No Quiz Today!

Grab a book from the back corner (start with stacks on the right of all the stacks) of the room and tear out <u>chapter 7 (pgs.511-570).</u>

Unequal Equals
## Solving Polynomial Inequalities

7.1

pg.513-514 in your book.

Lawn Enforcement is a small landscaping company. It has a profit model that can be represented by the function,

$$p(x) = -x^4 + 19.75x^3 - 133.25x^2 + 351.25x - 280.75 \quad > 0 \\ < 0$$

$> 35,000$

where profit, in thousands of dollars, is a function of time, in years, the company has been in business. Let's analyze $p(x)$ represented on a graph.

The graph shown represents the change in profit as a function of the number of years that Lawn Enforcement has been in business.
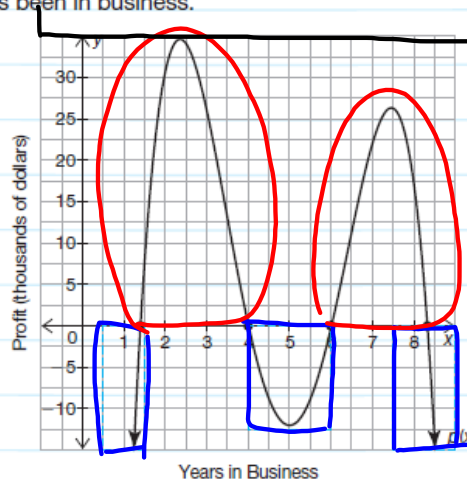
The points identified on the graph represent the zeros of the function where Lawn Enforcement's profit was 0.
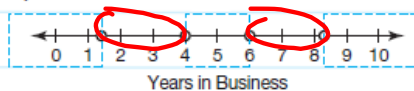
Each point on the number line represents the years in business when Lawn Enforcement's profit was 0.
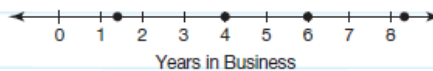
The function $p(x) = 0$ when $x = 1.4, 4, 6, 8.3$.

The regions enclosed in dashed boxes on the coordinate plane represent Lawn Enforcement's profit less than 0.

The regions on the number line enclosed in dashed boxes represent the years in business when Lawn Enforcement's profit was less than 0.
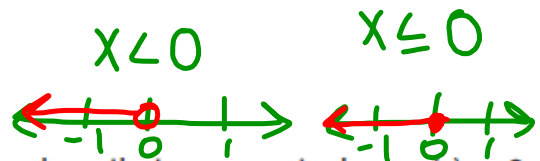

The function $p(x) < 0$ when $\begin{cases} x < 1.4 \\ 4 < x < 6 \\ x > 8.3 \end{cases}$

$\rightarrow (-\infty, 1.4)$
$\rightarrow (4, 6)$
$\rightarrow (8.3, \infty)$

Nov 19-8:31 AM

2

pg.515 in your book

1. Analyze the worked example.

    a. Why were the points changed to open circles on the number line to represent the years in business when $p(x) < 0$.

    We want the intervals where $p(x) < 0$, not equal to 0.

$x < 0$ $x \leq 0$

    b. Circle the parts of the graph on the coordinate plane that represent where $p(x) > 0$. Then circle the intervals on the number line that represent the years in business where $p(x) > 0$. Finally identify the set of x-values to complete the sentence and explain your answer in terms of this problem situation.

$$\left\{ \begin{array}{c} 1.4 < x < 4 \\ 6 < x < 8 \end{array} \right\}$$

    The function $p(x) > 0$ when _____.

    c. Draw a solid box around the segment(s) where $p(x) > 35{,}000$. Then identify the set of x-values to complete the sentence. Finally, explain your answer in terms of this problem situation.
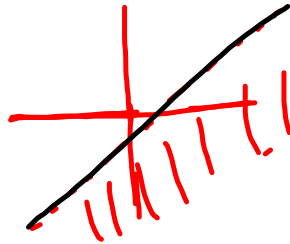
    The function $p(x) > 35{,}000$ when ___ no solution ___.

take 5 minutes to work on pgs.516-c on pg.519 in your book

$x - 2 \geq y$

2. Solve $18 \leq 3x^2 + x$ using any method. Explain why you chose the method.

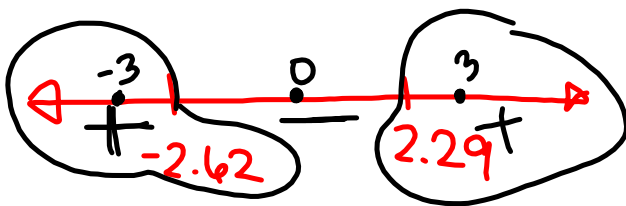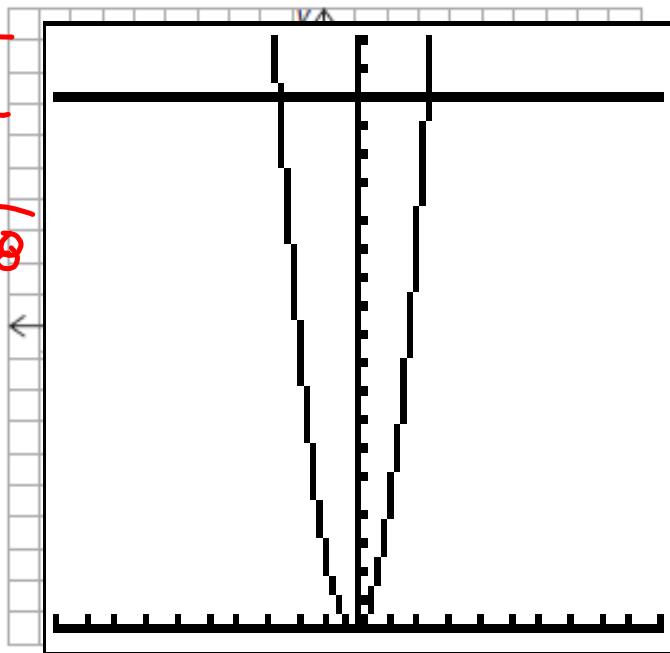$a = 3 \quad b = 1 \quad c = -18$

$\underline{-18 \qquad\qquad -18}$

$0 \leq 3x^2 + x - 18$

$x = -\dfrac{b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \dfrac{-1 \pm \sqrt{1 - 4 \cdot 3 \cdot -18}}{6}$

$x = \dfrac{-1 \pm \sqrt{217}}{6}$

$x = -2.62, 2.29$

$\begin{cases} x \leq -2.62 \\ x \geq 2.29 \end{cases}$

pg.520 in your book

Polynomial inequalities can be used to represent everyday situations. Write and solve each real-world inequality.

1. Get Your Kicks is an indoor soccer complex. The roof's height at the facility is 80 feet. If a soccer ball is kicked and touches the ceiling during a game, the team that kicked the ball must have a player sit out for two minutes. Michael kicks a ball straight up in the air with an initial velocity of 73 feet per second.

   a. Write an inequality to represent this problem situation.

   Remember the formula for initial velocity is
   $$h(t) = -16t^2 + V_o t + h_o$$
   where v_o represents initial velocity and h_o represents initial height.

   b. Use your inequality to determine whether Michael's team will be penalized for hitting the ceiling. Explain your reasoning.

2. Glen High School's student council is hosting a dance to raise money for panda bears. The dance will cost $2250. At the current ticket price of $10, the council knows that they will have 185 people attend the dance. This is not enough people to cover the cost of the dance, so they estimate that for every $0.25 decrease in ticket price, 15 more people will attend the dance.

   a. Write an equation that will represent the profit that the dance will make.

   b. Write an inequality to represent the dance making a profit.

   c. Determine the maximum price the council can charge for tickets and still make a profit.
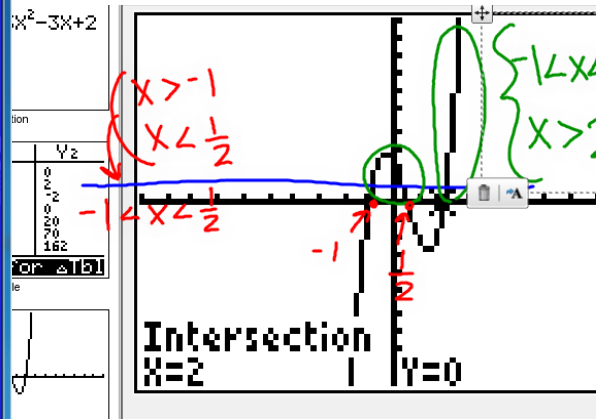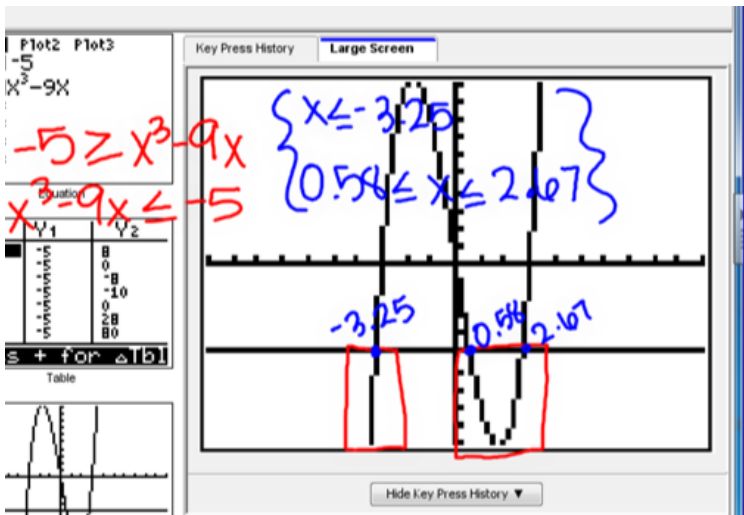
   d. Determine the price of the ticket that will maximize profit. What is the maximum profit?

Oct 29-9:00 AM

pg.521 in your book
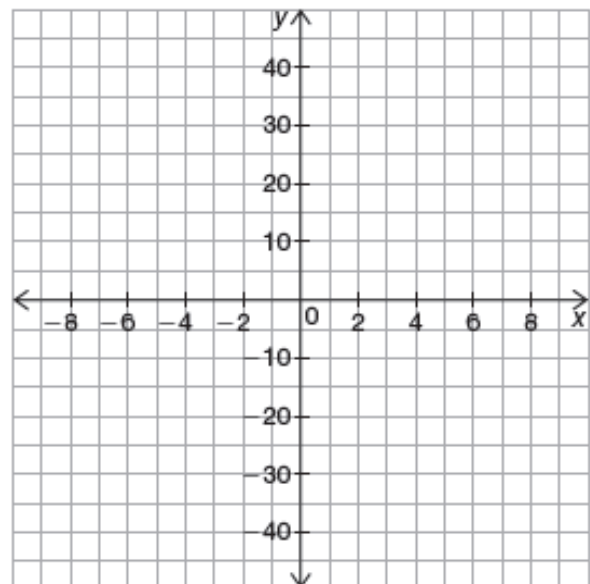
3. Use a graphing calculator to solve each inequality.

a. $-5 \geq x^3 - 9x$ b. $0 < 2x^3 - 3x^2 - 3x + 2$

Handwritten on graph a:
$-5 \geq x^3 - 9x$
$x^3 - 9x \leq -5$
$\{x \leq -3.25$
$0.58 \leq x \leq 2.67\}$
-3.25 0.58 2.67

Handwritten on graph b:
$x > -1$
$x < \frac{1}{2}$
$-1 < x < \frac{1}{2}$
$\{1 < x$
$x > 2\}$
-1 $\frac{1}{2}$
Intersection X=2 Y=0

finish #4 on pg.521 and 5a & b on pg.522

c. $x^4 - 13x^2 + 36 \leq 0$

Jan 5-2:18 PM

Homework
Finish Lesson 7.1

Oct 21-8:47 AM