

CORRIGÉ Devoir

P. 89.

$$1. 27^x = 9^{2x-1}$$

$$3^{3x} = 3^{4x-2}$$

$$3x = 4x - 2$$

$$2 = x$$

$$2. 4^{2x-1} = 64$$

$$4^{2x-1} = 4^3$$

$$2x-1 = 3$$

$$2x = 4$$

$$x = 2$$

$$3. 6^{3x-6} = 1$$

$$6^{3x-6} = 6^0$$

$$3x-6 = 0$$

$$x = 2$$

$$4. 2^{-x} = 128$$

$$2^{-x} = 2^7$$

$$x = -7$$

$$5. 5^{4-x} = \frac{1}{5}$$

$$5^{4-x} = 5^{-1}$$

$$4-x = -1$$

$$5 = x$$

$$6. 32^{3x-2} = 64$$

$$2^{15x-10} = 2^6$$

$$15x-10 = 6$$

$$15x = 16$$

$$x = \frac{16}{15}$$

$$7. 2^{-2x} = 32$$

$$2^{-2x} = 2^5$$

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

$$8. 4^{4x} = \frac{1}{16}$$

$$4^{4x} = 4^{-2}$$

$$x = -\frac{1}{4}$$

$$9. 3^{2x-1} + 1 = 2$$

$$3^{2x-1} = 1$$

$$3^{2x-1} = 3^0$$

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

$$10. \frac{3(5)^{x+1}}{3} = \frac{15}{3}$$

$$5^{x+1} = 5^1$$

$$x+1 = 1$$

$$x = 0$$

$$11. \frac{27^x}{9^{2x-1}} = 3^{x+4}$$

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

$$3^{-x+2} = 3^{x+4}$$

$$-x+2 = x+4$$

$$-2 = 2x$$

$$-1 = x$$

$$12. 27^x \cdot 9^{2x-1} = 3^{x+4}$$

$$3^{3x} \cdot 3^{4x-2} = 3^{x+4}$$

$$3^{7x-2} = 3^{x+4}$$

$$7x-2 = x+4$$

$$6x = 6$$

$$x = 1$$

$$13. \sqrt[5]{256} \div \sqrt[6]{64} = 2^x$$

$$2^{8/5} \div 2^{6/6} = 2^x$$

$$2^{8/5-1} = 2^x$$

$$x = 3/5$$

$$15. \frac{8(2x-1)^3}{8} = \frac{125}{8}$$

$$\sqrt[3]{(2x-1)^3} = \sqrt[3]{\frac{125}{8}}$$

$$2x-1 = \frac{5}{2}$$

$$2x = \frac{5}{2} + 1$$

$$2x = \frac{7}{2}$$

$$x = 7/4$$

$$16. 8^{3/4} \cdot \left(\frac{1}{2}\right)^{7/2} = 16^{3/4}$$

$$2^{3/4} \cdot 2^{-7/2} = 2^3$$

$$\left(\frac{3}{4} - \frac{7}{2} = 3\right) \cdot 8$$

$$6 - 4x = 24$$

$$18 = 4x$$

$$\frac{9}{2} = x$$

$$14. \frac{(9^{2x-1})^3 \cdot (3^{3x})^2}{(27^{x+2})^4} = 81^3$$

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

$$\frac{3^{12x-6} \cdot 3^{6x}}{3^{12x+24}} = 3^{12}$$

$$3^{6x-30} = 3^{12}$$

$$6x-30 = 12$$

$$6x = 42$$

$$x = 7$$

$$24. a) \sqrt[5]{\frac{4^{3x-2}}{8^{x+1}}} = 16$$

$$\left(\frac{2^{6x-4}}{2^{3x+3}}\right)^{1/5} = 2^4$$

$$\left(2^{3x-7}\right)^{1/5} = \left(2^4\right)^5$$

$$2^{3x-7} = 2^{20}$$

$$3x-7 = 20$$

$$3x = 27$$

$$x = 9$$

$$b) \left(\frac{3}{4}\right)^{3x-2} \cdot \left(\frac{4}{3}\right)^{1-x} = \frac{9}{16}$$

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

$$\left(\frac{3}{4}\right)^{4x-3} = \left(\frac{3}{4}\right)^2$$

$$4x-3=2$$

$$4x=5$$

$$x = \frac{5}{4}$$

$$d) (5^{x-1})^x = 25$$

$$5^{x^2-x} = 5^2$$

$$x^2-x=2$$

$$x^2-x-2=0$$

$$(x-2)(x+1)=0$$

$$x=2 \quad x=-1$$

$$e) 2^{x+1} - 2^x = 2^{-3}$$

$$2^x \div 2 - 2^x = 2^{-3}$$

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

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

↑ impossible

Aucune solution.

$$c) \left(\frac{9^{2x}}{27^{3x-1}}\right)^3 = \sqrt[3]{3^x}$$

$$\left(\frac{3^{4x}}{3^{9x-3}}\right)^3 = 3^{x/3}$$

$$\left(3^{-5x+3}\right)^3 = 3^{x/3}$$

$$3^{-15x+9} = 3^{x/3}$$

$$-15x+9 = \frac{x}{3}$$

$$-45x+27 = x$$

$$27 = 46x$$

$$\frac{27}{46} = x$$

$$f) 3^{x+1} + 3^x = 36$$

$$3^x \cdot 3 + 3^x = 36$$

$$\frac{3^x(3+1)}{4} = \frac{36}{4}$$

$$3^x = 9$$

$$x = 2$$