Solving Logarithmic Functions

Recall: Given $\log_c x$; x must be greater than 0.

Solve the following:

1) $5\log_2(2x+1) - 3 = 12$ What is the restriction?

$2x + 1 > 0$

$2x > -1$

$x > -1/2$

$$\frac{5\log_2(2x+1)}{5} = \frac{15}{5}$$

$$\log_2(2x+1) = 3$$

$$(c^q = p \quad \log_c p = q)$$

$$2x+1 = 2^3$$

$$2x+1 = 8$$

$$2x = 7$$

$$x = 3.5$$ ← does this satisfy the restriction? Yes.

2) $3\log_2(2x-4) - 5 = 4$ What is the restriction?

$2x - 4 > 0$

$2x > 4$

$x > 2$

$$3\log_2(2x-4) = 9$$

$$\log_2(2x-4) = 3$$

$$2x-4 = 2^3$$

$$2x-4 = 8$$

$$2x = 12$$

$$x = 6$$

3. A company has established that the required assembly time for *t* parts, in minutes, is given by $t = -20\log_5(n/5 - 2) + 80$, where *n* represents the number of parts to be assembled.

a)What restriction must be placed on the variable *n?*

$$\frac{n}{5} - 2 > 0$$

$$\frac{n}{5} > 2$$

$$n > 10$$

b) If an employee takes 40 minutes to assemble parts, how many parts did he assemble? Does the number of parts respect the restriction?

$$-20\log_5\left(\frac{n}{5}-2\right)+80 = 40$$

$$-20\log_5\left(\frac{n}{5}-2\right) = -40$$

$$\log_5\left(\frac{n}{5}-2\right) = 2$$

$$\frac{n}{5} - 2 = 5^2$$

$$\frac{n}{5} - 2 = 25$$

$$\frac{n}{5} = 27$$

$$n = 135$$ → this Satisfies the Restriction