1. $a.x = b.y = c.z = 30$

$\dfrac{x+y}{x.y}+\dfrac{y+z}{y.z}+\dfrac{x+z}{x.z}=6$ $\Rightarrow$ **= a + b + c = ?**

$ax = by = cz = 30 \Rightarrow x = \dfrac{30}{a}\ ,\ y = \dfrac{30}{b}\ ,\ z = \dfrac{30}{c}$

$$\frac{x+y}{x.y}+\frac{y+z}{y.z}+\frac{x+z}{x.z} = \frac{x}{x.y}+\frac{y}{x.y}+\frac{y}{y.z}+\frac{z}{y.z}+\frac{x}{x.z}+\frac{z}{x.z}$$

$$= \frac{1}{y}+\frac{1}{x}+\frac{1}{z}+\frac{1}{y}+\frac{1}{z}+\frac{1}{x}$$

$$= 2.\left(\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right) = 6$$

$$\Rightarrow \quad \frac{1}{x}+\frac{1}{y}+\frac{1}{z} = 3$$

$$\Rightarrow \quad \frac{a}{30}+\frac{b}{30}+\frac{c}{30} = 3$$

$$\Rightarrow \quad \frac{a+b+c}{30} = 3$$

$$\Rightarrow \quad \boxed{a+b+c = 90}$$

Cevap: E

2. $\dfrac{x-y}{2}=\dfrac{y+z}{3}=\dfrac{z}{4}=k$ olsun.

$$\Rightarrow \begin{cases} x - y = 2k \\ y + z = 3k \\ \boxed{z = 4k} \end{cases}$$

$y + z = 3k \rightarrow y + 4k = 3k \rightarrow \boxed{y = -k}$

$x - y = 2k \rightarrow x + k = 2k \rightarrow \boxed{x = k}$

$\Rightarrow 2x - 3y - z = 7$

$\Rightarrow 2k + 3k - 4k = 7$

$\Rightarrow k = 7$

$\Rightarrow \boxed{x = 7}$

Cevap: D

3. $\dfrac{a}{-2}=\dfrac{b}{-3}=\dfrac{c}{-4}=k \Rightarrow a = -2k\ ,\ b = -3k\ ,\ c = -4k$

$a - b + c = 3 \Rightarrow -2k + 3k - 4k = 3 \Rightarrow -3k = 3 \Rightarrow \boxed{k = -1}$

$\Rightarrow a = 2\ ,\ b = 3\ ,\ c = 4$

$\Rightarrow \dfrac{b.c}{a}=\dfrac{3.4}{2}=\boxed{6}$

Cevap: B

4. $\dfrac{a}{2}=\dfrac{b}{3}=\dfrac{c}{5}=k \Rightarrow a = 2k\ ,\ b = 3k\ ,\ c = 5k$

$2a + 3b - c = 16 \Rightarrow 2.2k + 3.3k - 5k = 16$

$\Rightarrow 4k + 9k - 5k = 16$

$\Rightarrow 8k = 16 \Rightarrow \boxed{k = 2}$

$\Rightarrow a - 2b + c = 2k - 6k + 5k = k = \boxed{2}$

Cevap: A

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

$\dfrac{b}{2} = 3c \Rightarrow b = 6c$

$7a + 2b = 69 \Rightarrow 7a + 12c = 69$

$\quad\ \downarrow \quad\ \downarrow$

$\quad 3 \quad\ 4$

$c = 4\ ,\ a = 3$ için eşitlik sağlanır.

$\min(a + c) = 4 + 3 = \boxed{7}$

Cevap: C

6. $a + \dfrac{1}{b} = 2 \Rightarrow a.b + 1 = 2b \Rightarrow a.b = 2b - 1$

$b + \dfrac{2}{a} = 3 \Rightarrow a.b + 2 = 3a \Rightarrow a.b = 3a - 2$

$\Rightarrow 2b - 1 = 3a - 2$

$\Rightarrow \boxed{3a = 2b + 1}$

$\Rightarrow \dfrac{3a+2b-1}{4b}=\dfrac{2b+\cancel{1}+2b-\cancel{1}}{4b}=\dfrac{4b}{4b}=\boxed{1}$

Cevap: A

7. $\frac{x}{a}=\frac{y}{b}=\frac{z}{c}=2 \Rightarrow x=2a,\ y=2b,\ z=2c$

$a.x+b.y+c.z=5 \Rightarrow a.2a+b.2b+c.2c=5$

$2a^2+2b^2+2c^2=5$

$2.(a^2+b^2+c^2)=5$

$\boxed{a^2+b^2+c^2=\frac{5}{2}}$

Cevap: C

8. $ax=by=cz=\frac{1}{6} \Rightarrow a=\frac{1}{6x},\ b=\frac{1}{6y},\ c=\frac{1}{6z}$

$a+b+c=30 \Rightarrow \underbrace{\frac{1}{6x}}_{(y.z)}+\underbrace{\frac{1}{6y}}_{(x.z)}+\underbrace{\frac{1}{6z}}_{(x.y)}=30$

$\Rightarrow \frac{y.z+x.z+x.y}{\underbrace{6.x.y.z}_{2}}=30$

$\Rightarrow \frac{x.y+y.z+x.z}{12}=30$

$\Rightarrow x.y+y.z+x.z=\boxed{360}$

Cevap: D

9. $a+\frac{3}{b}=7 \Rightarrow a.b+3=7b \Rightarrow a.b=7b-3$

$2b+\frac{5}{a}=8 \Rightarrow 2a.b+5=8a \Rightarrow a.b=\frac{8a-5}{2}$

$7b-3=\frac{8a-5}{2}$

$14b-6=8a-5$

$14b-8a=1$

$\boxed{7b-4a=\frac{1}{2}}$

$4a+\frac{1}{2}$

$\frac{\textcircled{7b}+4a-\frac{1}{2}}{2a}=\frac{4a+\frac{1}{\cancel{2}}+4a-\frac{1}{\cancel{2}}}{2a}=\frac{8\cancel{a}}{2\cancel{a}}=\boxed{4}$

Cevap: B

10. $\frac{y}{3}=\frac{x}{5} \Rightarrow x=5k,\ y=3k$

$6x+7y=34 \Rightarrow 6.5k+7.3k=34$

$30k+21k=34$

$51k=34$

$k=\frac{34}{51}=\frac{2}{3}$

$\Rightarrow x-y=5k-3k=2k=2\cdot\frac{2}{3}=\boxed{\frac{4}{3}}$

Cevap: C

11. $\frac{a}{b}=\frac{c}{d}=12 \Rightarrow a=12b,\ c=12d$

$\frac{a-b-c+d}{b-d}=\frac{12b-b-12d+d}{b-d}=\frac{11b-11d}{b-d}$

$=\frac{11.(b-\cancel{d})}{\cancel{b-d}}$

$=\boxed{11}$

Cevap: B

12. $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}=\frac{1}{5} \Rightarrow b=5a,\ d=5c,\ f=5e$

$\boxed{2a-3c+5e=-8}$

$2b+5f=35 \Rightarrow 2.5a+5.5e=35 \Rightarrow \boxed{10a+25e=35}$

$\begin{array}{rl} {\scriptstyle -5}/ & 2a-3c+5e=-8 \\ & 10a+25e=35 \\ \hline \end{array}$

$\begin{array}{rl} & -\cancel{10a}+15c-\cancel{25e}=40 \\ + & \cancel{10a}+\cancel{25e}=35 \\ \hline & 15c=75 \end{array}$

$\boxed{c=5}$

$\Rightarrow d=5c=5.5=\boxed{25}$

Cevap: E

13. $bc \neq 0$

$\dfrac{a+3b}{b} = \dfrac{7}{3} \Rightarrow 3a + 9b = 7b \Rightarrow \boxed{3a = -2b}$

$\dfrac{a+c}{c} = \dfrac{1}{3} \Rightarrow 3a + 3c = c \Rightarrow \boxed{3a = -2c}$

$\Rightarrow b = c$

$\dfrac{a-c}{b-a} = \dfrac{a-c}{c-a} = \boxed{-1}$

Cevap: B

14. $\dfrac{a+2b}{b} = \dfrac{7}{3} \Rightarrow 3a + 6b = 7b \Rightarrow 3a = b$

$\dfrac{a-2c}{c} = \dfrac{1}{3} \Rightarrow 3a - 6c = c \Rightarrow 3a = 7c$

$$\frac{a+c}{b-a} = \frac{a+\frac{3a}{7}}{3a-a} = \frac{\frac{10a}{7}}{2a} = \frac{\overset{5}{\cancel{10}a}}{7} \cdot \frac{1}{\cancel{2}a}$$

$$= \boxed{\frac{5}{7}}$$

Cevap: C

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

$2a = b \Rightarrow {}^{5}/\ \dfrac{a}{b} = \dfrac{1}{2} \Rightarrow \dfrac{a}{b} = \dfrac{5}{10}$

$5c = 4b \Rightarrow {}^{2}/\ \dfrac{c}{b} = \dfrac{4}{5} \Rightarrow \dfrac{c}{b} = \dfrac{8}{10}$

$a = 5k,\ b = 10k,\ c = 8k$

$\boxed{a < c < b}$

Cevap: B

16. x ve y ; 5 ve 7 ile ters orantılı ise $x = \dfrac{k}{5}$, $y = \dfrac{k}{7}$

$$3x + 9y = 99 \Rightarrow 3 \cdot \underset{(7)}{\frac{k}{5}} + 9 \cdot \underset{(5)}{\frac{k}{7}} = 99 \Rightarrow \frac{2ik + 45k}{35} = 99$$

$$\Rightarrow \frac{\overset{2}{\cancel{66}}k}{35} = \overset{3}{\cancel{99}} \Rightarrow \boxed{k = \frac{3.35}{2}}$$

$$x - y = \underset{(7)}{\frac{k}{5}} - \underset{(5)}{\frac{k}{7}} = \frac{2k}{35} = \cancel{2} \cdot \frac{3.\cancel{35}}{\cancel{2}} \cdot \frac{1}{\cancel{35}} = \boxed{3}$$

Cevap: E

17. $\dfrac{a}{b} = \dfrac{c}{d} = \dfrac{e}{f} = \dfrac{1}{4} \Rightarrow b = 4a\ ,\ d = 4c\ ,\ f = 4e$

$\boxed{2a - 3c + e = 5}$

$3d - f = 16 \Rightarrow 3.4c - 4e = 16 \Rightarrow \boxed{12c - 4e = 16}$

$$\begin{array}{rl} {}^{4}/\ & 2a - 3c + e = 5 \\ & 12c - 4e = 16 \\ \hline \end{array}$$

$$\begin{array}{rl} & 8a - \cancel{12c} + \cancel{4e} = 20 \\ + & \cancel{12c} - \cancel{4e} = 16 \\ \hline & 8a = 36 \end{array}$$

$$a = \frac{36}{8}$$

$$= \boxed{\frac{9}{2}}$$

Cevap: A

18.

$$\frac{1}{a} + \frac{1}{b} = 15$$

$$\frac{1}{b} + \frac{1}{c} = 17$$

$$+ \quad \frac{1}{a} + \frac{1}{c} = 22$$

$$2.\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right) = 44 \Rightarrow \underbrace{\frac{1}{a} + \frac{1}{b}}_{15} + \frac{1}{c} = 22$$

$$\Rightarrow \frac{1}{c} = 7$$

$$\Rightarrow \boxed{c = \frac{1}{7}}$$

Cevap: C

19. $n \in N$

$$\left.\begin{array}{l} a = 2^n + 6^n \\ b = 6^n - 2^n \end{array}\right\} \Rightarrow \frac{a}{b} = \frac{2^n + 6^n}{6^n - 2^n} = \frac{14}{13}$$

$$13.2^n + 13.6^n = 14.6^n - 14.2^n$$
$$27.2^n = 6^n$$
$$3^3.2^n = 2^n.3^n$$
$$3^3 = 3^n \Rightarrow \boxed{n = 3}$$

$$a - b = (2^n + 6^n) - (6^n - 2^n) = 2^n + 6^n - 6^n + 2^n = 2.2^n$$
$$= 2.2^3$$
$$= 2^4$$
$$= \boxed{16}$$

Cevap: B

20.

$$\left.\begin{array}{l} \frac{K}{L} = \frac{1}{7} \\ 7/\quad \frac{L}{M} = \frac{1}{4} \Rightarrow \frac{L}{M} = \frac{7}{28} \end{array}\right\} \Rightarrow \begin{array}{l} K = k \\ L = 7k \\ M = 28k \end{array}$$

$$K + L + M = 72 \Rightarrow k + 7k + 28k = 72$$
$$\Rightarrow 36k = 72$$
$$\Rightarrow k = 2$$
$$\Rightarrow L = 7k = 7.2 = \boxed{14}$$

Cevap: C