LESSON MAKER PRO

Undo the Function

Solve equations by using inverse functions.

HIGH SCHOOL · A2S.AF.D.12

A2S.AF.D.12 "Solve simple equations involving exponential, radical, logarithmic, and trigonometric functions using inverse functions."

NAME _____ DATE _____

THE BIG IDEA

First, isolate the function. Then use its inverse to find x. For trigonometric equations, find every angle in the given interval.

WORKED EXAMPLE

Solve sqrt(x+13)=8.

1. Square both sides: x+13=64.
2. Subtract 13: x=51.
3. Check: sqrt(51+13)=8.

Answer: x=51

PRACTICE 6 problems

1 Solve $3^x=81$.

ANSWER _____

2 Solve $\log_5(x)=3$.

ANSWER _____

3 Solve sqrt(x-4)=6.

ANSWER _____

4 Solve sin(x)=1/2 for 0°≤x<360°. Give both angles.

ANSWER _____

_____

5 Solve cos(x)=-1 for 0°≤x<360°.

ANSWER _____

6 Solve $\log_3(x+1)=4$.

ANSWER _____

APPLY IT Show your work

1 A video has 20 views when posted. Its total views triple each day. After how many days will it have 540 views?

WORK SPACE

ANSWER _____

2 A sound's intensity is x times a reference intensity. Its sound level is $L=10\log_{10}(x)$ decibels. If its level is 30 decibels, what is x?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve $\log_3(\text{sqrt}(x+4))=2$.

WORK SPACE AND ANSWER

ANSWER KEY

Undo the Function

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $3^x=81$.	**x=4**
2	Solve $\log_5(x)=3$.	**x=125**
3	Solve sqrt(x-4)=6.	**x=40**
4	Solve sin(x)=1/2 for 0°≤x<360°. Give both angles.	**x=30° or x=150°**
5	Solve cos(x)=-1 for 0°≤x<360°.	**x=180°**
6	Solve $\log_3(x+1)=4$.	**x=80**

PART 2 · APPLY IT

1. **3 days** Solve $20\cdot3^x=540$, so $3^x=27$ and x=3.
2. **x=1000** Divide by 10 to get $\log_{10}(x)=3$, then use the inverse to get $x=10^3=1000$.

CHALLENGE

x=77

For the sine problem, accept the two angles in either order. In the challenge, sqrt(77+4)=9 and $\log_3(9)=2$.