1.

$$\frac{xy^2 - 4x - 3y^2 + 12}{xy - 3y - 2x + 6} + \frac{xy - 2x - y + 2}{x - 1}$$

$$= \frac{xy^2 - 3y^2 - 4x + 12}{xy - 3y - 2x + 6} + \frac{xy - y - 2x + 2}{x - 1}$$

$$= \frac{y^2 \cdot (x - 3) - 4 \cdot (x - 3)}{y \cdot (x - 3) - 2 \cdot (x - 3)} + \frac{y \cdot (x - 1) - 2(x - 1)}{x - 1}$$

$$= \frac{(x - 3) \cdot (y^2 - 4)}{(x - 3) \cdot (y - 2)} + \frac{(x - 1) \cdot (y - 2)}{x - 1}$$

$$= \frac{(y - 2) \cdot (y + 2)}{y - 2} + y - 2$$

$$= y + 2 + y - 2 = 2y$$

Cevap: A

2.

$$\left(\frac{\frac{x}{1} + \frac{1}{1} + \frac{1}{x}}{\frac{(x)}{x^3 - 1} \frac{(x)}{}} \right) \cdot (-x^2 + x)$$

$$= \frac{\frac{x^2 + x + 1}{x}}{(x - 1) \cdot (x^2 + x + 1)} \cdot x \cdot (-x + 1)$$

$$= \frac{x^2 + x + 1}{x} \cdot \frac{1}{(x - 1) \cdot (x^2 + x + 1)} \cdot (-x) \cdot (x - 1)$$

$$= -1$$

Cevap: B

3.

$$\begin{array}{cc} 2x & -1 \\ x & -1 \\ \uparrow & \uparrow \end{array}$$

$$\frac{x^2 - 1}{x + 1} - \frac{2x^2 - 3x + 1}{x - 1} = \frac{(x - 1) \cdot (x + 1)}{x + 1} - \frac{(2x - 1) \cdot (x - 1)}{x - 1}$$

$$= (x - 1) - (2x - 1)$$

$$= x - 1 - 2x + 1$$

$$= -x$$

Cevap: D

4.

$$\frac{16 - (4a - a^2)^2}{a^2 - 4a - 4} \cdot \frac{1}{2 - a}$$

$$= \frac{(4 - (4a - a^2)) \cdot (4 + (4a - a^2))}{(a^2 - 4a - 4)} \cdot \frac{1}{2 - a}$$

$$= \frac{(4 - 4a + a^2) \cdot (4 + 4a - a^2)^{-1}}{a^2 - 4a - 4} \cdot \frac{1}{2 - a}$$

$$= -(a^2 - 4a + 4) \cdot \frac{1}{2 - a}$$

$$= -(a - 2)^2 \cdot \frac{-1}{a - 2} = a - 2 = -2 + a$$

Cevap: A

5. $m - n = 5$

$n + 2r = 4$

$\Rightarrow n^2 - 2mr - mn + 2nr = n^2 - mn - 2mr + 2nr$

$\qquad = -n(m - n) - 2r \cdot (m - n)$

$\qquad = (m - n) \cdot (-n - 2r)$

$\qquad = -\underbrace{(m - n)}_{5} \cdot \underbrace{(n + 2r)}_{4}$

$\qquad = -20$

Cevap: C

6.

$$\left(\frac{1 + k}{1 - k} - \frac{1 - k}{1 + k} \right) \cdot \left(k - \frac{1}{k} \right)$$
$$\quad (1 + k) \quad (1 - k)$$

$$= \frac{(1 + k)^2 - (1 - k)^2}{(1 - k) \cdot (1 + k)} \cdot \frac{k^2 - 1}{k}$$

$$= \frac{(1 + 2k + k^2) - (1 - 2k + k^2)}{1 - k^2} \cdot \frac{k^2 - 1^{-1}}{k}$$

$$= (1 + 2k + k^2 - 1 + 2k - k^2) \cdot \frac{-1}{k} = 4k \cdot \frac{-1}{k} = -4$$

Cevap: B

7. $\left(\dfrac{1}{\underset{(a-\sqrt{b})}{a+\sqrt{b}}} - \dfrac{1}{\underset{(a+\sqrt{b})}{a-\sqrt{b}}}\right) \cdot \left(\dfrac{a^2-b}{\sqrt{b}}\right)$

$= \dfrac{(a-\sqrt{b})-(a+\sqrt{b})}{a^2-(\sqrt{b})^2} \cdot \dfrac{a^2-b}{\sqrt{b}}$

$= \dfrac{\cancel{a}-\sqrt{b}-\cancel{a}-\sqrt{b}}{a^2\cancel{-b}} \cdot \dfrac{a^2\cancel{-b}}{\sqrt{b}}$

$= \dfrac{-2\cancel{\sqrt{b}}}{\cancel{\sqrt{b}}} = -2$

Cevap: B

8. $\dfrac{x^4+x^2+1}{x^3+1} = \dfrac{(x^2)^2+x^2+1}{x^3+1}$

$= \dfrac{(x^2+1)^2-x^2}{x^3+1}$

$= \dfrac{(x^2+1-x)\cdot(x^2+1+x)}{(x+1)\cdot(x^2-x+1)}$

$= \dfrac{x^2+x+1}{x+1}$

Cevap: B

9. $y \neq \pm 1, x \neq 0$

$\left(\dfrac{x-\dfrac{x}{y}}{y-\dfrac{1}{y}}\right) : \left(\dfrac{x}{y^2-1}\right) + 1 = \left(\dfrac{\dfrac{x\cdot y-x}{y}}{\dfrac{y^2-1}{y}}\right) : \left(\dfrac{x}{y^2-1}\right) + 1$

$= \dfrac{x\cdot y-x}{\cancel{y}} \cdot \dfrac{\cancel{y}}{y^2\cancel{-1}} \cdot \dfrac{y^2\cancel{-1}}{x} + 1$

$= \dfrac{x\cdot y-x}{x} + 1$

$= \dfrac{x\cdot y}{x} - \dfrac{x}{x} + 1$

$= y - \cancel{1} + \cancel{1} = y$

Cevap: A

10. $2x^2-6x+3=0 \Rightarrow ax^2+bx+c = 2x^2-6x+3=0$

$a=2,\quad b=-6,\quad c=3$

$\Delta = b^2-4ac = (-6)^2-4\cdot2\cdot3 = 36-24 = 12$

$x_{1,2} = \dfrac{-b\pm\sqrt{\Delta}}{2a} = \dfrac{-(-6)\pm\sqrt{12}}{2\cdot2} = \dfrac{6\pm2\sqrt{3}}{4}$

$\qquad\qquad = \dfrac{3\pm\sqrt{3}}{2}$

$\Rightarrow x_1 = \dfrac{3-\sqrt{3}}{2}\quad,\quad x_2 = \dfrac{3+\sqrt{3}}{2}$

Cevap: B

11. $\dfrac{(a^2-1)^2}{1-a-a^2+a^3} = \dfrac{(a^2-1)^2}{1-a-a^2\cdot(1-a)}$

$= \dfrac{(1-a^2)^2}{(1-a)\cdot(1-a^2)}$

$= \dfrac{(1-a^2)\cdot(1\cancel{-a^2})}{(1-a)\cdot(1\cancel{-a^2})}$

$= \dfrac{(1\cancel{-a})\cdot(1+a)}{1\cancel{-a}}$

$= a+1$

Cevap: D

12. $\left(\dfrac{x^3+y^3}{x^3-y^3} : \dfrac{x^2-xy+y^2}{x-y}\right)(x^2+xy+y^2)$

$= \dfrac{(x+y)\cdot(x^2\cancel{-xy+y^2})}{(x\cancel{-y})\cdot(x^2+xy+y^2)} \cdot \dfrac{x\cancel{-y}}{x^2\cancel{-xy+y^2}} \cdot x^2\cancel{+xy+y^2}$

$= x+y$

Cevap: D

13. $x \neq y \Rightarrow \underset{(1) \quad (y)}{\dfrac{1}{\dfrac{x}{y^2} - \dfrac{1}{y}}} + \underset{(1) \quad (x)}{\dfrac{1}{\dfrac{y}{x^2} - \dfrac{1}{x}}} = \dfrac{1}{\dfrac{x-y}{y^2}} + \dfrac{1}{\dfrac{y-x}{x^2}}$

$= \dfrac{y^2}{x-y} + \dfrac{x^2}{y-x}$

$= \dfrac{y^2}{x-y} - \dfrac{x^2}{x-y}$

$= \dfrac{y^2 - x^2}{x-y}$

$= \dfrac{\overset{-1}{(\cancel{y-x})}.(y+x)}{\cancel{x-y}}$

$= -(x+y)$

$= -x - y$

Cevap: C

14. $\dfrac{m^2 + n^2 - 2mn}{\dfrac{1}{m} - \dfrac{1}{n}} : \dfrac{m+n}{\dfrac{1}{m.n}} = \dfrac{m^2 - 2m.n + n^2}{\dfrac{n-m}{m.n}} : (m+n).m.n$

$= (m-n)^2 \cdot \dfrac{\cancel{m.n}}{n-m} \cdot \dfrac{1}{(m+n).\cancel{m.n}}$

$= \dfrac{\overset{-1}{(\cancel{m-n})}.(m-n)}{(\cancel{n-m}).(m+n)}$

$= \dfrac{-(m-n)}{m+n}$

$= \dfrac{n-m}{n+m}$

Cevap: B

15.
$$\begin{array}{cc} x & 3 \\ x & 2 \\ \uparrow & \uparrow \end{array}$$

$\dfrac{x^2 + 5x + 6}{x^3 + x^2 - 2x} \cdot \dfrac{x^3 - x}{x^2 + 6x + 5}$

$$\begin{array}{cc} \downarrow & \downarrow \\ x & 5 \\ x & 1 \end{array}$$

$= \dfrac{(x+3).(x+2)}{\cancel{x}.(x^2 + x - 2)} \cdot \dfrac{\cancel{x}.(x^2 - 1)}{(x+5).(x+1)}$

$$\begin{array}{cc} \downarrow & \downarrow \\ x & 2 \\ x & -1 \end{array}$$

$= \dfrac{(x+3).(\cancel{x+2})}{(\cancel{x+2}).(\cancel{x-1})} \cdot \dfrac{(\cancel{x-1}).(\cancel{x+1})}{(x+5).(\cancel{x+1})}$

$= \dfrac{x+3}{x+5}$

Cevap: E

16.
$$\begin{array}{cccc} x & -3 & x & -2 \\ x & 1 & x & 1 \\ \uparrow & \uparrow & \uparrow & \uparrow \end{array}$$

$\dfrac{x^2 - 2x - 3}{6x^2 + 7x - 3} : \dfrac{x^2 - x - 2}{2x^2 - x - 6}$

$$\begin{array}{cccc} \downarrow & \downarrow & \downarrow & \downarrow \\ 3x & -1 & 2x & 3 \\ 2x & 3 & x & -2 \end{array}$$

$= \dfrac{(x-3).(\cancel{x+1})}{(3x-1).(\cancel{2x+3})} \cdot \dfrac{(2x+3).(\cancel{x-2})}{(\cancel{x-2}).(\cancel{x+1})}$

$= \dfrac{x-3}{3x-1}$

Cevap: D

17. $a = \sqrt{5} + \sqrt{3}$

$a^2 - 2\sqrt{3}a + 3 = a.(a - 2\sqrt{3}) + 3$

$\qquad = (\sqrt{5} + \sqrt{3}).(\sqrt{5} + \sqrt{3} - 2\sqrt{3}) + 3$

$\qquad = (\sqrt{5} + \sqrt{3}).(\sqrt{5} - \sqrt{3}) + 3$

$\qquad = (\sqrt{5})^2 - (\sqrt{3})^2 + 3$

$\qquad = 5 - \cancel{3} + \cancel{3} = 5$

Cevap: C

18. $\dfrac{a^2+b^2}{a.b}=3 \;\Rightarrow\; \dfrac{a^2}{b^2}+\dfrac{b^2}{a^2}=\left(\dfrac{a}{b}\right)^2+\left(\dfrac{b}{a}\right)^2=\,?$

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

$$\left(\dfrac{a}{b}+\dfrac{b}{a}\right)^2=3^2 \;\Rightarrow\; \left(\dfrac{a}{b}\right)^2+2\cdot\dfrac{\cancel{a}}{\cancel{b}}\cdot\dfrac{\cancel{b}}{\cancel{a}}+\left(\dfrac{b}{a}\right)^2=9$$

$$\left(\dfrac{a}{b}\right)^2+\left(\dfrac{b}{a}\right)^2=9-2=7$$

Cevap: C

19. $a+b=\dfrac{1}{6} \;\Rightarrow\; \dfrac{(a-b)^2+ab}{3a^3+3b^3}=\dfrac{a^2-2ab+b^2+ab}{3.(a^3+b^3)}$

$$=\dfrac{a^2-ab+b^2}{3.(a+b).(a^2-ab+b^2)}$$

$$=\dfrac{1}{\cancel{3}\cdot\dfrac{1}{\underset{2}{\cancel{6}}}}=\dfrac{1}{\dfrac{1}{2}}=2$$

Cevap: B

20. $\dfrac{a^5+b^3a^2}{a^2-b^2}:\dfrac{\dfrac{a^2+b^2}{b}-a}{\dfrac{1}{b}-\dfrac{1}{a}}$

$$=\dfrac{a^2.(a^3+b^3)}{(a-b).(a+b)}\cdot\dfrac{\dfrac{a-b}{a.b}}{\dfrac{a^2+b^2-a.b}{b}}$$

$$=\dfrac{a^2.(a+b).(a^2-ab+b^2)}{(a-b).(a+b)}\cdot\dfrac{a-b}{a.b}\cdot\dfrac{b}{a^2-ab+b^2}$$

$$=\dfrac{a^2}{a}=a$$

Cevap: D