

TÀI LIỆU TOÁN LỚP 8
HƯỚNG DẪN BÀI TẬP VỀ NHÀ
Liên hệ đăng kí học: 0832.64.64.64

Họ và tên: Ngày học:

Câu 1. Thực hiện phép tính (với điều kiện biểu thức xác định):

$$a) M = \frac{5x-5}{(x+1)^2} \cdot \frac{3+3x}{20-20x};$$

$$b) P = \left(\frac{x^2+x+1}{x^3-1} \right) \cdot \frac{x^2-4}{x+2} + \frac{2}{x-1}.$$

HD:

$$a) M = \frac{5(x-1)}{(x+1)^2} \cdot \frac{3(x+1)}{20(1-x)} = \frac{15(x-1)(x+1)}{-20(x+1)^2(x-1)} = \frac{3}{-4(x+1)} = \frac{-3}{4(x+1)}.$$

$$b) P = \left(\frac{x^2+x+1}{x^3-1} \right) \cdot \frac{x^2-4}{x+2} + \frac{2}{x-1}$$

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

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

$$= \frac{x}{x-1}.$$

Câu 2. Rút gọn biểu thức:

$$a) P = \frac{x^2-4y^2}{x^2-y^2} : \frac{x-2y}{x+y} \text{ với } x \neq y; x \neq -y; x \neq 2y.$$

$$b) Q = \frac{x+3}{x-1} - \frac{2}{x^2-1} \cdot \frac{x+1}{2} \text{ với } x \neq -1; x \neq 1$$

HD:

$$a) \text{ Với } x \neq y; x \neq -y; x \neq 2y \text{ ta có: } P = \frac{(x-2y)(x+2y)}{(x-y)(x+y)} \cdot \frac{x+y}{x-2y} = \frac{x+2y}{x-y}$$

b) Với $x \neq -1; x \neq 1$ ta có:

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

Câu 3. Thực hiện phép tính:

$$a) A = \frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots + \frac{1}{49.51};$$

$$b) B = \left(1 - \frac{1}{2^2}\right) \left(1 - \frac{1}{3^2}\right) \left(1 - \frac{1}{4^2}\right) \dots \left(1 - \frac{1}{100^2}\right);$$

$$c) C = \frac{1^4+4}{3^4+4} \cdot \frac{5^4+4}{7^4+4} \cdot \frac{9^4+4}{11^4+4} \cdots \frac{25^4+4}{27^4+4}; \quad d) D = \left(1 - \frac{3}{2.4}\right) \cdot \left(1 - \frac{3}{3.5}\right) \cdot \left(1 - \frac{3}{4.6}\right) \cdots \left(1 - \frac{3}{n(n+2)}\right).$$

HD:

$$a) A = \frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \cdots + \frac{1}{49.51}$$

$$= \frac{1}{2} \left(\frac{2}{1.3} + \frac{2}{3.5} + \frac{2}{5.7} + \cdots + \frac{2}{49.51} \right)$$

$$= \frac{1}{2} \left(1 - \frac{1}{3} + \frac{1}{3} - \frac{1}{5} + \frac{1}{5} - \frac{1}{7} + \cdots + \frac{1}{49} - \frac{1}{51} \right)$$

$$= \frac{1}{2} \left(1 - \frac{1}{51} \right)$$

$$= \frac{25}{51}.$$

$$b) B = \left(1 - \frac{1}{2^2}\right) \left(1 - \frac{1}{3^2}\right) \left(1 - \frac{1}{4^2}\right) \cdots \left(1 - \frac{1}{100^2}\right)$$

$$= \left(\frac{2^2-1}{2^2}\right) \left(\frac{3^2-1}{3^2}\right) \left(\frac{4^2-1}{4^2}\right) \cdots \left(\frac{100^2-1}{100^2}\right)$$

$$= \frac{1.3.2.4.3.5 \cdots 99.101}{2^2.3^2.4^2 \cdots 100^2}$$

$$= \frac{1.2.3 \cdots 99}{2.3.4 \cdots 100} \cdot \frac{3.4.5 \cdots 101}{2.3.4 \cdots 100}$$

$$= \frac{1}{100} \cdot \frac{101}{2} = \frac{101}{200}.$$

$$c) \text{Ta có: } n^4 + 4 = (n^4 + 4n^2 + 4) - 4n^2 = (n^2 + 2)^2 - (2n)^2$$

$$= (n^2 + 2 - 2n)(n^2 + 2 + 2n) = [(n-1)^2 + 1] \cdot [(n+1)^2 + 1]$$

$$\text{Khi đó: } C = \frac{1 \cdot (2^2 + 1)}{(2^2 + 1)(4^2 + 1)} \cdot \frac{(4^2 + 1)(6^2 + 1)}{(6^2 + 1)(8^2 + 1)} \cdot \frac{(8^2 + 1)(10^2 + 1)}{(10^2 + 1)(12^2 + 1)} \cdots \frac{(24^2 + 1)(26^2 + 1)}{(26^2 + 1)(28^2 + 1)}$$

$$= \frac{1}{28^2 + 1} = \frac{1}{785}.$$

$$d) D = \left(1 - \frac{3}{2.4}\right) \cdot \left(1 - \frac{3}{3.5}\right) \cdot \left(1 - \frac{3}{4.6}\right) \cdots \left(1 - \frac{3}{n(n+2)}\right).$$

$$\text{Ta có: } 1 - \frac{3}{n(n+2)} = \frac{n^2 + 2n - 3}{n(n+2)} = \frac{(n-1)(n+3)}{n(n+2)} = \frac{n-1}{n} \cdot \frac{n+3}{n+2}.$$

$$\text{Khi đó: } D = \frac{1}{2} \cdot \frac{5}{4} \cdot \frac{2}{3} \cdot \frac{6}{5} \cdot \frac{3}{4} \cdot \frac{7}{6} \cdots \frac{n-1}{n} \cdot \frac{n+3}{n+2} = \frac{1.2.3 \cdots (n-1)}{2.3.4 \cdots n} \cdot \frac{5.6.7 \cdots (n+3)}{4.5.6 \cdots (n+2)} = \frac{n+3}{4n}.$$