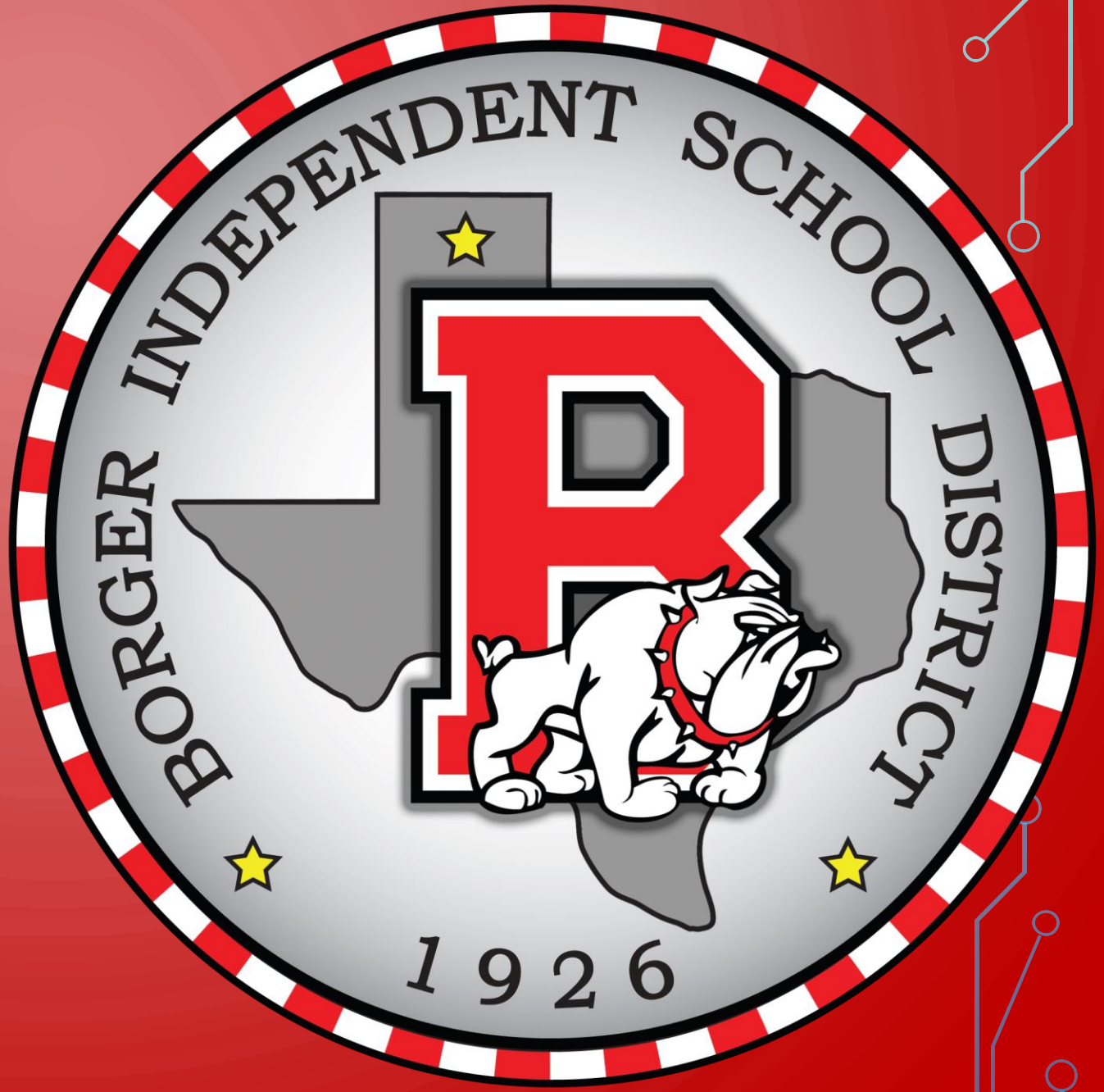
BOARD NOTES

1 OCTOBER 2018



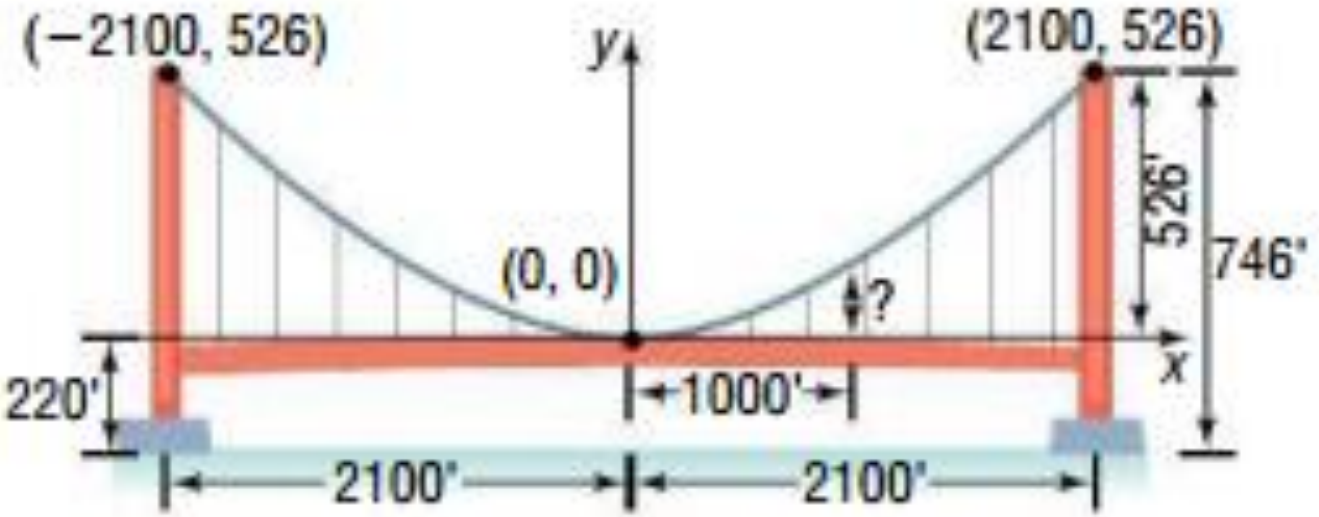
CC PRECALCULUS CHAPTER 3 – LINEAR AND QUADRATIC FUNCTIONS

- SECTION 3.4 - BUILD QUADRATIC MODELS FROM VERBAL DESCRIPTIONS AND FROM DATA

Objectives:

- Build quadratic models from verbal descriptions
- Build quadratic models from data

The Golden Gate Bridge spans the entrance to San Francisco Bay. Its 746-foot tall towers are 4200 feet apart. The bridge is suspended from two huge cables more than 3 feet in diameter; the 90-foot wide roadway is 220 feet above the water. The cables are parabolic in shape and touch the road surface at the center of the bridge. Find the height of the cable above the road at a distance 1000 feet from the center. Begin by choosing the placement of the coordinate axes so that the x-axis coordinates with the road surface and the origin coincides with the center of the bridge



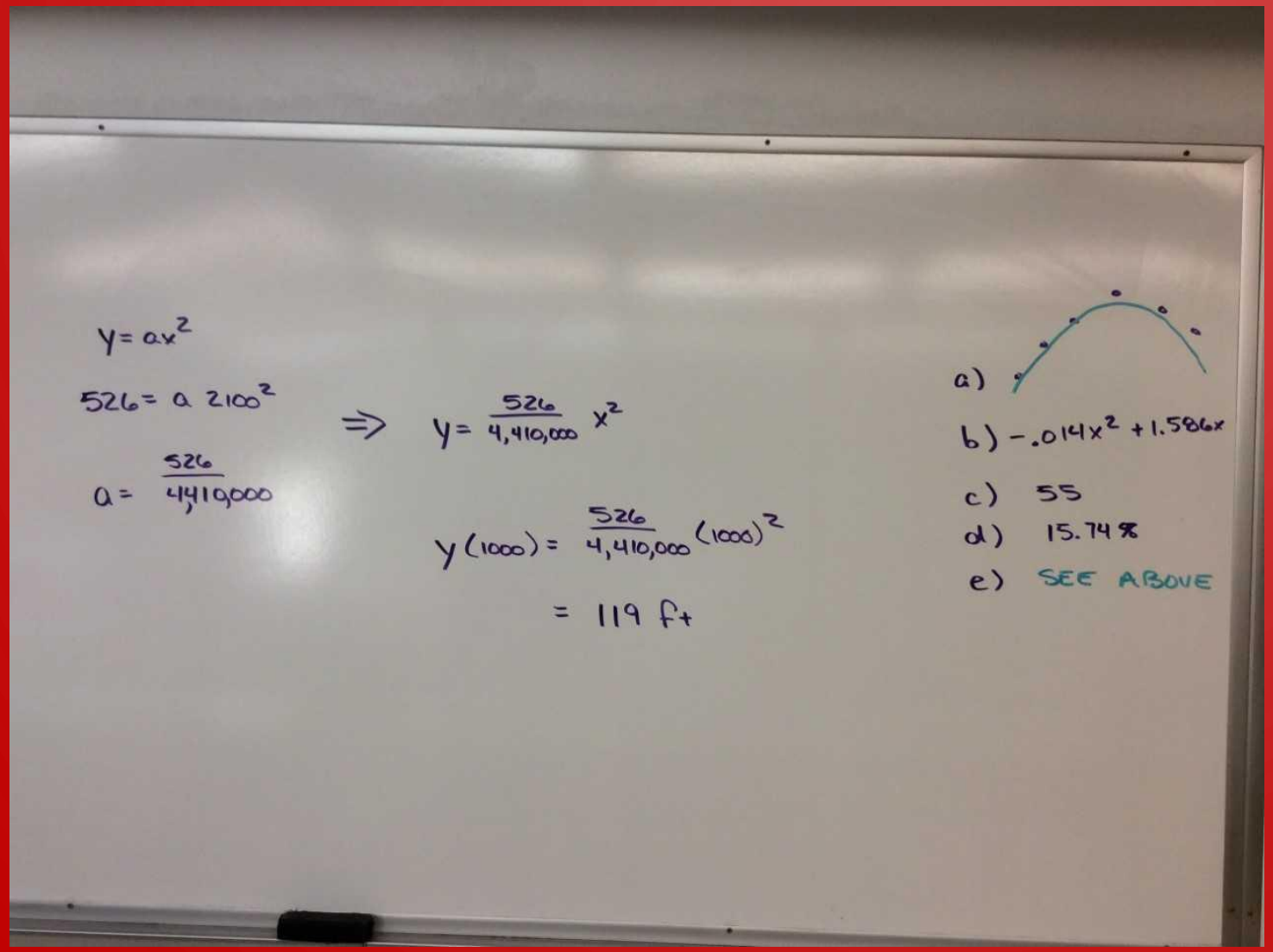
Use these facts to find the value of a in $y = ax^2$.

Age, x	Percentage Divorced, D
22	0.9
27	3.6
32	7.4
37	10.4
42	12.7
50	15.7
60	16.2
70	13.1
80	6.5

Source: United States Statistical Abstract, 2012

The data in the table represents the percentage D of the population that are divorced for various ages x in 2012.

a) Draw a scatter diagram
b) Find an equation for the model that best fits the data
c) What age is divorces the highest?
d) What is the highest divorce rate?
e) Graph the equation of best fit.


$y = ax^2$
$526 = a\ 2100^2$
$a = \frac{526}{4{,}410{,}000}$
$\Rightarrow y = \frac{526}{4{,}410{,}000} x^2$
$y(1000) = \frac{526}{4{,}410{,}000}(1000)^2$
$= 119$ ft
a)
b) $-.014x^2 + 1.586x$
c) 55
d) 15.74%
e) SEE ABOVE

CC PRECALCULUS CHAPTER 3 – LINEAR AND QUADRATIC FUNCTIONS

- SECTION 3.5 - INEQUALITIES INVOLVING A QUADRATIC FUNCTION

Objectives:

- Solve inequalities involving a quadratic function

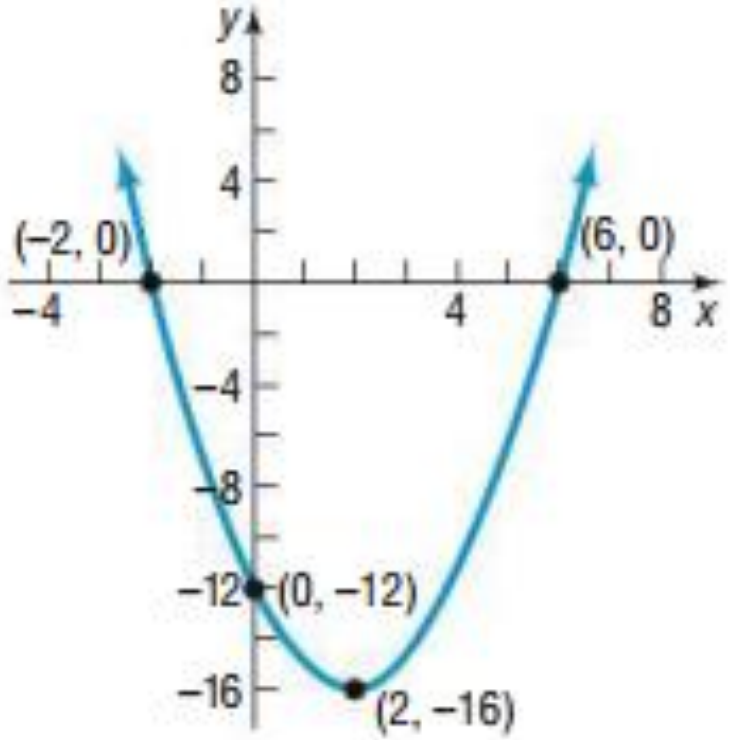


Figure 33 $f(x) = x^2 - 4x - 12$

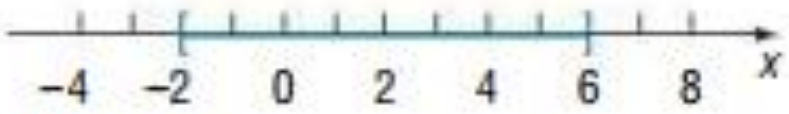


Figure 34

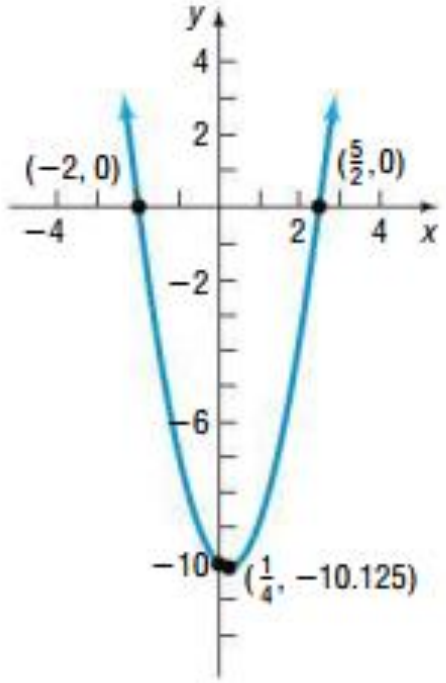


Figure 35 $f(x) = 2x^2 - x - 10$

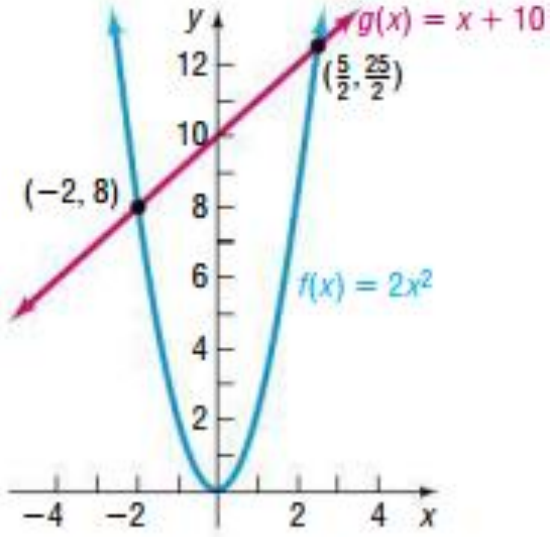
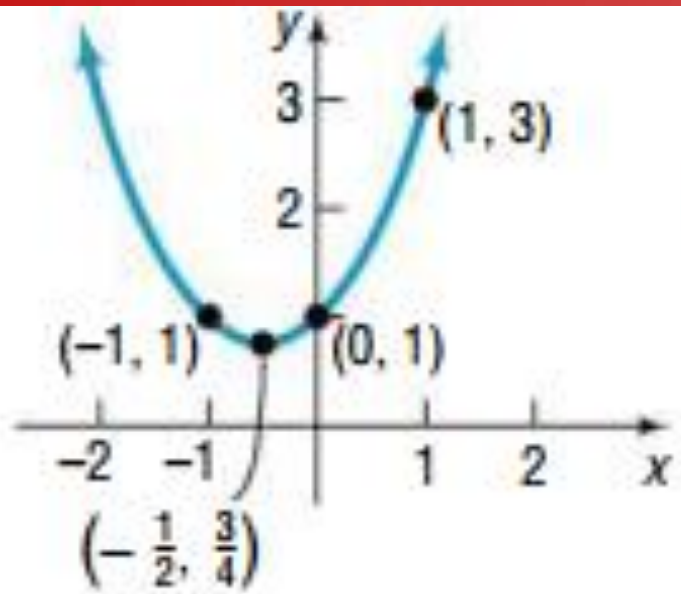


Figure 36

Figure 37



Solution

Figure 38 $f(x) = x^2 + x + 1$

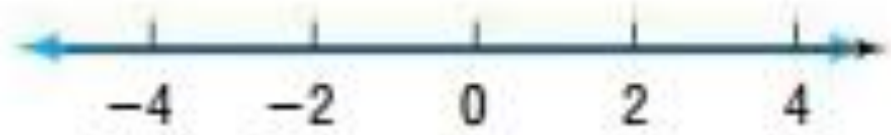
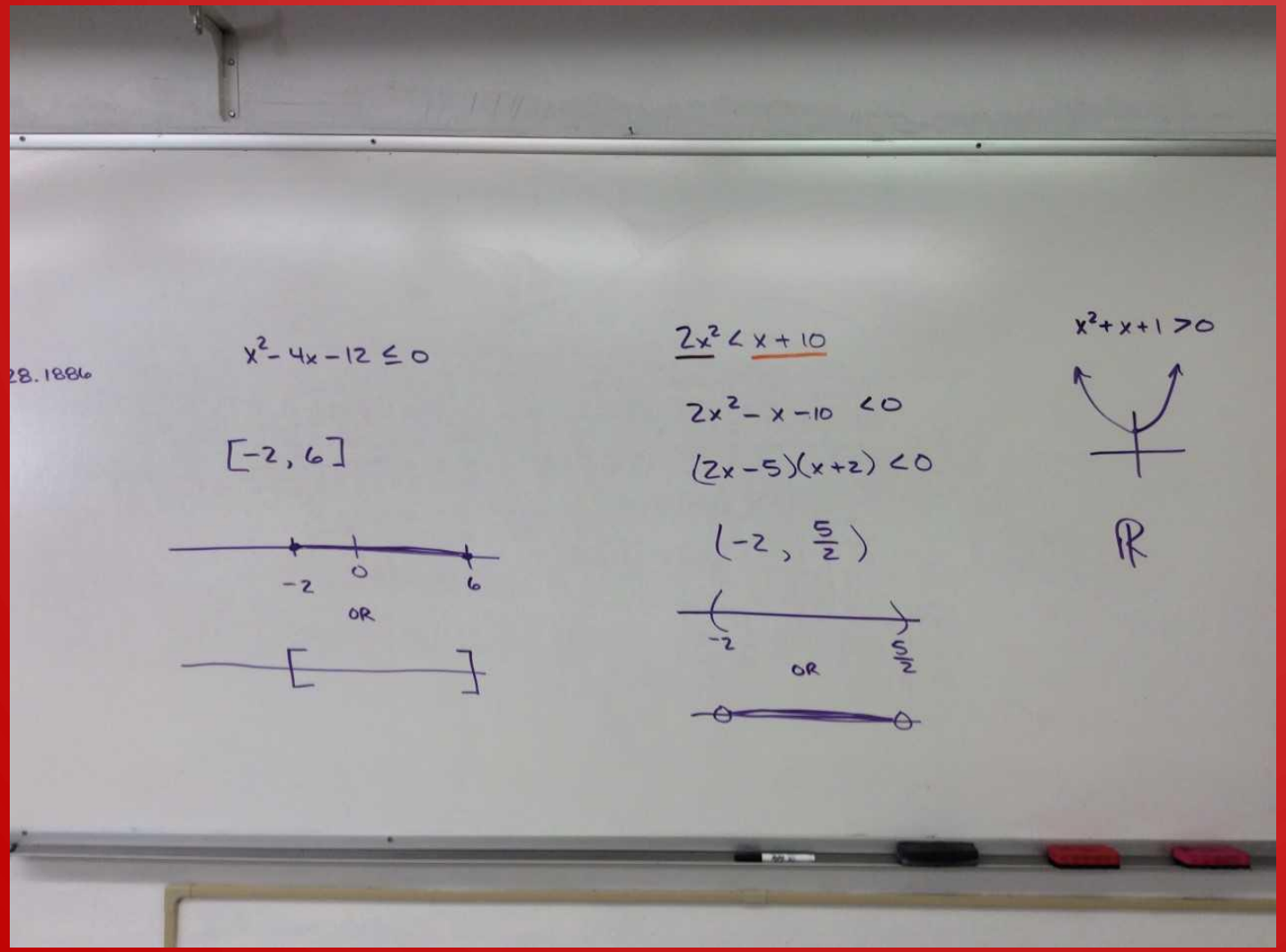


Figure 39


28.1886
$x^2 - 4x - 12 \leq 0$
$[-2, 6]$
-2
0
6
OR
$2x^2 < x + 10$
$2x^2 - x - 10 < 0$
$(2x - 5)(x + 2) < 0$
$(-2, \frac{5}{2})$
-2
$\frac{5}{2}$
OR
$x^2 + x + 1 > 0$
R