Question of the Day

If you had the power to switch the sound that two animals make, which two would you choose?

On the Docket

Concept Check-In

Concept Review: Oblique Asymptotes

Quiz

Concept Check-in

Describe, in your own words,

- Vertical Aymptotes
- Horizontal Asymptotes
- Oblique Asymptotes

Describe the process for finding each.

Concept Check-in

Discuss the following theorems:

- Remainder Theorem
- Factor Theorem
- The Rational Root (Zeroes) Theorem
- Theorem: the maximum number of zeroes of a polynomial is equal to its degree.
- Theorem: Every polynomial is the produc to flinear terms and irreducible quadratic terms.
- Theorem: an odd degree polynomial has at least one real zero.

What do they say? What can they be used for?

Oblique Asymptotes

Find the oblique asymptotes

$$\frac{6x^2 - 3x - 9}{x + 3}$$

$$\frac{-10x^3 + 4x^2 - 5x + 2}{2x^2 + 4x - 1}$$

$$\frac{4x^5 - 2x^4 + x^2 - 2x + 9}{2x^4 - x^2 - 7x - 3}$$

Oblique Asymptotes

Find the oblique asymptotes

$$
\begin{array}{r}
6x - 21 \\
\hline
x + 3 \big) \quad 6x^2 - 3x - 9 \\
\underline{-6x^2 - 18x} \\
-21x - 9 \\
\underline{21x + 63} \\
54
\end{array}
$$

$$\frac{-10x^3 + 4x^2 - 5x + 2}{2x^2 + 4x - 1}$$

$$\frac{4x^5 - 2x^4 + x^2 - 2x + 9}{2x^4 - x^2 - 7x - 3}$$

Oblique Asymptotes

Find the oblique asymptotes

$$\frac{6x^2 - 3x - 9}{x + 3} = (6x + 21)(x + 3) + 54$$

$$\begin{array}{r} -5x+12 \\ \hline 2x^2+4x-1\,\big)\,-10x^3+4x^2-5x+2 \\ \quad 10x^3+20x^2-5x \\ \hline \qquad 24x^2-10x+2 \\ \qquad -24x^2-48x+12 \\ \hline \qquad -58x+14 \end{array}$$

$$\frac{4x^5 - 2x^4 + x^2 - 2x + 9}{2x^4 - x^2 - 7x - 3}$$

Oblique Asymptotes

Find the oblique asymptotes

$$\frac{6x^2 - 3x - 9}{x + 3} = (6x + 21)(x + 3) + 54$$

$$\frac{-10x^3 + 4x^2 - 5x + 2}{2x^2 + 4x - 1} = (-5x + 12)(2x^2 + 4x - 1) + (32x - 6)$$

$$\begin{array}{r|l} & 2x - 1 \\ \hline 2x^4 + x^2 - 7x - 3 & 4x^5 - 2x^4 + x^2 - 2x + 9 \\ & \underline{-4x^5 - 2x^3 + 14x^2 + 6x} \\ & -2x^4 - 2x^3 + 15x^2 + 4x + 9 \\ & \underline{2x^4 + x^2 - 7x - 3} \\ & -2x^3 + 16x^2 - 3x + 6 \end{array}$$

Oblique Asymptotes

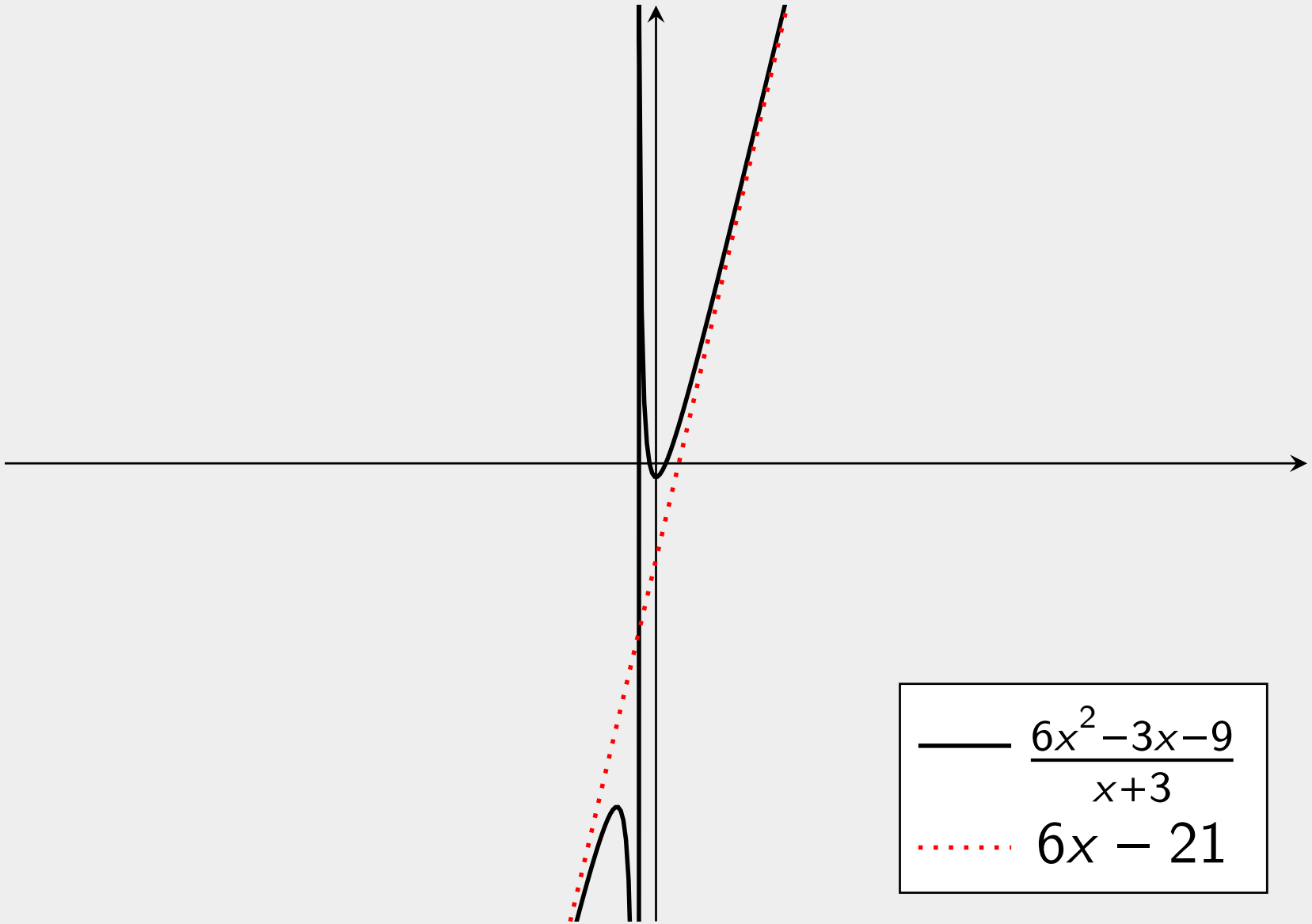
Find the oblique asymptotes

$$\frac{6x^2 - 3x - 9}{x + 3} = (6x + 21)(x + 3) + 54$$

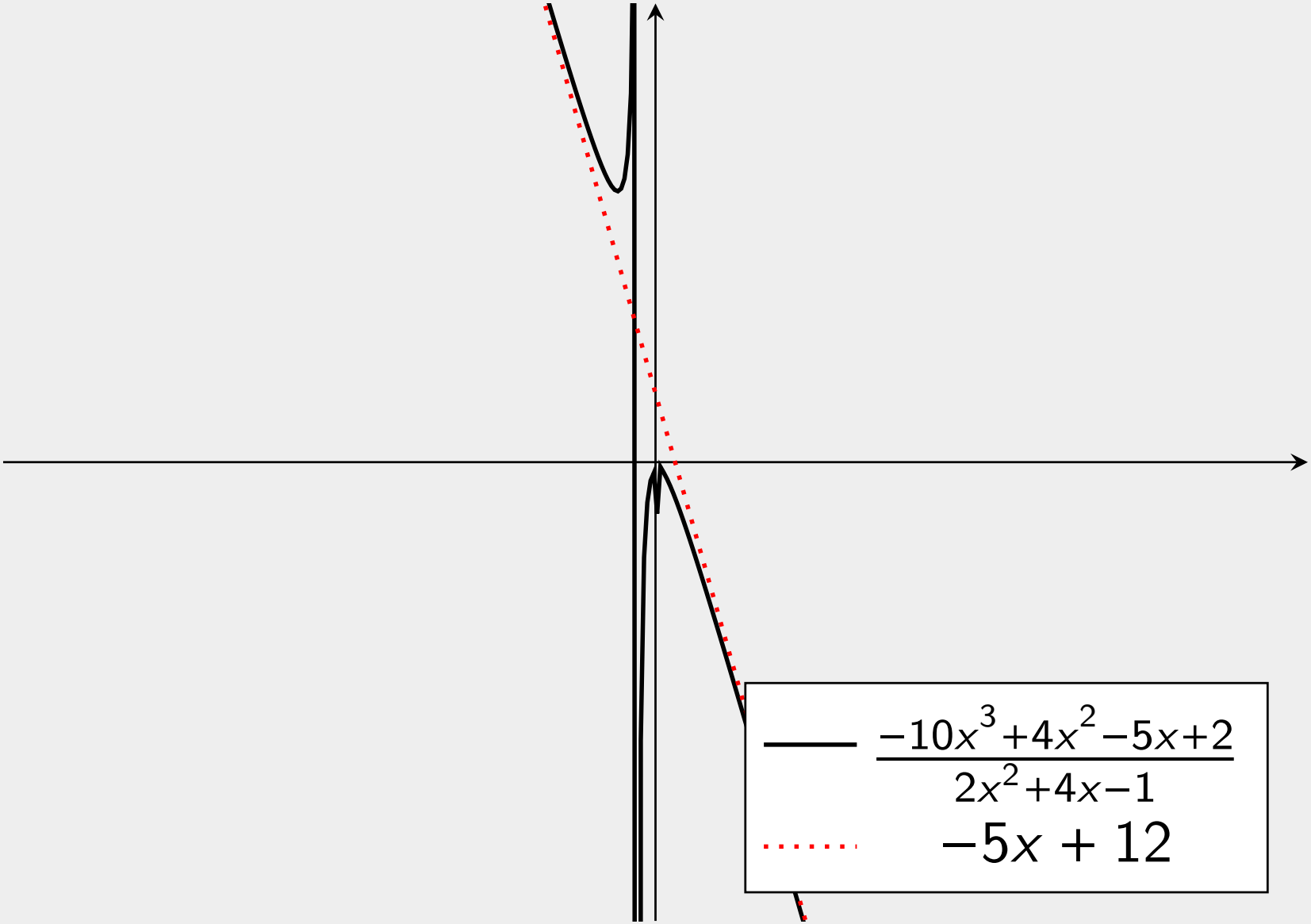
$$\frac{-10x^3 + 4x^2 - 5x + 2}{2x^2 + 4x - 1} = (-5x + 12)(2x^2 + 4x - 1) + (32x - 6)$$

$$\frac{4x^5 - 2x^4 + x^2 - 2x + 9}{2x^4 - x^2 - 7x - 3}$$
$$= (2x - 1)(2x^4 + x^2 - 7x + 3) + (-2x^3 + 16x^2 - 3x + 6)$$

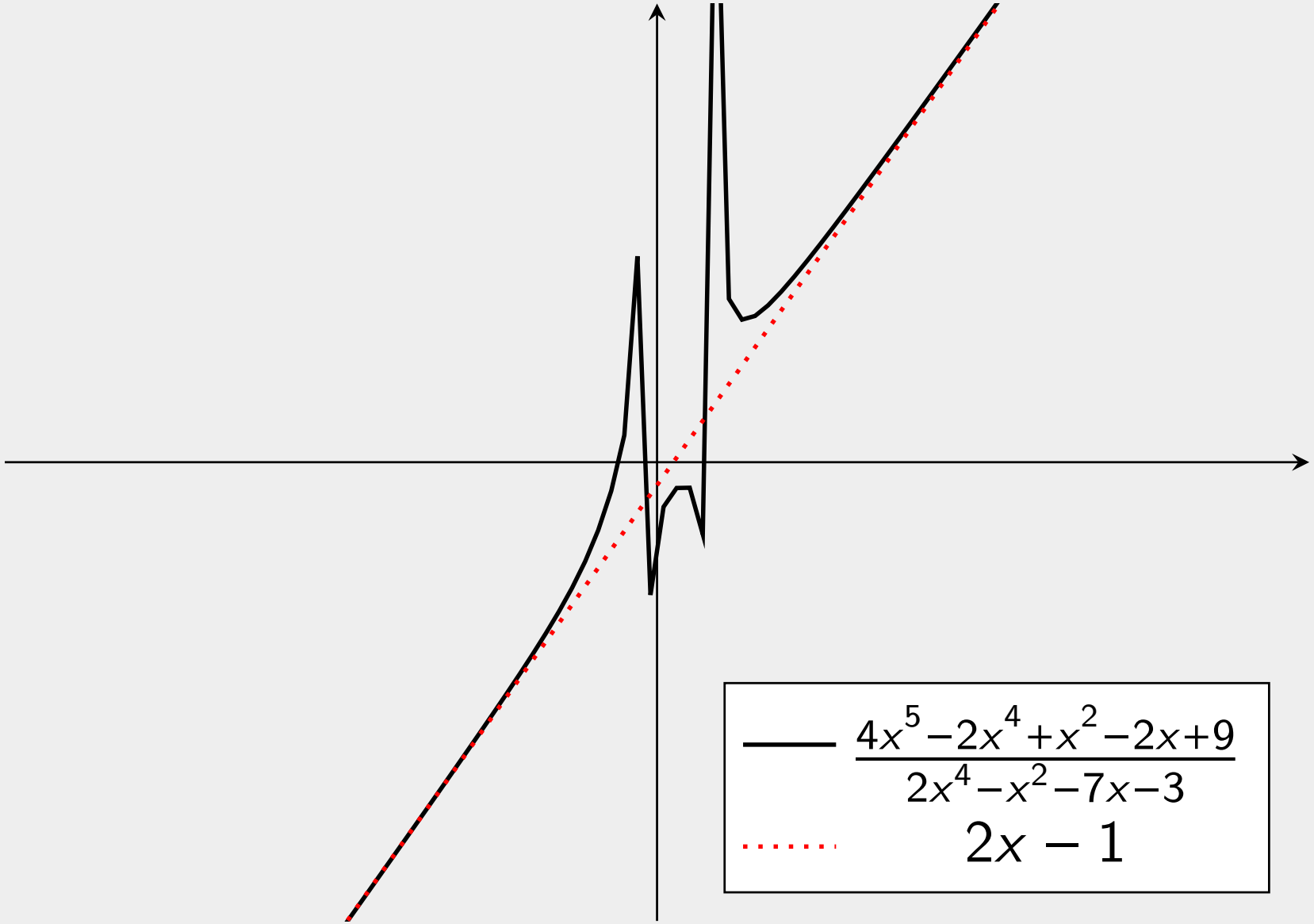
Oblique Asymptotes - Graph 1



Oblique Asymptotes - Graph 2



Oblique Asymptotes - Graph 3



Quiz

Find the oblique asymptote of the following rational function.

$$R(x) = \frac{x^4 + x^3 - 5x + 7}{x^3 + 4x^2 + 2x - 5}$$