array}{l} b+1 = -1 \\ b = -2 \end{array} \right.$$

b'nin alabileceği değerler toplamı

$$2 + (-4) + 0 + (-2) = -4$$

CEVAP: C



19. $A = \{a, b, c, d, e\}$ kümesi üzerinde " Δ " işlemi

Δ	a	b	c	d	e
a	e	a	b	c	d
b	a	b	c	d	c
c	b	c	d	e	a
d	c	d	e	a	b
e	d	e	a	b	c

Birim eleman $\rightarrow b$

$$a^{24} = a^4 = a\Delta a\Delta a\Delta a, \quad \left(\begin{array}{l} 24 \mid 5 \\ 20 \mid 4 \end{array} \right)$$

$$= e\Delta e$$

$$= c$$

$$b^{25} = b, \quad \left(\begin{array}{l} 25 \mid 5 \\ 25 \mid 5 \\ 0 \end{array} \right)$$

$$c^{26} = c^1 = c, \quad \left(\begin{array}{l} 26 \mid 5 \\ 25 \mid 5 \\ 1 \end{array} \right)$$

$$a^{24}\Delta b^{25}\Delta c^{26} = c\Delta b\Delta c$$

$$= c\Delta c$$

$$= d$$

CEVAP: D

20. $x\Delta(y+1) = x+y-xy$

$$(x+1)\Delta y = x+1+y-1-(x+1)\cdot(y-1), \quad \left(\begin{array}{l} x = x+1 \\ y = y-1 \end{array} \right)$$

$$(x+1)\Delta y = x+1+y-1-(xy-x+y-1)$$

$$(x+1)\Delta y = x+y-xy+x-x-y+1$$

$$(x+1)\Delta y = 2x-xy+1$$

CEVAP: A

