Additional Problems: Complex Numbers

**The Fundamental Theorem of Algebra**

**Some problems include the solution. Please remove before sharing with students.**

1. Show that the Fundamental Theorem of Algebra is true for the quadratic polynomial $x^{2}-10x+25=0$ through solving by factoring. Which of the following statements accurately describes the solution set?

There are two irrational solutions.

There are two identical solutions.

There are two non-real solutions.

There are two rational solutions.

\*\*Solution:\*\* There are two identical solutions.

1. Show that the Fundamental Theorem of Algebra is true for the quadratic polynomial $x^{2}-6x+9=0$ through solving by factoring. Which of the following statements accurately describes the solution set?

There are two irrational solutions.

There are two identical solutions.

There are two non-real solutions.

There are two rational solutions.

\*\*Solution:\*\* There are two identical solutions.

1. Show that the Fundamental Theorem of Algebra is true for the quadratic polynomial $x^{2}-7x+12=0$ through solving by factoring. Which of the following statements accurately describes the solution set?

There are two irrational solutions.

There are two identical solutions.

There are two non-real solutions.

There are two rational solutions.

\*\*Solution:\*\* There are two rational solutions.

1. Without solving, apply the Fundamental Theorem of Algebra to determine how many roots $y=3x^{4}-7x^{3}+2$ will have.

four roots

three roots

six roots

five roots

\*\*Solution:\*\* four roots

1. Without solving, apply the Fundamental Theorem of Algebra to determine how many roots $y=x^{7}+4x^{5}-x+9$ will have.

seven roots

five roots

nine roots

three roots

\*\*Solution:\*\* seven roots

1. Without solving, apply the Fundamental Theorem of Algebra to determine how many roots $y=2x^{6}-3x^{4}+x^{2}-5$ will have.

six roots

five roots

four roots

eight roots

\*\*Solution:\*\* six roots

1. Apply the Fundamental Theorem of Algebra to determine how many imaginary roots $h\left(x\right)=5x^{4}+2x^{3}-7x+10$ will have, if you know it has two x-intercepts.

four imaginary roots

two imaginary roots

no imaginary roots

one imaginary root

\*\*Solution:\*\* two imaginary roots

1. Apply the Fundamental Theorem of Algebra to determine how many imaginary roots $q\left(x\right)=3x^{6}+2x^{4}-x+5$ will have, if you know it has four x-intercepts.

six imaginary roots

four imaginary roots

two imaginary roots

no imaginary roots

\*\*Solution:\*\* two imaginary roots

1. Apply the Fundamental Theorem of Algebra to determine how many imaginary roots $x^{5}-3x^{3}+2x+7$ will have, if you know it has three x-intercepts.

five imaginary roots

three imaginary roots

two imaginary roots

no imaginary roots

\*\*Solution:\*\* two imaginary roots

1. Solve the polynomial equation $p\left(x\right)=x^{3}-4x^{2}+x+6$. Which of the following is a factor?

$$x-2$$

$$x+3$$

$$x-1$$

$$x+2$$

\*\*Solution:\*\* $x-2$

1. Solve the polynomial equation $x^{3}+3x^{2}-4x-12.$ Which of the following is a factor?

$$x+2$$

$$x-3$$

$$x+3$$

$$x-2$$

\*\*Solution:\*\* $x-3$

1. Solve the polynomial equation $x^{3}-6x^{2}+11x$-6. Which of the following is a factor?

$$x-1$$

$$x+1$$

$$x-2$$

$$x+2$$

\*\*Solution:\*\* $x-1$

1. What are the roots of $f\left(x\right)=4x^{2}+100$?

$$\pm 5i$$

$$\pm 10i$$

$$\pm 5$$

$$\pm 10$$

\*\*Solution:\*\* $\pm 5i$

1. What are the roots of $f\left(x\right)=9x^{2}+81$?

$$\pm 3i$$

$$\pm 9i$$

$$\pm 3$$

$$\pm 9$$

\*\*Solution:\*\* $\pm 3i$

1. What are the roots of $f\left(x\right)=25x^{2}+225$?

$$\pm 15i$$

$$\pm 5i$$

$$\pm 15$$

$$\pm 5$$

\*\*Solution:\*\* $\pm 3i$