

no calculator

(20 points) For this polynomial: Determine the leading term, the degree, the ending behavior as $x \rightarrow \pm\infty$, the x -intercepts and their multiplicities, the y -intercept coefficient. Finally make a sketch of what this polynomial would look like.

$$f(x) = -4(x+3)^2(x-1)$$

x -intercepts $x = -3$ multiplicity 2 $(-3, 0)$
 $x = 1$ multiplicity 1 $(1, 0)$

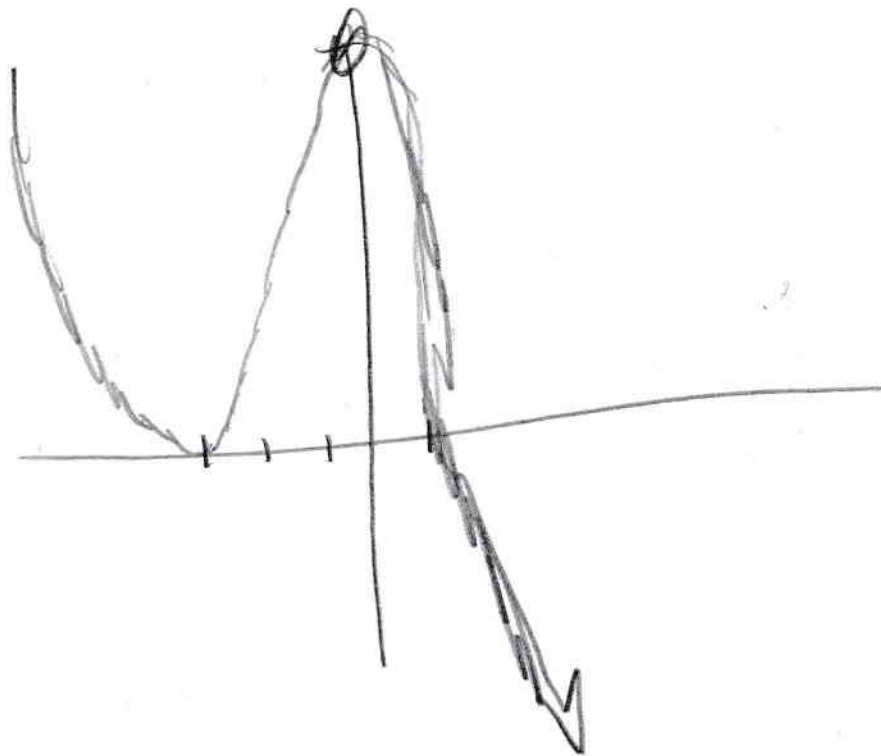
y -int. $f(0) = -4(4)(-1) = 16$ $(0, 16)$

Leading term $-4x^3$

degree = 3

$x \rightarrow -\infty, y \rightarrow \infty$

$x \rightarrow \infty, y \rightarrow -\infty$



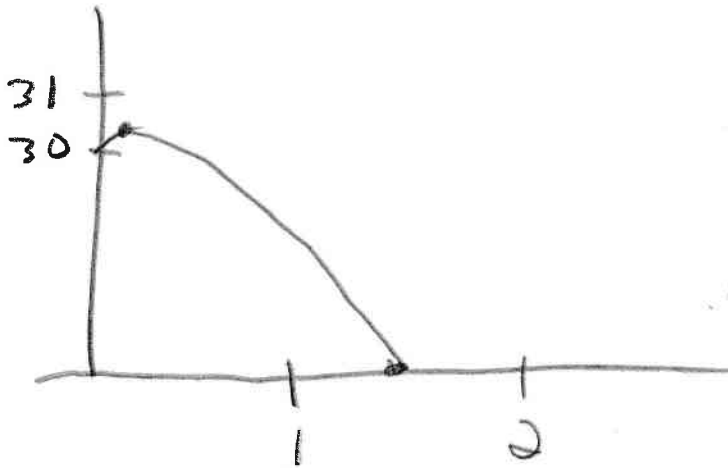
(20 points) Ainsley throws a bagel off Old Orchard Pier. The height, in feet, of the bagel above the water is described by the function $h(t) = -16t^2 + 2t + 30$; t is measured in seconds.

- From what height was the bagel initially thrown?
- How high above sea level does the bagel reach its peak? When does this happen?
- Assuming the bagel will splash down in the ocean, at what time does splashdown occur?
- Make a sketch of this situation.

(a) 30 FT

(b) $\frac{481}{16}$ or 30.0625 FT @ $\frac{1}{16}$ sec
 .0625 sec

(c) $h(t) = 0$ $T = 1.433$ sec.



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(10 points) Find the domain. Explain your thinking.

$$f(x) = \sqrt{(x+4)(x-3)}$$

$$(-\infty, -4) \cup (3, \infty)$$

left of $x = -4$ +

Right of $x = 3$ +