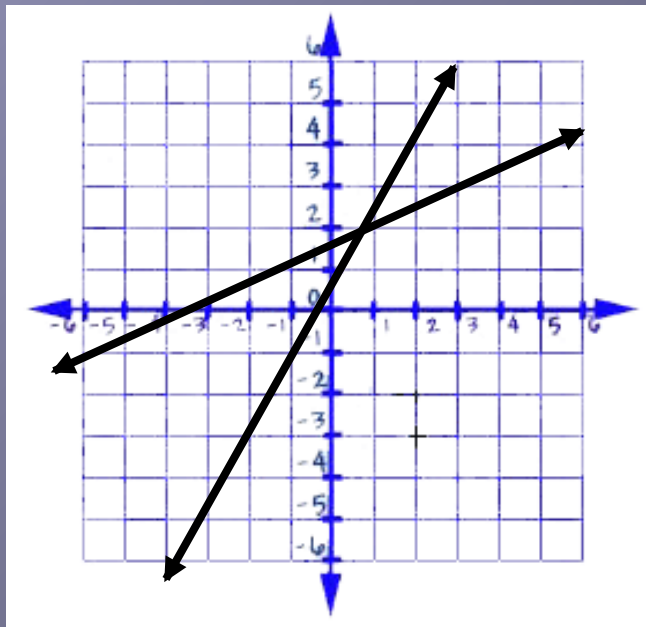
How Graphs of Systems of Equations Help Us Make Decisions

By: Laura Becker

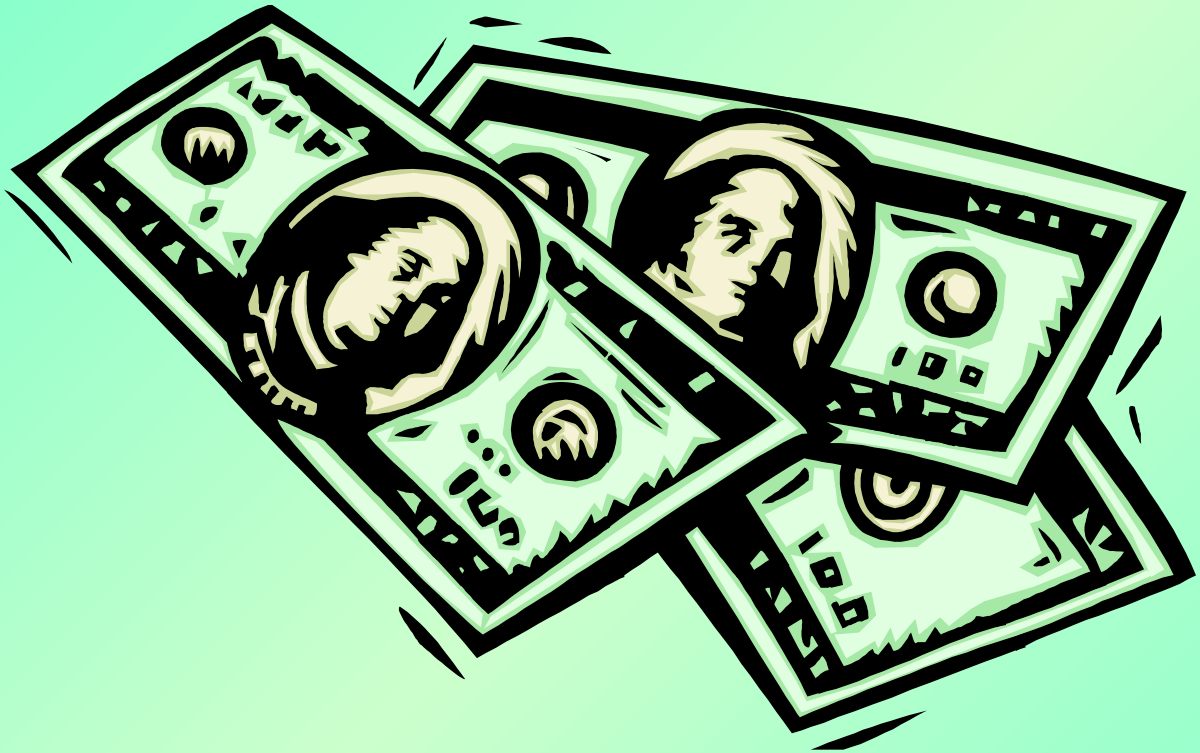
Algebra 1



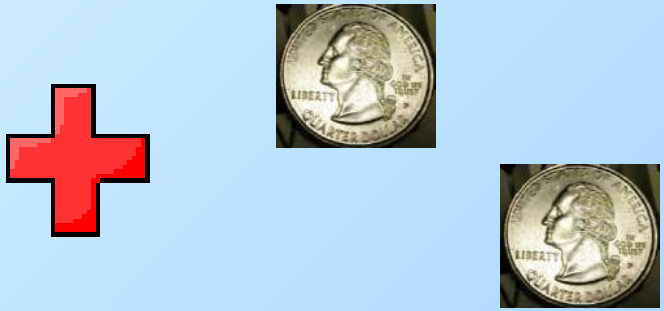
SHOULD I BECOME A MEMBER OR NOT?

Kato's DVD is offering customers a monthly membership into its DVD club.

Normally, to rent a DVD it costs $3.50.



If I become a member of the DVD club, it will cost me $18.00 a month plus $0.50 per DVD.



I need to decide whether it is worth it or not for me to join the DVD club.

TO JOIN OR NOT TO JOIN

Let's Write an Equation for Each Situation

Let y= total cost Let x = number of DVDs rented

With Membership to DVD Club	Without Membership to DVD Club
$y = 0.50x + 18.00$	$y = 3.50x$

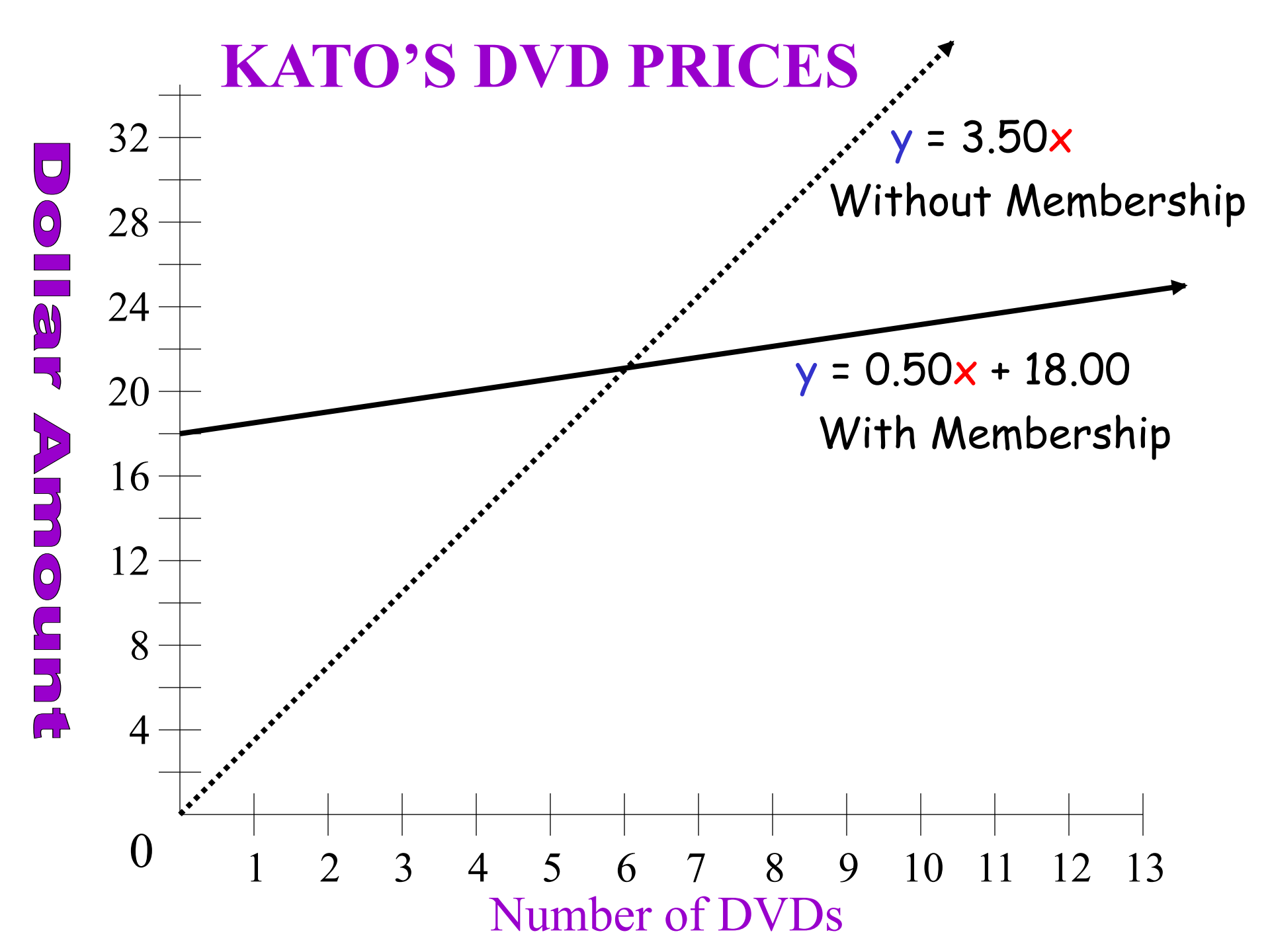
Let's Graph Both Equations Using Slope Intercept Form

With Membership to DVD Club

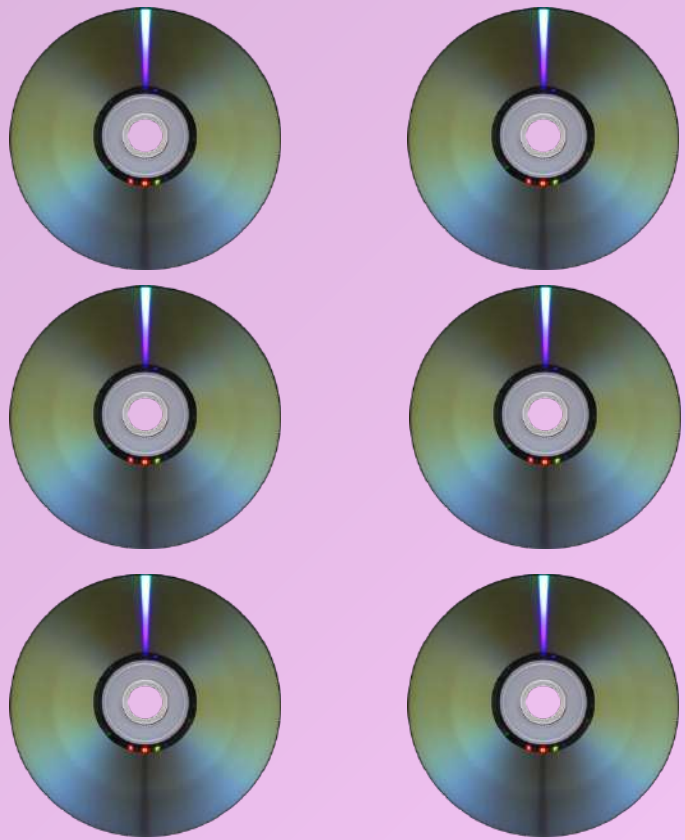
$y = 0.50x + 18.00$

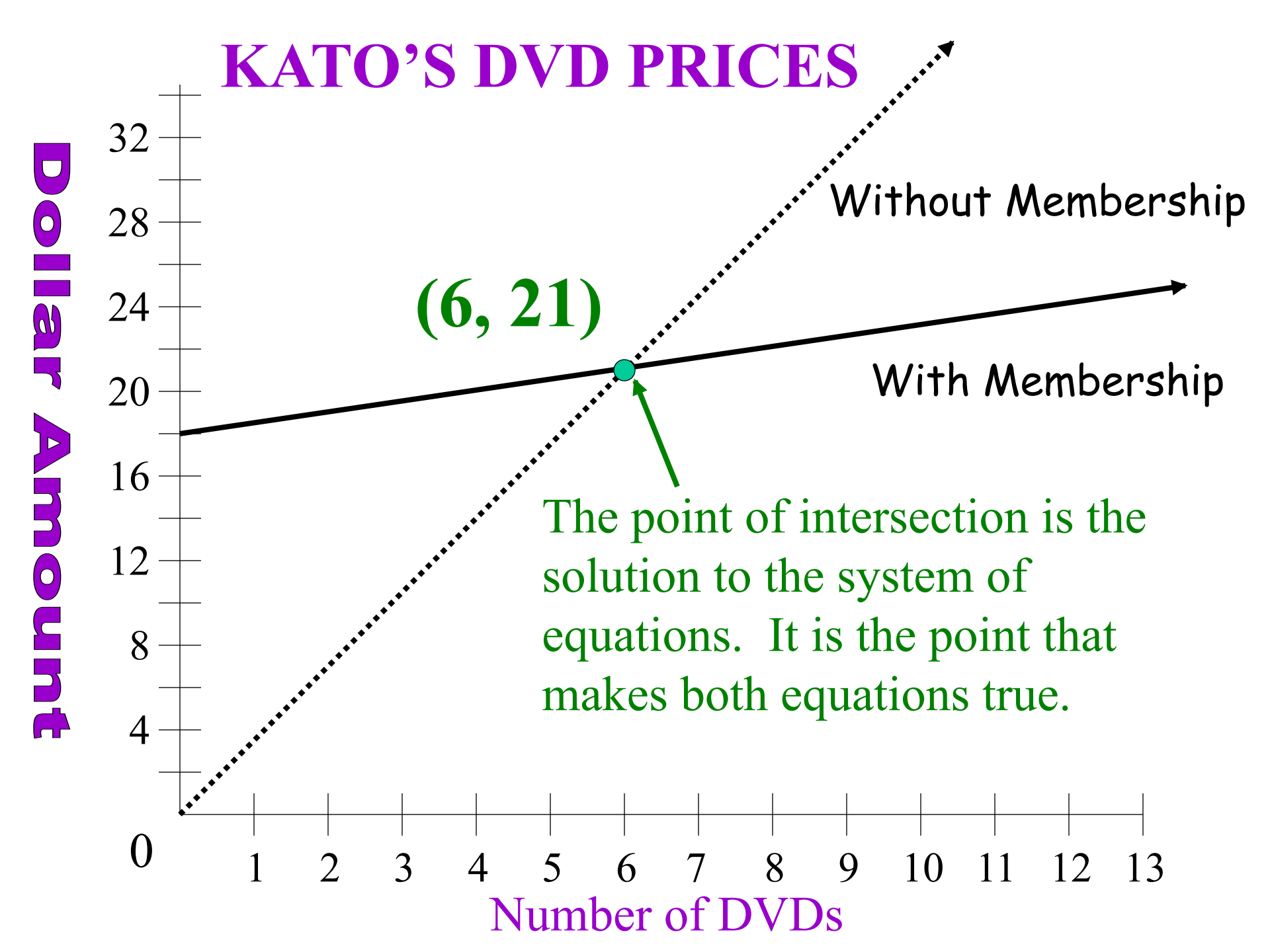
Without Membership to DVD Club

$y = 3.50x$


KATO'S DVD PRICES
Dollar Amount
32
28
24
20
16
12
8
4
0
1
2
3
4
5
6
7
8
9
10
11
12
13
Number of DVDs
y = 3.50x
Without Membership
y = 0.50x + 18.00
With Membership

Since the graphs of the lines intersect at the point (6, 21), it would cost $21.00 to rent 6 DVDs both with the membership as well as without the membership.

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13
Number of DVDs
Without Membership
With Membership
(6, 21)
The point of intersection is the solution to the system of equations. It is the point that makes both equations true.

We can algebraically show that 6 DVDs rented would cost the same, both with or without the membership.

Without DVD Membership

Renting 6 DVDs

$y = 3.50x$

$y = 3.50(6)$

$y = \$21.00$

With DVD Membership

Renting 6 DVDs

$y = 0.50x + 18.00$

$y = 0.50(6) + 18.00$

$y = 3.00 + 18.00$

$y = \$21.00$

By looking more closely at the graph, the line for "Without a Membership" has a lower cost when renting less than six DVDs per month.

We can look at this algebraically as well.

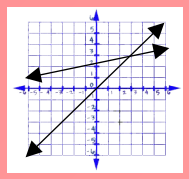
Without DVD Membership

Renting 4 DVDs

$y = 3.50x$

$y = 3.50(4)$

$y = \$14.00$



See Graph

With DVD Membership

Renting 4 DVDs

$y = 0.50x + 18.00$

$y = 0.50(4) + 18.00$

$y = 2.00 + 18.00$

$y = \$20.00$

After the point of intersection, renting more than 6 DVDs per month, the line for "With a Membership" has a lower cost.

Without DVD Membership

Renting 8 DVDs

$y = 3.50x$

$y = 3.50(8)$

$y = \$28.00$

With DVD Membership

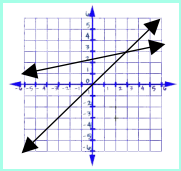
Renting 8 DVDs

$y = 0.50x + 18.00$

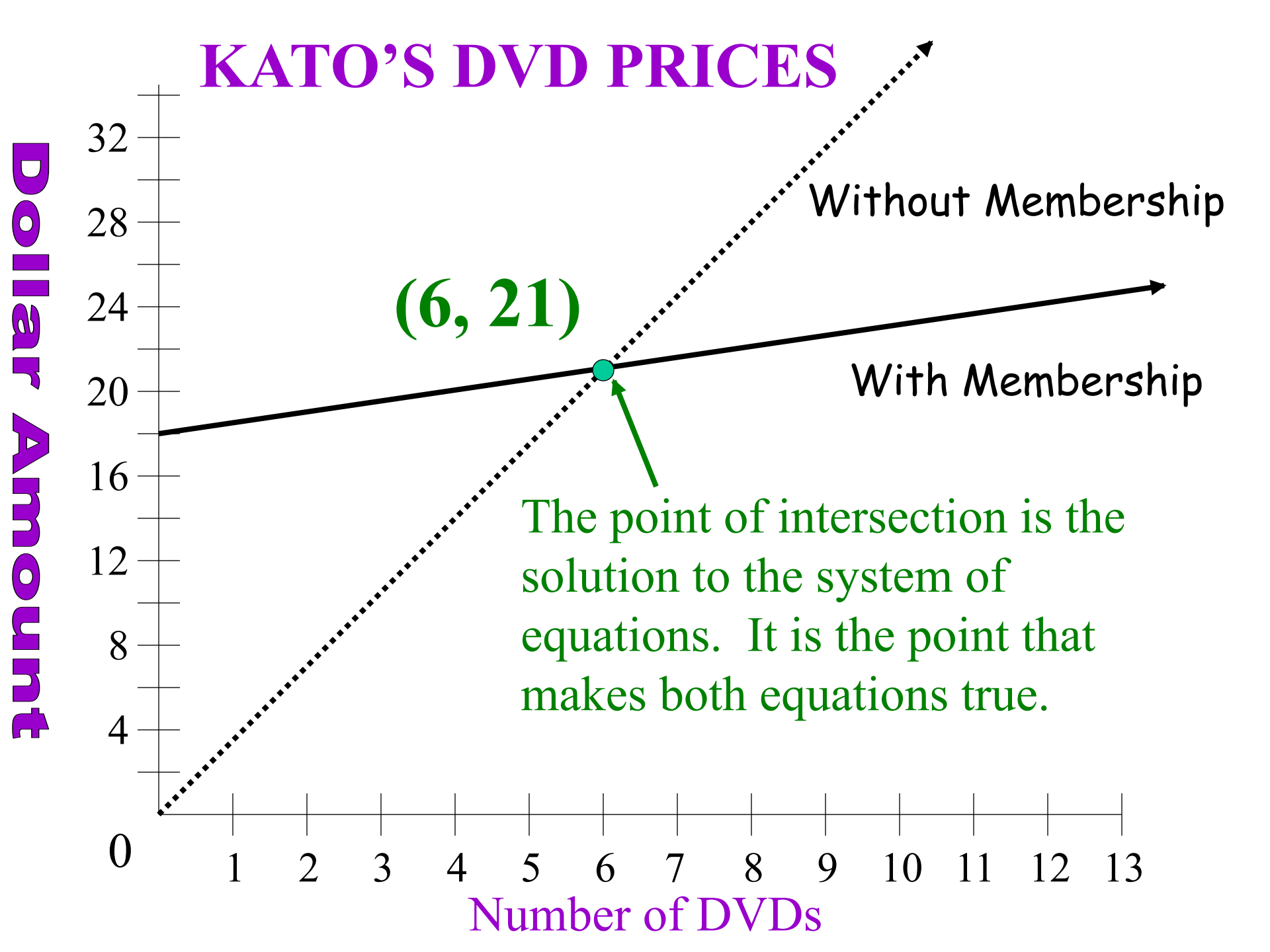
$y = 0.50(8) + 18.00$

$y = 4.00 + 18.00$

$y = \$22.00$



See Graph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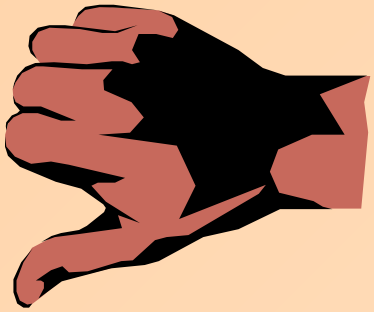
Number of DVDs
Without Membership
With Membership
(6, 21)
The point of intersection is the solution to the system of equations. It is the point that makes both equations true.

In summary, if you know that you will rent less than six DVDs per month, it is cheaper to not become a member of the DVD club.



If you know that you will rent more than six DVDs per month, it is cheaper to become a member of the DVD club.