

Test 1.

$$1) \quad \frac{3x+15}{x^2-25} - \frac{10}{2x-10} = \frac{3(x+5)}{(x-5)(x+5)} - \frac{10^5}{2(x-5)}$$

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

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

$$EK\eta = x \cdot (x+2)$$

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

$$3) \quad \frac{1}{2x+8} + \frac{x}{x^2-16} = \frac{1}{2(x+4)} + \frac{x}{(x-4)(x+4)}$$

$$EK\eta = 2(x-4)(x+4)$$

$$= \frac{x-4+2x}{2(x-4)(x+4)} = \frac{3x-4}{2(x-4)(x+4)}$$

$$4) \quad \left(\frac{1+x}{1-x} - 1 \right) : \left(1 - \frac{1}{1-x} \right) =$$

$$= \left(\frac{1+x}{1-x} - \frac{1-x}{1-x} \right) : \left(\frac{1-x}{1-x} - \frac{1}{1-x} \right) =$$

$$= \frac{1+x-1+x}{1-x} : \frac{1-x-1}{1-x} = \frac{2x}{1-x} \cdot \frac{1-x}{-x} = -2$$

$$5) \frac{5\sigma^2}{\sigma^2 - \sigma\tau} + \frac{5\tau}{\tau^2 - \tau\sigma} = \frac{5\sigma^2}{\sigma(\sigma - \tau)} + \frac{5\tau}{\tau(\tau - \sigma)} =$$

$$= \frac{5\sigma}{\sigma - \tau} - \frac{5}{\sigma - \tau} = \frac{5\sigma - 5}{\sigma - \tau} = \frac{5(\sigma - 1)}{\sigma - \tau}$$

$$6) \frac{x^2 - 1}{x^2 + 2x - 3} - \frac{1}{x - 1} + \frac{2}{x + 3} =$$

$$\begin{array}{l|l} k+j=2 & \Rightarrow k=3 \\ k \cdot j = -3 & j = -1 \end{array} \quad \text{d.h. } x^2 + 2x - 3 = (x+3)(x-1)$$

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

$$EK\eta = (x+3)(x-1)$$

$$= \frac{x^2 - 1 - x - 3 + 2x - 2}{(x+3)(x-1)} = \frac{x^2 + x - 6}{(x+3)(x-1)}$$

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

$$\begin{array}{l|l} k+j=1 & \Rightarrow k=2 \\ k \cdot j = -6 & j = +3 \end{array}$$

$$\Rightarrow x^2 + x - 6 = (x-2)(x+3)$$

$$7) a) \frac{x}{x} + \frac{x}{x} - \frac{2}{1}$$

$$EK\eta = xx$$

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

$$b) \left(\frac{x}{x} + \frac{x}{x} - 2 \right) \div \frac{2x - 2x}{xx} = \frac{(x-x)^2}{xx} \cdot \frac{xx}{2(x-x)}$$

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

$$8) \frac{k^3 - 1^3}{x - 4} \cdot \frac{x^2 - 4^2}{1 - k} \cdot \frac{1}{x + 4} \cdot \frac{14}{k^2 + 1^2 + k1} =$$

$$= \frac{(k-1)(\cancel{k^2+k1+1^2}) \cdot (\cancel{x+4})(\cancel{x-4}) \cdot 14}{(\cancel{x-4})(1-k)(\cancel{x+4})(\cancel{k^2+1^2+k1})} =$$

$$= \frac{14(k-1)}{-(k-1)} = -14$$

$$9) \left(1 + \frac{a}{b}\right) \cdot \frac{a}{a+b} = \left(\frac{b}{b} + \frac{a}{b}\right) \frac{a}{a+b}$$

$$= \frac{\cancel{b+a}}{b} \frac{a}{a+b} = \frac{a}{b}$$