


Final Prep

- Absolute Value
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distance
from
zero



$$2|3x+4|-10=12$$

+10 +10

$$2|3x+4|=22$$

$$|3x+4|=11$$

$$|?|=11$$


$$3x+4=11$$

$$x = \frac{7}{3}$$

$$3x+4=-11$$

$$x = -5$$

5-54. AN ANCIENT PUZZLE

Parts (a) through (f) below are similar to a puzzle that is more than 2100 years old. Mathematicians first created the puzzle in ancient India in the 2nd century BCE. More recently, about 700 years ago, Muslim mathematicians created the first tables allowing them to locate answers to this type of puzzle quickly. Tables similar to them appeared in school math books until recently.

Here are some clues to help you figure out how the puzzle works:

$$\log_2(8) = 3$$

$$\log_3(27) = 3$$

$$\log_5(25) = 2$$

$$\log_{10}(10,000) = 4$$

$$\log_7(49) = 2$$

Use the clues to determine the missing pieces of the puzzles below:

a. $\log_2(16) = 4$

b. $\log_2(32) = 5$

c. $\log_7(100) = 2$

d. $\log_5(?) = 3$

↑
125

e. $\log_7(81) = 4$

↑
3

f. $\log_{100}(10) = \frac{1}{2}$

10
↓

$$4) f(x) = -\frac{1}{3}x - \frac{4}{3}$$

$$g(x) = -3x - 4$$

A) No

B) Yes

$$g(x)$$

$$\cdot -3$$

$$-4$$

$$g^{-1}(x)$$

$$+4$$

$$\div -3$$

$$g^{-1}(x) = \frac{x+4}{-3}$$

$$g^{-1}(x) = \frac{x}{-3} + \frac{4}{-3}$$

$$= -\frac{1}{3}x - \frac{4}{3}$$

Input $g(x)$ output $\rightarrow f(x)$

$$g(0) = -3(0) - 4$$

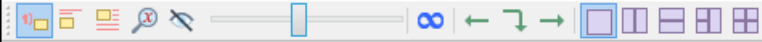
$$g(0) = -4$$

$$f(-4) = -\frac{1}{3}(-4) - \frac{4}{3}$$

$$f(-4) = \frac{4}{3} - \frac{4}{3}$$

$$f(-4) = 0$$

Show



$$7) \quad y = \underline{-2x - 1}$$

$$2x + 4y = 2$$

A) $(-1, 4)$

B) $(7, 1)$

C) $(1, 7)$

D) $(-1, 1)$

$$2x + 4(-2x - 1) = 2$$

$$2x - 8x - 4 = 2$$

$$2x - 8x = 6$$

$$-6x = 6$$

$$x = -1$$

$$y = -2(-1) - 1$$

$$y = 2 - 1$$

$$y = 1$$

Show



$$8) \quad |8n + 3| = 69$$

$$A) \quad \left\{ \frac{33}{4} \right\}$$

$$8n + 3 = 69$$

$$8n = 66$$

$$n = \frac{66}{8}$$

$$C) \quad \left\{ \frac{66}{8}, 9 \right\}$$

$$n = \frac{33}{4}$$

$$B) \quad \{-9\} \quad \begin{aligned} 8n + 3 &= -69 \\ 8n &= -72 \\ n &= -9 \end{aligned}$$

$$D) \quad \left\{ \frac{33}{4}, -9 \right\}$$