Quadratic Equation Worksheets
(include complex solutions)

1. Solve the equation $25x^2 + 100x + 200 = 0$

2. Show that if $k > 3.2$, the solutions of $5x^2 - 8x + k = 0$ are not real numbers.

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1. Solve the equation $25x^2 + 100x + 200 = 0$

We can factor 25 from the left side of this equation to obtain $25(x^2 + 4x + 8) = 0$, and we know that a product is zero when one of the factors is zero. Since $25 \neq 0$, we must have $x^2 + 4x + 8 = 0$. This is a quadratic equation with $a = 1$, $b = 4$, and $c = 8$. Then

$$x = \frac{-4 \pm 4\sqrt{-1}}{2},$$

and the solutions are $-2 + 2i$ and $-2 - 2i$.

2. Show that if $k > 3.2$, the solutions of $5x^2 - 8x + k = 0$ are not real numbers.

We have $a = 5$, $b = -8$, and $c = k$; then

$$b^2 - 4ac = (-8)^2 - 4 \cdot 5 \cdot k$$

$$= 64 - 20k.$$

When the discriminant is negative, the solutions of the quadratic function are not real numbers.

$$\boldsymbol{b^2 - 4ac = 64 - 20k}$$
$$\boldsymbol{k < 3.2}$$
$$\boldsymbol{b^2 - 4ac < 64 - 20(3.2)}$$
$$\boldsymbol{b^2 - 4ac < 0}$$
$$\boldsymbol{k > 3.2}$$

Thus, if $k > 3.2$, then the discriminant is negative and the solutions of $5x^2 - 8x + k = 0$ are not real numbers