

EQUITY

LEARNING PLACE

Additional Math Topical (**Exponential Function**)

Question 1:

Show that $\frac{6^{4x}}{2^{2x-2}3^{3x}}$ is a multiple of 4.

Question 2:

Given that $(64p^3)^{\frac{2}{3}} \div (432p)^{-1} = 2^x 3^y p^z$, evaluate x, y and z.

Question 3:

By using an appropriate substitution, solve $2^{2x+2} - 33 \times 2^x + 8 = 0$.

Question 4:

Simplify each of the following

a) $\left(a^{\frac{2}{5}} + b^{\frac{2}{5}}\right) \left(a^{\frac{4}{5}} - a^{\frac{2}{5}}b^{\frac{2}{5}} + b^{\frac{4}{5}}\right)$

b) $\frac{7^{5x} \times 7^{2-3x}}{7^{2x+1} + 22(49^x) + 20(7^{2x})}$

Question 5:

Solve $3(25^x) - 16(5^x) + 5 = 0$

Question 6:

Solve the equation $4^{x-2} = 2^x + 5$

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Question 7:

Solve the simultaneous equations

$$\begin{aligned}3^x \times 27^y &= 1, \\ 25^x \times 0.2^y &= 5^{-7}.\end{aligned}$$

Question 8:

Given that $14^x \times 5 = 35 \times 7^{x-2}$, find the value of 2^x .

Hence, or otherwise, solve for the value of x .

Question 9:

a) Simplify $\frac{3^{3x}5^{3x+2}+15^{3x}}{27^x \times 125}$.

b) By using appropriate substitution or otherwise, solve the equation $9^x - 2(3^{x+1}) = 27$.

Question 10:

Given that $\left(\frac{3}{49}\right)^{-x} \times 7^{2-5x} = (3^{x-1})^2 \div 21$, without the use of a calculator, find the value of 21^x .

Question 11:

Without using a calculator, evaluate 18^n given that $2^{2n+1} \times 9^{1-n} = 2^{n-1} \times 9^{2-2n}$

Question 12:

By using $u = 3^x$, solve $3 \times 9^x - 10 \times 3^x + 3 = 0$

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Question 13:

Solve the following pair of simultaneous equations for x and y .

$$3^x \times \sqrt{3^y} = 1,$$

$$\frac{4^{x-4}}{16^{\frac{1}{x}}} = 32^y.$$

Question 14:

Given that $2^{2x+3} \times 7^{x-2} = 2^{3x} \times 49^x$, evaluate 14^x .

Question 15:

Solve the simultaneous equations.

$$3^x - 5^y = 11,$$

$$3^{x-1} + 5^{y+1} = 34.$$

Question 16:

Given that $6^a = b$, express $\frac{36^{a+2} - 216^a}{6^{a-1}}$ in terms of b .

Question 17:

a) Given that $u = 2^x$, express $4^{x+1} - 2 = 7(2^x)$ as an equation in u .

Hence find the values of x for which $4^{x+1} - 2 = 7(2^x)$.

b) Explain why there are no values of x for which $4^{x+1} - k = 7(2^x)$ if $k < -\frac{49}{16}$.

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Question 18:

Solve, for x and y , the simultaneous equation

$$\left(\frac{1}{9}\right)(9^y) = 81^x,$$

$$(2^{2x^2+xy}) = 16(2^{-y^2}).$$

Question 19:

Simplify $14^{2x+6} \times 28^{-x-3} \div 7^x$.

Question 20:

Solve the simultaneous equations.

$$3^{2x} \times 27^{-y} = \frac{1}{9}$$

$$x + 2y = 13$$