

ANSWERS

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6b _____

Simplify the followings

1. a) $\frac{100^n}{2^{2n+1} \times 5^{2n-2}}$ b) $\frac{36^n}{3^{2n-3} \times 2^{2n+2}}$

2. a) $\frac{4 \times 18^n}{3^{2n-1} \times 2^{n+1}}$ b) $\frac{2^{2n-1} \times 3^{n+1}}{6 \times 12^n}$

3. a) $\frac{5^{n+1} - 5^{n-1}}{2 \times 5^n}$ b) $\frac{10 \times 2^n}{2^{n+1} + 2^{n-1}}$

4. a) $\frac{(4x - y)(2x + y) + (4x + 2y)^2}{4x^2 + yx}$

b) $\frac{a^4 + a^3 + 4a^2 + 3a + 3}{a^3 - 1}$

Simplify the followings and replace the points

5. a) $x^2 - \frac{x^3 - 4xy^2}{x(x-2y) + y^2} \times \frac{x^2 - 2xy + y^2}{x-2y} : x = -\frac{1}{2}, y = -5$

b) $\frac{a^2 + ab + b^2}{a^3 + 2a^2b + ab^2} + \frac{b-a}{(a+b)^2} \times \frac{a}{a-b} - \frac{a}{a^2 + ab} : a = -1$

6. a) $\left(\frac{mn}{m^2 - n^2} + \frac{n}{2n - 2m} \right) \times \frac{m^2 - n^2}{2n} : m = 6\frac{1}{2}, n = -1.5$

b) $\frac{5m + 5n}{m - n} \times \left(\frac{m}{m+n} - \frac{m}{m^2 - n^2} \right) : m = 3\frac{1}{2}, n = -\frac{1}{2}$

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$$1. a) \frac{1}{(a-3)(a-b)} + \frac{1}{(3-b)(3-a)} + \frac{1}{(b-a)(b-3)}$$

$$b) \frac{1}{(c-b)(c+4)} + \frac{1}{(b+4)(b-c)} + \frac{1}{(c+4)(b+4)}$$

$$2. a) \frac{a^2}{(a+1)(a-c)} + \frac{1}{(c+1)(a+1)} + \frac{c^2}{(c-a)(c+1)}$$

$$b) \frac{9}{(b-3)(c-3)} + \frac{b^2}{(b-c)(3-b)} + \frac{c^2}{(3-c)(c-b)}$$

$$3. a) \frac{1-b^{-1}+b^{-2}}{1-b+b^2} \quad b) (ab^{-1}-a^{-1}b)(a-b)^{-1}$$

Simplify the followings and find the value of the expressions at the given points

$$4. a) \frac{a^{-2}b^{-1}-a^{-1}b^{-2}}{a^{-3}-b^{-3}} \times \left(\frac{a^{-1}b^{-1}+a^{-2}}{b^{-1}+a^{-1}+a^{-2}b} \right)^{-1} : a=10, b=2$$

$$b) \left(-3((a^{-1})^2)^2 - (-2a^{-2})^3 - \left(\frac{1}{2}(-a)^3 \right)^{-2} \right)^{\frac{1}{2}} : a=3$$

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Prove the following expressions

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1a

$$1. a) \left(3a-1-\frac{3a-1}{x}\right) \times \frac{x}{2x-2} - 2a = \frac{-a-1}{2}$$

1b

$$b) \left(\frac{1+x}{1-2x+x^2} - \frac{1}{x-1}\right) \div \frac{x}{x-1} - \frac{2}{x+1} = -\frac{2}{x}$$

2a

$$2. a) \left(1 - \frac{1}{x-1} + \frac{1}{x+1}\right) \div \frac{1}{x^2-1} = x^2 - 3$$

2b

3a

$$b) \left(\frac{y}{2x^2+xy} - \frac{x}{2xy+y^2}\right) \times \left(\frac{x}{x^2-y^2} - \frac{x+y}{x^2-xy}\right) = \frac{1}{x^2}$$

3b

4a

$$3. a) \left(\frac{c+5}{5c-1} + \frac{c+5}{c+1}\right) \div \frac{c^2+5c}{1-5c} + \frac{c^2+5}{c+1} = c-1$$

4b

$$b) \left(\frac{y-3}{7y-4} - \frac{y-3}{y-4}\right) \times \frac{7y-4}{9y-3y^2} + \frac{y^2-14}{4-y} = -(y+4)$$

$$4. a) \frac{x-4}{x-2} \div \left(\frac{80x}{x^3-8} + \frac{2x}{x^2+2x+4} - \frac{x-16}{2-x}\right) - \frac{6x+4}{(4-x)^2} = \frac{x}{x-4}$$

$$b) \left(\frac{a+2}{2-a} - \frac{2-a}{2+a} - \frac{4a^2}{a^2-4}\right) \div \left(\frac{1}{a^3+a^2} - \frac{1-a}{a^2} - 1\right) = \frac{4(a+1)}{a-2}$$

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Simplify the following expressions

$$1. a) \frac{3n+14}{n+4} - \left(\frac{n-4}{n+6}\right)^2 \times \left(\frac{n+21}{16-8n+n^2} - \frac{n+3}{16-n^2}\right)$$

$$b) \left(\frac{x+5}{x^2-81} + \frac{x+7}{x^2-18x+81}\right) \div \left(\frac{x+3}{x-9}\right)^2 + \frac{7+x}{9+x}$$

$$2. a) \left(\left(\frac{a+1}{a-1}\right)^2 + 3\right) \div \left(\left(\frac{a-1}{a+1}\right)^2 - 3\right) \div \frac{a^3+1}{a^3-1} - \frac{2a}{a-1}$$

$$b) \frac{12b-4b^2}{2b+3} + \frac{1}{2b-3} \div \left(\frac{4}{4b^2-9} - \frac{6b-9}{8b^2+27}\right)$$

$$3. a) \left(\frac{1-2z}{3+6z^2} + 2z-1\right) \times \frac{1+2z}{1-2z} + \frac{6z^2-1}{3z}$$

$$b) \left(\frac{3+t}{(3-t)^2} - \frac{6}{9-t^2} + \frac{3-t}{(t+3)^2}\right) \div \frac{24t^2}{81-t^4} + \frac{2t^2}{t^2-9}$$

$$4. a) \frac{2-a}{5} + \left(\frac{1}{1-2a}\right)^2 \div \left(\frac{a+2}{4a^3-4a^2+a} - \frac{2-a}{1-8a^3} \times \frac{4a^2+2a+1}{2a^2+a}\right)$$

$$b) \left(\frac{x^2-2x+4}{4x^2-1} - \frac{2x^2+x}{x^3+8} - \frac{x+8}{2x^2-x}\right) \div \frac{4}{x^2+2x} - \frac{x+4}{3-6x}$$

5. a) If the sum of the following expressions is equal to 1, find u .

$$\frac{12u-7}{10u+1} \quad \text{and} \quad \frac{6u-3}{5u+1}$$

b) If the difference of the following expressions is equal to their product, find v .

$$\frac{5v-2}{2v-1} \quad \text{and} \quad \frac{5v+1}{7v-3}$$

C