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GUIDED NOTES: Polynomial Applications

EX1. For 1985 through 1996, the number, C (in millions), of videos rented each year in the United States can be modeled by $C = 0.053\left(t^3 + 2t^2 + 33t + 500\right)$, where $t = 0$ represents 1990. Using this model, estimate the number of videos rented in the United States in 1994.

$t=4$
$1994-1990=4$ years

*Plug value into equation!

$C = 38.584$ million rentals

EX2. The profit P (in millions of dollars) for a manufacturer of MP3 players can be modeled by $P = -4x^3 + 12x^2 + 16x$, where x is the number of MP3 players produced (in millions). Currently, the company produces 3 million MP3 players and makes a profit of $48,000,000. What lesser number of MP3 players could the company produce and still make the same profit?

*Put equation in y=

*2 million MP3 players

Look at table!

1	24
2	48
3	48

EX3. Given that the volume of the box is 40 in^3, determine the dimensions of the box.

*Setting equal to zero!

$V = l \times w \times h$

$40 = (x-1)(2x)(x-4)$

$-40 \quad\quad -40$

Put in y=

$0 = (x-1)(2x)(x-4) - 40$

Plug

*Find zero on graph.

$x = 5$

$4 \times 10 \times 1$

EX4. A rectangular pool has a length of $x^2 + 9x + 3$ feet and a width of $4x - 2$ feet. Determine the area of the pool.

$A = l \times w$

$(x^2+9x+3) \times (4x-2)$

l $\quad\quad$ w

	x^2	$9x$	3
$4x$	$4x^3$	$36x^2$	$12x$
-2	$-2x^2$	$-18x$	-6

*Combine like terms

$4x^3 + 34x^2 - 6x - 6$

EX5. A rectangular Tyrannosaurus Rex paddock has an area of $x^3 + x^2 - 11x + 4$ square meters, and a width of $x + 4$ meters. Find its length.

$A = l \times w$

$\frac{x^3 + x^2 - 11x + 4}{(x+4)} = \frac{l * (x+4)}{(x+4)}$

-4 | 1 | 1 | −11 | 4

↓ | −4 | 12 | −4

1 | −3 | 1 | 0 remainder

x^2 $\quad$ x $\quad$ c

$x^2 - 3x + 1 = \text{length}$