1. An object is launched from a platform that is 80 feet above the ground. The height of the object is a function of time $h\left(t\right)=-16t^{2}+64t+80$, where h is measured in feet and t is time in seconds. *If you choose to solve this problem graphically, be sure to support your solution with a sketch or table and the proper labeling of all parts.*
	1. At what time does the object reach its maximum height?
	2. What is the maximum height the ball will reach?
	3. For how many seconds, to the nearest hundredth, will the ball be above 125 feet?
2. Factor and reduce the following rational expression: $\frac{3x-x^{2}}{9-x^{2}}$
3. Write and equation of a parabola with the given characteristics, sketch a graph for full credit:

Focus: (0, 6) directrix: y = -6

1. Identify the transformation, in function notation, of a parabola with a vertex of $(-1, 3)$ to a parabola with a vertex of $\left(2, 4\right)$.
2. Simplify each expression:
	1. $3\sqrt{32}$
	2. $\sqrt{-36}$
	3. $2\sqrt{-20}$
3. Sketch a scatter plot of a linear regression with an *r*-value close to $-1$.
4. Solve the equation using the quadratic formula, express your answer in simplest $a+bi$ form:

$$x^{2}+4x=-5$$

1. Factor the perfect square trinomial: $x^{2}-7x+\frac{49}{4}$
2. Find the average rate of change over the interval $-2\leq x\leq 2$ for the graph given below.

1. The expression $4i^{3}(2i+3) $is equivalent to what simplified expression?
2. Find algebraically, the zeros for $p\left(x\right)=x^{3}+2x^{2}-4x-8$.

Sketch the graph $y=p(x)$; using the calculator determine to the nearest hundredth the relative maximum and the relative minimum.

1. What is an even function? Draw a sketch of one below:
2. If the discriminant is less than zero, sketch a graph the best representation of $y=ax^{2}+bx+c$.
3. The graph of $f(x)$ is shown below. What is the remainder when $f(x)$ is divided by:
	1. $(x-2)$
	2. $(x)$
	3. $(x-4)$
	4. $(x+3)$

1. Solve and check the following rational equation:

$$\frac{5}{x}-\frac{1}{3}=\frac{1}{x}$$

1. Using long division, convert $f\left(x\right)=\frac{7x+4}{x-3}$ into the $f\left(x\right)= \frac{a}{x-h}+k$ form, and state the Domain and the Range. Include a sketch of a graph with asymptotes for full credit.
2. Solve the non-linear system of equations using and algebraic technique:

$$y+3x=-17$$

$$y=-3x^{2}-30x-71$$

1. Determine if $x+3$ is a factor of $-2x^{3}+4x^{2}+8x+10$. Explain your reasoning.