$$e^{-2\ln(x)}=\frac{1}{16}$$

$$e^{-2ln(x)} = rac{1}{16}$$
  
Recall Because they are inverses,  $e^{ln(x)} = x$ 

Example: Find the solutions of:

$$e^{-2\ln(x)}=\frac{1}{16}$$

• Recall Because they are inverses,  $e^{ln(x)} = x$ 

But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left

Example: Find the solutions of:

$$e^{-2\ln(x)}=\frac{1}{16}$$

• Recall Because they are inverses,  $e^{\ln(x)} = x$ 

But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left How do we deal with multiplying by -2 in the exponent?

Example: Find the solutions of:

$$e^{-2\ln(x)}=\frac{1}{16}$$

• Recall Because they are inverses,  $e^{ln(x)} = x$ 

But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left How do we deal with multiplying by -2 in the exponent?

Recall One of our power rules for exponents is:

Example: Find the solutions of:

$$e^{-2\ln(x)}=\frac{1}{16}$$

• Recall Because they are inverses,  $e^{ln(x)} = x$ 

But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left How do we deal with multiplying by -2 in the exponent? • Recall One of our power rules for exponents is:  $(b^m)^n = b^{m \cdot n}$ 

Example: Find the solutions of:

$$e^{-2\ln(x)}=\frac{1}{16}$$

• Recall Because they are inverses,  $e^{ln(x)} = x$ 

But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left How do we deal with multiplying by -2 in the exponent? • Recall One of our power rules for exponents is:

 $(b^m)^n = b^{m \cdot n}$ So, we can re-write as:

Example: Find the solutions of:

$$e^{-2\ln(x)}=\frac{1}{16}$$

• Recall Because they are inverses,  $e^{ln(x)} = x$ 

But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left How do we deal with multiplying by -2 in the exponent? • Recall One of our power rules for exponents is:  $(b^m)^n = b^{m \cdot n}$ 

So, we can re-write as:

$$\left(e^{\ln(x)}\right)^{-2} = e^{-2\ln(x)}$$

Example: Find the solutions of:

$$e^{-2\ln(x)}=\frac{1}{16}$$

• Recall Because they are inverses,  $e^{ln(x)} = x$ 

But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left How do we deal with multiplying by -2 in the exponent? • Recall One of our power rules for exponents is:

 $(b^m)^n = b^{m \cdot n}$ So, we can re-write as:

$$x^{-2} = (e^{\ln(x)})^{-2} = e^{-2\ln(x)}$$

Example: Find the solutions of:

$$e^{-2ln(x)} = \frac{1}{16}$$
  
Recall Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
Recall One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$ 

$$e^{-2ln(x)} = \frac{1}{16}$$
  
**Recall** Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
**Recall** One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$   
**We can simplify** the negative exponent as:  $x^{-2} = \frac{1}{x^2}$ 

Example: Find the solutions of:

$$e^{-2ln(x)} = \frac{1}{16}$$
Recall Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
Recall One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $\frac{1}{x^2} = x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$   
We can simplify the negative exponent as:  $x^{-2} = \frac{1}{x^2}$ 

Example: Find the solutions of:

$$e^{-2ln(x)} = \frac{1}{16}$$
  
• Recall Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
• Recall One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $\frac{1}{x^2} = x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$   
• We can simplify the negative exponent as:  $x^{-2} = \frac{1}{x^2}$   
Reducing denominators we get:  $x^2 = 16$ 

$$e^{-2ln(x)} = \frac{1}{16}$$
  
**Recall** Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
**Recall** One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $\frac{1}{x^2} = x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$   
**We can simplify** the negative exponent as:  $x^{-2} = \frac{1}{x^2}$   
Reducing denominators we get:  $x^2 = 16$   
Which has solutions:  $x = \pm 4$ 

$$e^{-2ln(x)} = \frac{1}{16}$$
• Recall Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
• Recall One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $\frac{1}{x^2} = x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$   
• We can simplify the negative exponent as:  $x^{-2} = \frac{1}{x^2}$   
Reducing denominators we get:  $x^2 = 16$   
Which has solutions:  $x = \pm 4$   
• Recall the domain of  $log_b$  is  $(0, \infty)$ 

$$e^{-2ln(x)} = \frac{1}{16}$$
  
**Recall** Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
**Recall** One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $\frac{1}{x^2} = x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$   
**Note an simplify** the negative exponent as:  $x^{-2} = \frac{1}{x^2}$   
Reducing denominators we get:  $x^2 = 16$   
Which has solutions:  $x = \pm 4$   
**Recall** the domain of  $log_b$  is  $(0, \infty)$   
 $ln(4)$  is defined, but  $ln(-4)$  is not defined!

Example: Find the solutions of:

$$e^{-2ln(x)} = \frac{1}{16}$$
  
• Recall Because they are inverses,  $e^{ln(x)} = x$   
But we have more than just  $e^{ln(x)} = x$ , we have  $e^{-2ln(x)}$  on the left  
How do we deal with multiplying by  $-2$  in the exponent?  
• Recall One of our power rules for exponents is:  
 $(b^m)^n = b^{m \cdot n}$   
So, we can re-write as:  
 $\frac{1}{x^2} = x^{-2} = (e^{ln(x)})^{-2} = e^{-2ln(x)} = \frac{1}{16}$   
• We can simplify the negative exponent as:  $x^{-2} = \frac{1}{x^2}$   
Reducing denominators we get:  $x^2 = 16$   
Which has solutions:  $x = \pm 4$   
• Recall the domain of  $log_b$  is  $(0, \infty)$   
 $ln(4)$  is defined, but  $ln(-4)$  is not defined!  
**Conclusion:** The solution to  $e^{-2ln(x)} = \frac{1}{16}$  is  $x = 4$