## 3-6 Additional Practice

Theorems About Roots of Polynomial Equations

List all the possible rational solutions for each equation.

1. $2 x^{2}+5 x+3=0$
2. $2 x^{4}-18 x^{2}+5=0$
3. $4 x^{3}-12 x+9=0$

List all the real and complex roots of each of the following functions.
4. $x^{3}+x^{2}-x+2=0$
5. $x^{3}-2 x^{2}+4 x-8=0$
6. $x^{5}-3 x^{4}-8 x^{3}-8 x^{2}-$ $9 x-5=0$
7. What is the equation of a quadratic function $P$ with rational coefficients that has a zero of $3+7 i$ ?
8. What is the equation of a polynomial function, $R$, with rational coefficients that have a zero of $4+\sqrt{5}$ and $3 i$ ?
9. A section of roller coaster can be modeled by the function: $f(x)=x^{5}-5 x^{4}-31 x^{3}+113 x^{2}+282 x-360$.
A walkway bridge will be placed at one of the zeros. What are the possible locations for the walkway bridge?
10. A shed in the shape of a rectangular prism measures $x$ feet high, $x+6.5$ feet wide, and is $x-4$ feet deep. The volume of the shed is given by the function $v(x)=x^{2}+2.5 x-26$. What is the height, width, and depth of the shed, in feet, if the volume is $990 \mathrm{ft}^{3}$ ?
11. Suppose a cubic polynomial, $f$, has two rational roots $c$ and $d$ and one irrational root which is a conjugate pair $a+\sqrt{b}$, where $a$ and $b$ are rational numbers. Does $f$ have rational coefficients? Explain.

