3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

trees	Pounds
35	150
36	148
37	146

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

trees	Pounds	yield/acre (lbs/acre)
35	150	5250
36	148	5328
37	146	5402
x	150 − x	

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

$f(x) =$ [illegible] I need more practice with making equations

38	144	5472
39	142	5538
40	140	5600
43	134	5762
45	130	5850
47	126	5922
~~55~~	~~100~~	
~~57~~		
50	120	6000
52	116	6032
54	112	6048
56	108	6048
55	110	6050

55 trees would provide the maximum yield per acre.

3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield *for one tree* if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

trees	pound	yield total
X	150-2(X-35)	trees X pounds
35	150-2(35-35) = 150	35 x 150 = 5250 lb total
36	150-2(36-35) = 148	148 x 36 = 5328 lb total

37 = 146 lb per tree
36 = 148 lb per tree
35 = 150 lb per tree

b) What would be the *total yield per acre* if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

trees	yield
35	5250 lb per acre
36	5328 lb per acre
37	5402 lb per acre

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

$f(x) = x(150-2(x-35))$

$f(x) = x(150-2x+70)$

$f(x) = 150x - 2x^2 + 70x$

$f(x) = -2x^2 + 220x$

$x = \frac{-220}{2(-2)} = 110$ trees to maximize yield

$V = -2(35)^2 + 220(35) = y$

$-2(1225) + 7700 = y$

$y = 5250$

3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

At 35 trees, 1 tree would produce 150lbs
At 36 trees, 1 tree would produce 148lbs.
At 37 trees, 1 tree would produce 146 lbs.

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

I know, I know... I didn't read

$-1x^2+185x$

$\sqrt{-1(150)^2+185(150)}$

$-22500+27750$

5250

$\frac{-b}{2a}$ $\quad \frac{-185}{2(-1)}$

$= \frac{-185}{-2}$

$= 92\frac{1}{2}$

*About 92 trees should be planted per acre for maximum total yield.

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

yield	trees	acre	total yield
150	35	1	5250 (150)(35)
150 - 2 = 148	36	1	5328 (148)(36)
150 - 4 = 146	37	1	5402 (146)(37)
$150-1(x-35)$ $150-1x+35$	x	1	$(x)(150-1x+35)$ $150x-1x^2+35x$ $-1x^2+185x$

x=trees planted

3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

trees planted	yield for 1 tree
35	150 lbs
36	148 lbs
37	146 lbs

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

trees planted	yield per 1 tree	yield per acre
35	150	$(35)(150) = 5250$
36	$150 - 2(36-35) = 148$	$(36)(148) = 5328$
37	$150 - 2(37-35) = 146$	$(37)(146) = 5402$

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

Trees planted	yield per tree	yield per acre
x	$150 - 2(x-35)$	$(x)(-2x+220)$
	$= 150 - 2x + 70$	$= -2x^2 + 220x$
	$= -2x + 220$	

✓ $f(36)$
$= -2(36)^2 + 220(36)$
$= -2592 + 7920$
$= 5328$ lbs ✓

$x = \frac{-b}{2a}$

$x = \frac{-220}{2(-2)}$

$= 55$ trees planted

$f(55) = -2(55)^2 + 220(55)$

$= 6050$ lbs per acre

3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

trees	yield
35	150 Pounds per tree
36	148 Pounds per tree
37	146 Pounds per tree

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

trees per acre	yield per acre
35	5250 Pounds per acre
36	5328 Pounds per acre
37	5402 Pounds per acre

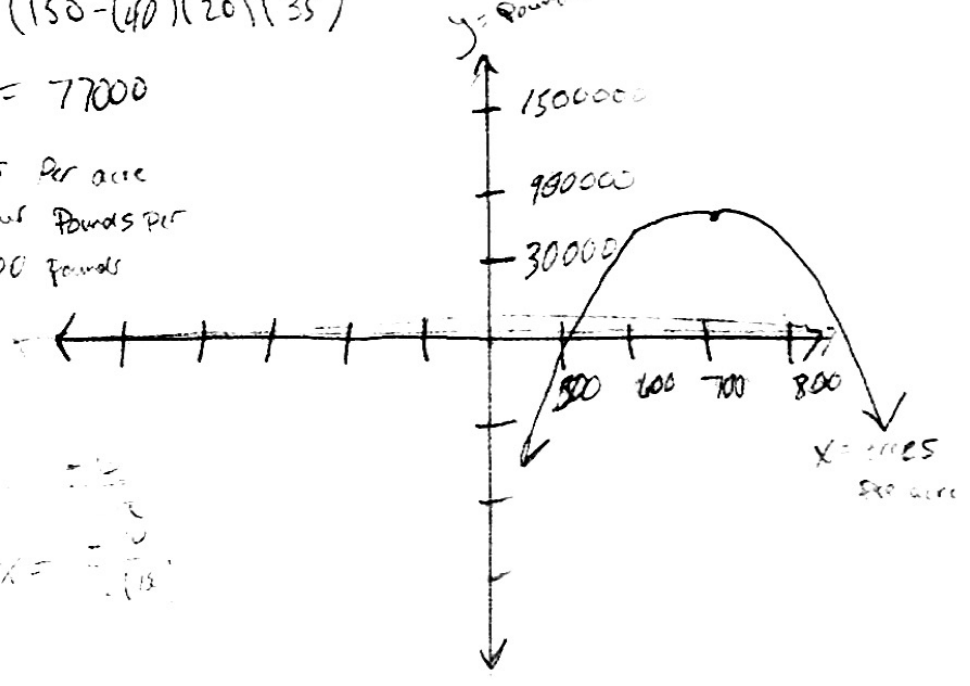
d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

$$f(x) = ((150 - (x^2))(x)(35)$$

$$f(x) = (150 - (40)(20)(35)$$

$$f(x) = 77000$$

If you plant 20 trees per acre you will maximize your pounds per tree by getting 77000 pounds per acre.



3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

Yield/trees with 35 trees is 150 lbs/tree.
Yield/trees with 36 trees is 148 lbs/tree.
Yield/tree with 37 trees is 146 lbs/tree.

trees/acre	lbs/tree	total lbs/acre
35	150	$35(150) = 5250$
$35+1$	$150-2$ $(1x-2)$	$36(148) = 5328$
$35+2$	$150-4$ $(2x-2)$	$(37)(146) = 5402$
x	$150-2(x-35) \rightarrow 150-2x+70$	$x(220-2x) = 220x-2x^2$

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

If 35 trees were planted, yield/acre would be 5250 lbs/acre.

If 36 trees were planted, yield/acre would be 5328 lbs/acre.

If 37 trees were planted, yield/acre would be 5402 lbs/acre.

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

$f(x) = 220x - 2x^2$

$f(35) = 220(35) - 2(35)^2$
$= 5250$ lbs/acre.

MAX:

$x = \frac{b}{2a}$

$= \frac{-220}{2(-2)}$

$= \frac{220}{4}$

$= 55$ trees/acre

$f(55) = 220(55) - 2(55)^2$

$= 6050$ lbs/acre.

To produce the max yield/acre of 6050, there would need to be 55 trees planted/acre.

3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

lbs	tpa	Yield
150	35	150
148	36	148
146	37	146

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

lbs	tpa	yield
150	35	5250
148	36	5328
146	37	5402

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

$Y(x) = (150 - 2)x$

$Y(55) = (150 - \quad)55$

3) The annual yield per fruit tree is fairly constant at 150 pounds ~~per tree~~ when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

trees	fruit yielded per tree
35	150 lb
36	148 lb
37	146 lb

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

Trees	yield per acre
35	$35 \cdot 150 = 5250$ lb.
36	$36 \cdot 148 = 5328$ lb.
37	$37 \cdot 146 = 5402$ lb.

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

$f(x) = 150 - 2(x-35)$

$= 150 - 2x + 70$

$= -2x^2 + 220x$

$x = \frac{-220}{2(-2)}$

$= \frac{220}{4}$

$= 55$ trees

$\checkmark f(35) = -2(35)^2 + 220(35)$

$= -2450 + 7700$

$\checkmark = 5250$ lb

55 trees should be planted to maximize the total yield.

X = trees per acre P = pounds per tree

3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

X	P	total yield
35	150	5250 (150(35))
36	148	5328 (36(148))
37	146	5402 (37(146))

150
35

35 trees = 150 pounds average
36 trees = 148 pound average
37 trees = 146 pound average

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

35 trees = 5250 pounds per acre

36 trees = 5328 pounds per acre

37 trees = 5402 pounds per acre

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

$x = \frac{-b}{2a}$

X	P	total yield
36	150-2	5328=(36)(148)
X	150-2(x-35)	total yield = (X)(P)
	(220-2x)	= x(220+2x²)

$x = \frac{-220}{-2(2)}$

$x = 55$

$P(55) = 220(55) - 2(50)^2$

$= 12100 - 5000$

$P(x) = 220x - 2x^2$

$P(55) = 7100$ pounds per acre

$P = 220 - 2x$

35 220-2(35)
220-70
=150

*When there were 55 trees planted per acre it allowed for the greatest amount of fruit at 7100 pounds per acre.

3) The annual yield per fruit tree is fairly constant at 150 pounds per tree when the number of trees per acre is 35 or fewer. For each additional tree over 35, the annual yield per tree for all trees on the acre decreases by 2 pounds due to overcrowding.

a) What would be the yield ***for one tree*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted?

# of trees	Yield (lbs.)
35	150
36	148
37	146

35 trees = 4.29 lbs/tree

36 trees = 4.11 lbs/tree

37 trees = 3.95 lbs/tree.

b) What would be the ***total yield per acre*** if 35 trees were planted? if 36 trees were planted? if 37 trees were planted? Organize your results in a table.

# of trees	yield/tree	total yield
35	150	35·150 = 5250 lbs.
36	148	36·148 = 5328 lbs.
37	146	37·146 = 5402 lbs.

d) *If x represents the number of trees per acre*, express the total yield per acre as a function of x. Use that function to determine the number of trees that should be planted per acre to maximize total yield.

# of trees = x

$Y = (35+x)(150-2x)$

$= 5250 - 70x + 150x - 2x^2$

$Y(x) = -2x^2 + 80x + 5250$

$Y(20) = -2(20)^2 + 80(20) + 5250$

$-800 + 1600 + 5250$

$Y(20) = 6050$ ✓

$Y(20) = (35+20)(150-2(20))$

$= (55)(110)$

$Y(20) = 6050$

$x = \frac{-b}{2a}$

$x = \frac{-(80)}{2(-2)}$

$= \frac{-80}{-4}$

$x = 20$

35 + 20

$x = 55$

There should be 55 trees planted per acre to maximize total yield.

1 2

Logan Logan

Nichm Nichm

✓ Andrew

✓ ✓ Gracie

✓ Parrish W.

✓ Tori

✓ Ryan G

✓ Nate B

Jack H

✓ Jack A