

تمارين المقادير الكسرية

العمليات الجبرية للمقادير الكسرية :

▪ جمع و طرح المقادير الكسرية :

$$\frac{Z}{Y} - \frac{X}{Y} = \frac{Z-X}{Y} , Y \neq 0 , \quad \frac{Z}{Y} + \frac{X}{Y} = \frac{Z+X}{Y} , Y \neq 0$$

$$\frac{Z}{X} + \frac{W}{Y} = \frac{ZY+XW}{XY} , \quad \frac{Z}{X} - \frac{W}{Y} = \frac{ZY-XW}{XY}$$

▪ ضرب و قسمة المقادير الكسرية :

$$\frac{Z}{Y} \div \frac{X}{W} = \frac{Z}{Y} \times \frac{W}{X} = \frac{Z \cdot W}{Y \cdot X}$$

$$\frac{3}{X^2} \div \frac{1}{X^3} : \text{نتج المقدار}$$

$$\text{A) } 3X$$

$$\text{B) } 3X^2$$

$$\text{C) } \frac{3}{X}$$

$$\text{D) } X^2 + 1$$

مثال : اوجد ناتج ما يلي :

$$1) \frac{5X+3}{6X} - \frac{X+1}{2X} = \frac{5X+3}{6X} - \frac{3(X+1)}{3 \times 2X} = \frac{5X+3}{6X} - \frac{3X+3}{6X} = \frac{5X+3-3X-3}{6X} = \frac{2X}{6X} = \frac{2X}{2 \times 3X} = \frac{1}{3}$$

$$2) \frac{X^3-X}{2X^2} - \frac{X^2-2}{X} = \frac{X^3-X}{2X^2} - \frac{2X(X^2-2)}{2X \cdot X} = \frac{X^3-X}{2X^2} - \frac{2X^3-4X}{2X^2} = \frac{X^3-X-2X^3+4X}{2X^2} = \frac{-X^3+3X}{2X^2} = \frac{X(3-X^2)}{2X^2} = \frac{3-X^2}{2X}$$

$$3) \frac{1}{X^2-4} + \frac{2X}{X+2} = \frac{1}{X^2-4} + \frac{(X-2)2X}{(X-2)(X+2)} = \frac{1}{X^2-4} + \frac{2X^2-4X}{X^2-4} = \frac{1+2X^2-4X}{X^2-4} = \frac{2X^2-4X+1}{X^2-4}$$

$$4) \frac{Y}{X^2-X+1} + \frac{X}{Y} = \frac{Y \cdot Y}{Y(X^2-X+1)} + \frac{X(X^2-X+1)}{Y(X^2-X+1)} = \frac{Y^2}{Y(X^2-X+1)} + \frac{X^3-X^2+X}{Y(X^2-X+1)} = \frac{X^3-X^2+Y^2+X}{X^2Y-XY+Y}$$

$$5) \frac{Y+1}{2Y-5} + \frac{3Y+1}{Y-2} = \frac{(Y-2)(Y+1)}{(Y-2)(2Y-5)} + \frac{(2Y-5)(3Y+1)}{(2Y-5)(Y-2)} = \frac{Y^2+Y-2Y-2}{(Y-2)(2Y-5)} + \frac{6Y^2+2Y-15Y-5}{(2Y-5)(Y-2)} = \frac{Y^2-Y-2}{(Y-2)(2Y-5)} + \frac{6Y^2-13Y-5}{(2Y-5)(Y-2)} = \frac{Y^2-Y-2+6Y^2-13Y-5}{(Y-2)(2Y-5)} = \frac{7Y^2-14Y-7}{2Y^2-9Y+10}$$

$$6) \frac{Y+1}{2Y-5} \cdot \frac{3Y+1}{Y-2} = \frac{(Y+1)(3Y+1)}{(2Y-5)(Y-2)} = \frac{3Y^3+Y+3Y+1}{2Y^2-4Y-5Y+10} = \frac{3Y^2+4Y+1}{2Y^2-9Y+10}$$

$$7) \frac{Y+1}{2Y-5} \div \frac{3Y+1}{Y-2} = \frac{Y+1}{2Y-5} \cdot \frac{Y-2}{3Y+1} = \frac{(Y+1)(Y-2)}{(2Y-5)(3Y+1)} = \frac{Y^2+Y-2Y-2}{6Y^2+2Y-15Y-5} = \frac{Y^2-Y-2}{6Y^2-13Y-5}$$

$$8) \frac{X^2-4}{X-2} \cdot (3X)^{-1} = \frac{X^2-4}{X-2} \cdot \frac{1}{3X} = \frac{X^2-4}{3X(X-2)} = \frac{X^2-4}{3X^2-6X}$$

$$9) \left(\frac{X}{X-5}\right)^{-1} \times (2X^2)^{-2} = \frac{X-5}{X} \times 2^{-2} X^{-2 \times 2} = \frac{X-5}{X} \times (2^{-2} X^{-4}) = \frac{X-5}{X} \times \frac{1}{2^2 X^4} = \frac{X-5}{4X^5}$$

$$10) \left(\frac{X^2+1}{X+1}\right)^{-1} \div \frac{X}{X^2-3} = \frac{X-1}{X^2+1} \div \frac{X}{X^2-3} = \frac{X-1}{X^2+1} \times \frac{X^2-3}{X} = \frac{(X-1)(X^2)-3}{X(X^2+1)} = \frac{X^3-3X-X^2+3}{X^3+X}$$