

## 8.3: Solving Exponential Equations

\* variables in our exponents

### Steps

- 1) Isolate the exponential term
- 2) take the log or ln of both sides
- 3) use exponent properties (power rule)
- 4) solve for the variable  $\rightarrow$  round 2 places

Ex 1)  $7^x = 39$

$$\log 7^x = \log 39$$
$$\cancel{x \cdot \log 7} = \frac{\log 39}{\cancel{\log 7}}$$
$$x = 1.88$$

$7^x = 39$

$$\ln 7^x = \ln 39$$
$$\cancel{x \ln 7} = \frac{\ln 39}{\cancel{\ln 7}}$$
$$x = 1.88$$

Ex 2)  $6^{2x} = 27$

$$\ln 6^{2x} = \ln 27$$
$$\frac{2x \ln 6}{\cancel{\ln 6}} = \frac{\ln 27}{\cancel{\ln 6}}$$
$$\frac{2x}{2} = \frac{1.83 \dots}{2}$$
$$x = 0.92$$

Ex 3)  $e^{5x} = 32$

$$\ln e^{5x} = \ln 32$$
$$\cancel{5x \ln e} = \ln 32$$
$$\frac{5x}{5} = \frac{\ln 32}{5}$$
$$x = 0.69$$

$$\text{Ex 4) } 11^{\cancel{3x} - 51} = 2 + 51$$

$$11^{3x} = 53$$

$$\ln 11^{3x} = \ln 53$$

$$\frac{3x \ln 11}{\ln 11} = \frac{\ln 53}{\ln 11}$$

$$\frac{3x}{3} = \frac{1.655\dots}{3}$$

$$x = 0.55$$

$$\text{Ex 5) } 5 \cdot 2^{\cancel{x} - 1} = 34 + 1$$

$$\frac{5 \cdot 2^x}{5} = \frac{35}{5}$$

$$2^x = 7$$

$$\ln 2^x = \ln 7$$

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

$$x = 2.81$$