

7. *Notice the word ASYMPTOTE in 3 out of 5 choices

Find H.A. : look at exponents. Top is "2" and bottom is "1"
 when top is bigger, SLANT ASYMPTOTE.

use long division:

$$\begin{array}{r} 150x - 600 \\ 2x + 8 \overline{) 300x^2 + 0x + 0} \\ \underline{-300x^2 - 1200x} \\ -1200x + 0 \\ \underline{-1200x} \\ 0 \end{array}$$

$y = 150x - 600$

8. $P(x) = -0.9(x-18)^2 + 202.5$ (LOOKS VERY SIMILAR to $y = a(x-h)^2 + k$.)

*Maximum \Rightarrow Vertex $\Rightarrow (h, k)$
 \uparrow max x-value \uparrow max y-value

In problem, x means Liters
 y means profit

so h means max liters
 to produce k max profit.

Question asks for max liters, which means the "h" value.

$h = 18$

9. Set up $\left\{ \begin{array}{l} \text{Zeros: } x = -4 \quad x = 2 \quad x = 3 \\ \text{factors: } (x+4)(x-2)(x-3) \end{array} \right.$

\leftarrow We know there are 3 because the equation is x^3
 \leftarrow To get factors, subtract/add to get 0 on one side.

use given zero ($x = -4$) as magic # in synthetic division

$$\begin{array}{r|rrrr} -4 & 1 & -1 & -14 & 24 \\ & \downarrow & -4 & 20 & -24 \\ \hline & 1 & -5 & 6 & 0 \end{array}$$

$(x^2 - 5x + 6)$
 $(x-2)(x-3)$
 \uparrow two \uparrow missing factors

10. Again, set up $\left\{ \begin{array}{l} \text{Zeros: } x = 1 \quad x = 1 \quad x = 2i \quad x = -2i \\ \text{factors: } (x-1)(x-1)(x-2i)(x+2i) \end{array} \right.$

use synthetic division w/ $x = 1$
 can do it twice since given two multiplicity

$$\begin{array}{r|rrrrr} & 1 & -2 & 5 & -8 & 4 \\ & \downarrow & 1 & -1 & 4 & -4 \\ \hline & 1 & -1 & 4 & -4 & 0 \end{array}$$

\leftarrow should get 0 remainder

$$\begin{array}{r|rrrr} & 1 & -1 & 4 & -4 \\ & \downarrow & 1 & 0 & +4 \\ \hline & 1 & 0 & 4 & 0 \end{array}$$

- * Real zeros are x-intercepts
- * ~~all~~ zeros w/ "i"s are imaginary.
- * If two zeros hit at the same place, they are considered only 1 x-int. (ex: $x = 1$, mult. of 2)

$(x^2 + 4)$ \leftarrow cannot factor more, but set = 0 to find zeros.

$$\begin{aligned} x^2 + 4 &= 0 \\ x^2 &= -4 \\ x &= \pm 2i \text{ zeros} \end{aligned}$$