Quadratic Equation Worksheets
(include complex solutions)

1. Compute the value of the discriminant of the quadratic equation. Use the value of the discriminant to predict the number and type of solutions. Find all real and complex solutions.

$4x - 3x^2 = 10$

2. Solve the equation $5x^2 - 4x + 3 = 0$

3. Solve the equation $2x^2 + 8x = -9$.

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$4x - 3x^2 = 10$

$$3x^2 - 4x + 10 = 0$$

We have $a = 3$, $b = -4$, and $c = 10$. Then

$$b^2 - 4ac = (-4)^2 - 4(3)(10)$$
$$= 16 - 120$$
$$= -104.$$

The value of the discriminant is negative, indicating that there are two complex solutions.

$$x = \frac{-(-4) \pm \sqrt{-104}}{2(3)}$$

$$x = \frac{4 \pm 2i\sqrt{26}}{6}$$

Thus, the two solutions are $\frac{2}{3} + \frac{\sqrt{26}}{3}i$ and $\frac{2}{3} - \frac{\sqrt{26}}{3}i$.

2. Solve the equation $5x^2 - 4x + 3 = 0$

We have a quadratic equation with $a = 5$, $b = -4$, and $c = 3$.

$$x = \frac{-(-4) \pm 2\sqrt{-11}}{2(5)}$$

So, the solutions are $\frac{2}{5} + \frac{i\sqrt{11}}{5}$ and $\frac{2}{5} - \frac{i\sqrt{11}}{5}$.

3. Solve the equation $2x^2 + 8x = -9$.

In standard form, this is the quadratic equation $2x^2 + 8x + 9 = 0$ with $a = 2$, $b = 8$, and $c = 9$.

$$x = \frac{-8 \pm 2\sqrt{-2}}{2(2)} = \frac{-4 \pm i\sqrt{2}}{2}$$

Thus, the solutions are $2 + \frac{i\sqrt{2}}{2}$ and $2 - \frac{i\sqrt{2}}{2}$.