

NAME: _____ Score _____/10

Please **print** your name

Circle **T** or **F**, whichever is correct.

Suppose f is a polynomial function f whose leading term is $-3x^6$ and whose constant term is 4 .

1. **T** **F** The graph of f tries to cross the x -axis 6 times.

The graph of a polynomial function f of degree n can have no more than n x -intercepts. The graph “tries” to have exactly n x -intercepts.

2. **T** **F** The graph of f has at least one x -intercept.

This reasoning answers both Question 2 and Question 3. The function is a sixth degree polynomial so it has exactly 6 zeros. It could have three pairs of complex conjugates as zeros in which case it has no x -intercept.

3. **T** **F** The graph of f might have no x -intercepts.

To answer Questions 4 – 8 you must remember: For domain elements far from the origin, the leading term in a polynomial function dominates the entire expression when calculating range elements.

4. **T** **F** As $x \rightarrow +\infty$, $f(x) \rightarrow +\infty$.

If x is positive, then $-3x^6$ is negative and it follows that $f(x)$ goes toward $-\infty$ not $+\infty$

5. **T** **F** As $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$.

If x is negative, then $-3x^6$ is negative and it follows that $f(x)$ goes toward $-\infty$ not $+\infty$

6. **T** **F** As $x \rightarrow +\infty$, $f(x) \rightarrow -\infty$.

If x is positive, then $-3x^6$ is negative and it follows that $f(x)$ goes toward $-\infty$

7. **T** **F** As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$

If x is negative, then $-3x^6$ is negative and it follows that $f(x)$ goes toward $-\infty$

8. **T** **F** The graph of f might have a horizontal asymptote.

The end behavior described in Questions 4 – 8 prohibits a horizontal asymptote.

9. **T** **F** A possible rational zero of f is $\frac{3}{4}$.

To answer Questions 9 and 10, you must remember the Rational Zeros Theorem which mandates that if a rational number is a zero of this polynomial, its numerator must be a divisor of the constant term 4 and its denominator must be a divisor of the leading coefficient -3 .

10. **T** **F** A possible rational zero of f is $\frac{4}{3}$.