*AAT

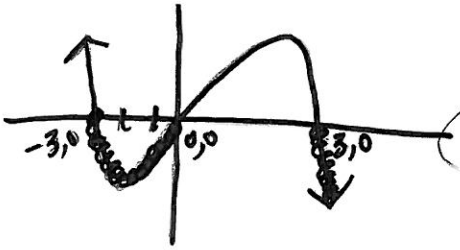
Name: Key

Chapter 4: Review for Quiz 4.1-4.3

Date: _____ Period: _____

1. Find all values of x such that f(x) < 0.

$f(x) = 9x - x^3$

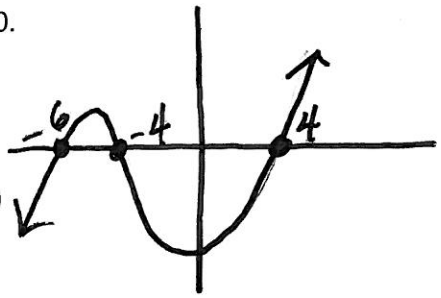


$-3 < x < 0,\ x > 3$

2. Find all values of x such that f(x) < 0.

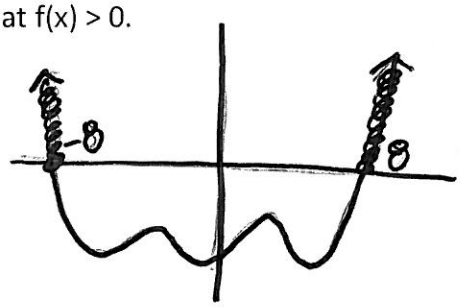
$f(x) = x^3 + 6x^2 - 16x - 96$

$x < -6$ or $-4 < x < 4$



3. Find all values of x such that f(x) > 0.

$f(x) = x^2(x+8)(x-2)^2(x-8)$



$x < -8$ or $x > 8$

4. Let f(x) be a polynomial such that the coefficient of every even power of x is 0. Is *f* an even or odd function?

$x^3 + 0x^2 + x = f(x)$

$-(x)^3 + (-x) = f(x)$

$-x^3 - x = -f(x)$

odd

5. If $f(x) = 5x^3 - kx^2 + x - 11k$, find a number k such that the graph of *f* contains the point (-1,22).

$22 = 5(-1)^3 - (-1)^2k + (-1) - 11k$

$22 = -5 - k - 1 - 11k$

$22 = -6 - 12k$

$\frac{28}{-12} = \frac{-12k}{-12}$

$k = -\frac{7}{3}$

6. If one zero of $f(x) = x^3 - 11x^2 - kx + 144$ is -3, find two other zeros.

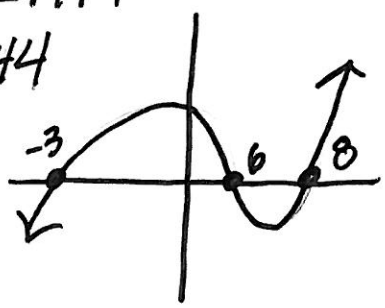
$0 = (-3)^3 - 11(-3)^2 - (-3)k + 144$

$0 = -27 - 99 + 3k + 144$

$\frac{3k}{3} = \frac{-18}{3}$

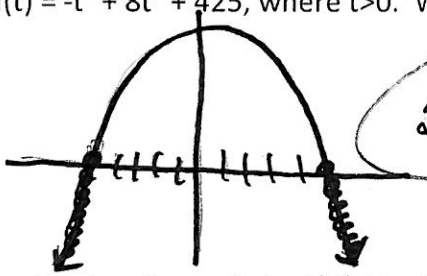
$k = -6$

$y = x^3 - 11x^2 + 6x + 144$



$x = 6,\ x = 8$

7. A herd of 425 deer is introduced onto a small island. At first, the herd increases rapidly, but eventually food resources dwindle and the population declines. Suppose that the number of deer after t years is given by $N(t) = -t^4 + 8t^2 + 425$, where $t>0$. When does the population become extinct?



5 years

8. Find the quotient and remainder if f(x) is divided by p(x).

$f(x) = 9x^4 - x^3 - 6x^2 + 5x - 5;$

$p(x) = x^2 - 3$

Q: $9x^2 - x + 21$ R: $2x + 58$

$$\begin{array}{r|l} x^2+0x-3 & 9x^4-x^3-6x^2+5x-5 \\ & -9x^4+0x^3-27x^2 \\ \hline & -x^3+21x^2+5x \\ & -(-x^3-0x^2+3x) \\ \hline & 21x^2+2x-5 \\ & -(21x^2+0x-63) \\ \hline & 2x+58 \end{array}$$

9. Decide whether $x - c$ is a factor of

$f(x) = x^{12} - 1$

$c=-4$

$f(-4) = (-4)^{12} - 1$

$\neq 0$

not a factor

10. Find a polynomial with leading coefficient 1 and having the degree 3 and zeros -3, 0, 8.

$f(x) = 1(x+3)(x)(x-8)$

$f(x) = x^3 - 5x^2 - 24x$

11. Use synthetic division or substitution to find f(c).

$f(x) = 9x^3 + 8x^2 - 3x + 2$

$c = 2$

$f(2) = 9(2^3) + 8(2^2) - 3(2) + 2$

$= 72 + 32 - 6 + 2$

$= 100$

-or-

$$\begin{array}{r|cccc} 2 & 9 & 8 & -3 & 2 \\ & & 18 & 52 & 98 \\ \hline & 9 & 26 & 49 & 100 \end{array}$$

12. Find all values of k such that f(x) is divisible by the given linear polynomial.

$f(x) = kx^3 + x^2 + k^2x + 3k^2 + 11$

$x+2$

$0 = (-2)^3k + (-2)^2 + (-2)k^2 + 3k^2 + 11$

$0 = -8k + 4 - 2k^2 + 3k^2 + 11$

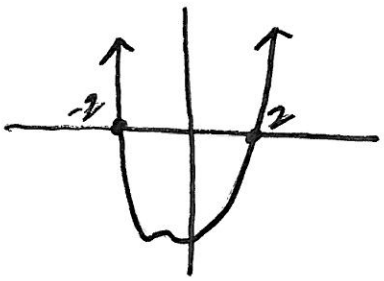
$0 = k^2 - 8k + 15$

$0 = (k-5)(k-3)$

$k = 5$ $k = 3$

13. Find the zeros of f(x), and state the multiplicity of each zero.

$f(x) = x^4 + 32x^2 - 144$



2 | 1 0 32 0 -144

2 4 72 144

1 2 36 72 | 0

-2 | -2 0 -72

1 0 36 | 0

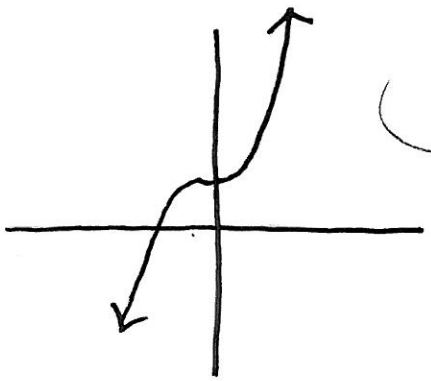
$x^2 + 36 = 0$

$x^2 = -36$

$x = \pm 6i$

14. Determine the number of positive, negative, and imaginary solutions of the equation.

$2x^3 + 3x^2 + 1 = 0$



1 negative root, 0 positive roots, 2 imag. roots