

1. $a * b = 2a \cdot b - a + \sqrt{b}$

$$x * 9 = 2 \cdot x \cdot 9 - x + \sqrt{9} = 37$$

$$18x - x + 3 = 37$$

$$17x = 37 - 3$$

$$17x = 34$$

$$x = 2 \text{ bulunur.}$$

Cevap: B

2. $x \triangle y = \frac{2x - y}{x + y}$

$$x = a + 2b, \quad y = 3a - b$$

$$(a + 2b) \triangle (3a - b) = \frac{2 \cdot (a + 2b) - (3a - b)}{a + 2b + 3a - b}$$

$$= \frac{2a + 4b - 3a + b}{4a + b}$$

$$\frac{5b - a}{4a + b} = \frac{4}{3} \Rightarrow 15b - 3a = 16a + 4b$$

$$11b = 19a$$

$$\begin{array}{cc} \downarrow & \downarrow \\ 11 & 19 \end{array}$$

$$a \triangle b = 11 \triangle 19 = \frac{2 \cdot 11 - 19}{11 + 19} = \frac{22 - 19}{30}$$

$$= \frac{3}{30} = \frac{1}{10}$$

Cevap: B

3. $\left(\frac{1}{4} \square \frac{1}{6}\right)$

$$x = \frac{1}{4} > y = \frac{1}{6} \text{ olduğunda}$$

$$\frac{1}{4} \square \frac{1}{6} = \frac{3y}{x} = \frac{3 \cdot \frac{1}{6}}{\frac{1}{4}} = \frac{\frac{1}{2}}{\frac{1}{4}} = \frac{4}{2} = 2$$

$$\bullet \quad 2 \square 3$$

$$x = 2 < y = 3 \text{ olduğundan}$$

$$2 \square 3 = \frac{2x}{y} = \frac{2 \cdot 2}{3} = \frac{4}{3}$$

Cevap: C

4. $a * b = a^2 - ab$

$$\bullet \quad 2 * 1 = 2^2 - 2 \cdot 1 = 4 - 2 = 2$$

$$\bullet \quad 3 * 2 = 3^2 - 3 \cdot 2 = 9 - 6 = 3$$

$$\bullet \quad x * 3 = x^2 - 3x = 10$$

$$x^2 - 3x - 10 = 0$$

$$(x - 5)(x + 2) = 0$$

$$x - 5 = 0 \quad x + 2 = 0$$

$$x = 5 \quad x \neq -2$$

Cevap: E

5. $a \triangle b = -4(b \triangle a) + b$

$$3 \triangle 5 = -4(5 \triangle 3) + 5$$

$$5 \triangle 3 = -4(3 \triangle 5) + 3$$

işleminde $(5 \triangle 3)$ yerine yazılır ise

$$3 \triangle 5 = -4(-4(3 \triangle 5) + 3) + 5$$

$$3 \triangle 5 = 16(3 \triangle 5) - 12 + 5$$

$$7 = 15(3 \triangle 5)$$

$$\frac{7}{15} = (3 \triangle 5) \text{ bulunur.}$$

Cevap: D

$$6. \quad x \odot y = \frac{x \cdot y}{x+y}$$

$$\bullet \quad \frac{1}{3} \odot \frac{2}{5} = 2 \odot \frac{1}{a}$$

$$\frac{\frac{1}{3} \cdot \frac{2}{5}}{\frac{1}{3} + \frac{2}{5}} = \frac{2 \cdot \frac{1}{a}}{2 + \frac{1}{a}}$$

$$\frac{\frac{2}{15}}{\frac{5+6}{15}} = \frac{\frac{2}{a}}{\frac{2a+1}{a}}$$

$$\frac{2}{15} \cdot \frac{15}{11} = \frac{2}{a} \cdot \frac{a}{2a+1}$$

$$\frac{2}{11} = \frac{2}{2a+1} \Rightarrow 2a+1 = 11$$

$$2a = 10$$

$$a = 5 \text{ bulunur.}$$

Cevap: B

$$7. \quad \textcircled{x} = \frac{2+x}{3x}$$

$$2 * 3 = \frac{\textcircled{2} - \textcircled{3}}{\textcircled{2} + \textcircled{3}}$$

$$\textcircled{2} = \frac{2+2}{3 \cdot 2} = \frac{4}{6} = \frac{2}{3}$$

$$\textcircled{3} = \frac{2+3}{3 \cdot 3} = \frac{5}{9}$$

$$2 * 3 = \frac{\frac{2}{3} - \frac{5}{9}}{\frac{2}{3} + \frac{5}{9}} = \frac{\frac{6-5}{9}}{\frac{6+5}{9}} = \frac{1}{11}$$

Cevap: C

$$8. \quad x \triangle y = \begin{cases} x+y & x \leq y \text{ ise} \\ x \cdot y & x > y \text{ ise} \end{cases}$$

$$8 \triangle (2 \triangle a) = 16$$

k olsun

i) $8 > k$ olsa

$$8 \triangle k = x \cdot y = 8 \cdot k = 16$$

$$k = 2$$

ii) $8 \leq k$ olsa

$$8 \triangle k = x + y = 8 + k = 16$$

$$k = 8$$

* $k = 2$ için

$$2 \triangle a = 2$$

$$2 > a$$

$$2 \cdot a = 2$$

$$a = 1$$

$k = 8$ için

$$2 \triangle a = 8$$

$$2 < a$$

$$2 + a = 8$$

$$a = 6$$

O halde a'nın alabileceği değerlerin toplamı

$$1 + 6 = 7 \text{ bulunur.}$$

Cevap: C

$$9. \quad a \triangle b = a^2 + a \cdot b + a^b$$

$$3 \triangle 4 = 1 \triangle x$$

$$3^2 + 3 \cdot 4 + 3^4 = 1^2 + 1 \cdot x + 1^x$$

$$9 + 12 + 81 = 1 + x + 1$$

$$100 = x \text{ bulunur.}$$

Cevap: E

10. $a * b = 3.(a^2 + b^2) - 12$
 $4 * x = 48$
 $3.(4^2 + x^2) - 12 = 48$
 $3.(16 + x^2) = 60$
 $16 + x^2 = 20$
 $x^2 = 4$
 $x = \pm 2$
 $x = 2$ ve $x = -2$ olur.

Bu değerlerin çarpımı $(-2).(2) = -4$

Cevap: C

12. $a \triangle b = 2a.b + a - b^2$
 $5 \triangle 3 = 2.5.3 + 5 - 3^2$
 $= 30 + 5 - 9$
 $5 \triangle 3 = 26$
 $a \odot b = 5(a \triangle b) - 20$
 $5 \odot 3 = 5.(5 \triangle 3) - 20$
 $= 5.26 - 20$
 $= 130 - 20$
 $= 110$ bulunur.

Cevap: D

11. $a \triangle b = (a + 1)!.(b - 1)!$
 $\frac{(x-1) \triangle x}{x \triangle (x-1)} = \frac{(x-1+1)!.(x-1)!}{(x+1)!.(x-1-1)!} = \frac{5}{7}$
 $= \frac{x!.(x-1)!}{(x+1)!.(x-2)!} = \frac{5}{7}$
 $= \frac{x!. \cancel{(x-2)!} .(x-1)}{x!. (x+1). \cancel{(x-2)!}} = \frac{5}{7}$
 $= \frac{x-1}{x+1} = \frac{5}{7}$

$$7x - 7 = 5x + 5$$

$$7x - 5x = 5 + 7$$

$$2x = 12$$

$$x = 6 \text{ bulunur.}$$

Cevap: D