1 1.3 Quadratic equations

1. Applying the zero product property to a non zero number, i.e., $x(x-1)=8$ implies that $x=8$ or $x-1=8, and this is not true.$

2. Completing the square of a binomial to make a perfect- square trinomial by adding the square of half the coefficient of x where the coefficient of x^2 is not 1, i.e., $2x^2+4x$ can't be completed by adding $\left(\frac{4}{2}\right)^2$. However, we need to take 2 as a common factor and then add $\left(\frac{2}{2}\right)^2$, i.e., $2\left(x^2+2x+1\right)-2$.

3. Applying the discriminant rule to a quadratic equation with non real coefficients, i.e., $ix^2+2x+i=0$, where $i=\sqrt{-1}$. This equation has $b^2-4ac=8>0$, but the equation has the solutions $-i\pm\sqrt{2}i$ which is not real.

4. Applying the quadratic formula without writing the quadratic equation in its standard form to find a, b, and c correctly. For example, the equation $2x^2-1=4x$ needs to be written as $2x^2-4x+1=0$, and so $a=2$, $b=-4$, and $c=1$.

5. Solve $x^2=x$, by multiplying by the variable $\frac{1}{x}$ and forgetting that x maybe zero. To solve that equation correctly, we need to do the following $x^2-x=0$, i.e., $x(x-1)=0$, i.e., $x=0$ or $x=1$.

2 1.4 Other types of Equations

1. We forget to check the solutions after we use the Power Principle, for example $\sqrt{2+x}=-x$ has no solution. However, $2+x=x^2$ has two solutions.

2. Square both sides of the equation by deleting the square root. For example, the equation $\sqrt{x}+\sqrt{x+2}=1$ can't be squared to get $x+(x+2)=1$, and this is a big mistake.

3. Make the correct changes in solving a quadratic in form equation but we forget to substitute for the original variable.

3 1.5 Inequalities

1. Using the properties of the absolute value inequality when k is negative, i.e., $|x|\leq -2$. However, This inequality has no solution.

2. Multiply by the denominator in solving a rational inequality and forget that we do not know the denominator is positive or negative. For example, $\frac{2-x}{x}\leq 1,$ can not be solved by multiplying by x.

4 Chapter 2

1. Use the sum of the x's or the y's in finding the distance formula.

2. Use the difference of the x's or the y's in finding the midpoint formula.

3. Find the slope by interchange the order of the y's and the x's. The slope is $m = \frac{y_2 - y_1}{x_2 - x_1}$ or $m = \frac{y_1 - y_2}{x_1 - x_2}$ and not $m = \frac{y_2 - y_1}{x_1 - x_2}$ or $m = \frac{y_1 - y_2}{x_2 - x_1}$.

4. Notice that the vertex of $(x - h)^2 + k$ is (h, k) and the vertex of $(x + h)^2 + k$ is $(-h, k)$ and not (h, k).