Serial #: _____ ID _____ NAME _____

Show all necessary steps for full marks.

Question 1: (3 points): Find the solution set of $-8(3x+4)+6x=4(x-8)+4x$

Solution:

24. $-8(3x+4)+6x=4(x-8)+4x$

$-24x-32+6x=4x-32+4x$

$-18x-32=8x-32$

$-32=26x-32$

$0=26x \Rightarrow 0=x$

Solution set: $\{0\}$

Question 2: (3 points): If the equation $\frac{9}{10}(x+2)-\frac{3}{2}(x+2)=\boldsymbol{m}\,x-\frac{6}{5}$ is an identity then find the value of $\boldsymbol{m}$.

Solution:

$\frac{9}{10}(x+2)-\frac{15}{10}(x+2)=\boldsymbol{m}\,x-\frac{6}{5}$

$-\frac{3}{5}(x+2)=\boldsymbol{m}\,x-\frac{6}{5}$

$-\frac{3}{5}x-\frac{6}{5}=\boldsymbol{m}\,x-\frac{6}{5} \Rightarrow \boxed{\boldsymbol{m}=-\frac{3}{5}}$

Question 3: (4 points): Solve $(3x+2)(x-1)=3x$

Solution: $3x^2-x-2=3x$

$3x^2-4x-2=0$

Let $a=3, b=-4,$ and $c=-2.$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{-(-4)\pm\sqrt{(-4)^2-4(3)(-2)}}{2(3)}$

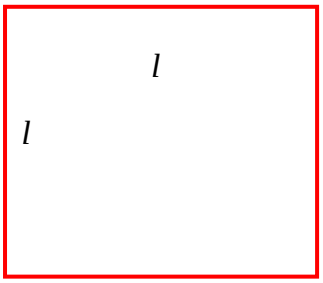
$=\frac{4\pm\sqrt{16+24}}{6}=\frac{4\pm\sqrt{40}}{6}$

$=\frac{4\pm 2\sqrt{10}}{6}=\frac{2\pm\sqrt{10}}{3}$

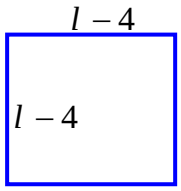
Solution set: $\left\{\frac{2\pm\sqrt{10}}{3}\right\}$

Question 4: (5 points): If the length of each side of the original square is decreased by 4 inches, the perimeter of the new square is 10 inches more than half the perimeter of the original square. What are the dimensions of the original square?

Solution: l = Length of the original rectangle in inches



Original square



Side is decreased 4

$$P_{new} = 10 + \frac{1}{2} P_{original}$$

$$4(l-4) = 10 + \frac{1}{2}(4l)$$

$$4l - 16 = 10 + 2l$$

$$2l = 26$$

$$l = 13 \text{ inches}$$

The original square is 13 by 13 inches.

Question 5: (5 points): Write the equation $4x^2 - 3x - 10 = 0$ by completing the square in the form $(x-m)^2 = n$. Then find $m + n = ?$

Solution:

$$x^2 - \frac{3}{4}x - \frac{10}{4} = 0$$

$$x^2 - \frac{3}{4}x - \frac{5}{2} = 0$$

$$x^2 - \frac{3}{4}x + \frac{9}{64} = \frac{5}{2} + \frac{9}{64}$$

$$\text{Note: } \left[\frac{1}{2}\cdot\left(-\frac{3}{4}\right)\right]^2 = \left(-\frac{3}{8}\right)^2 = \frac{9}{64}$$

$$\left(x - \frac{3}{8}\right)^2 = \frac{169}{64}$$

$$m + n = \frac{3}{8} + \frac{169}{64} = \frac{3(8)}{8(8)} + \frac{169}{64} = \frac{24+169}{64} = \frac{193}{64}$$