

EXPONENCIÁLNÍ A LOGARITMICKÉ ROVNICE, VÝRAZY S LOGARITMY, GONIOMETRICKÉ VÝRAZY A ROVNICE

1)

$$\left(\frac{1}{5}\right)^y = 125$$

$$(5^{-1})^y = 5^3$$

$$5^{-y} = 5^3$$

$$-y = 3 \quad | \cdot (-1)$$

$$\underline{\underline{y = -3}}$$

2)

$$3^{x+2} = 27$$

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

$$x+2 = 3$$

$$\underline{\underline{x = 1}}$$

3)

$$3^{x+1} + 3^{x+2} = 12$$

$$3^x \cdot 3^1 + 3^x \cdot 3^2 = 12$$

$$3^x (3^1 + 3^2) = 12$$

$$3^x (3+9) = 12$$

$$3^x \cdot 12 = 12 \quad | :12$$

$$3^x = 1$$

$$3^x = 3^0$$

$$\underline{\underline{x = 0}}$$

4)

$$\log_2 X = 1024$$

note: $\log_a X = y \Rightarrow a^y = X$

$$2^{1024} = X$$

5)

$$\log(3x^2+1) - \log(3+x) = \log(3x-2)$$

$$\log \frac{3x^2+1}{3+x} = \log(3x-2)$$

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

$$3x^2+1 = (3x-2)(3+x)$$

$$3x^2+1 = 9x + 3x^2 - 6 - 2x$$

$$7 = 7x \quad | :7$$

$$\underline{\underline{1 = x}}$$

6)

$$\frac{1 + \cos 2x}{1 - \cos 2x} = \frac{1 + \cos^2 x - \sin^2 x}{1 + (\cos^2 x - \sin^2 x)} =$$

$$1 = \sin^2 x + \cos^2 x \text{ (note)}$$

$$= \frac{\cancel{\sin^2 x} + \cos^2 x + \cos^2 x - \cancel{\sin^2 x}}{\cancel{\sin^2 x} + \cos^2 x - \cancel{\cos^2 x} + \cancel{\sin^2 x}} = \frac{2 \cos^2 x}{2 \sin^2 x} =$$

$$\underline{\underline{\cot^2 x}}$$

7)

$$\sin(2x-60) = 1 \quad \text{substitute } 2x-60 = y$$

$$\sin y = 1$$

$$y = 90^\circ + k \cdot 360^\circ$$

$$2x-60 = 90 + k \cdot 360 \quad | +60$$

$$2x = 150 + k \cdot 360 \quad | :2$$

$$\underline{\underline{x = 75^\circ + k \cdot 180^\circ}}$$

