

1 TON = 2000 lbs

Unit 6: Polynomial

Name key

MYP Real-life Practice Assessment

$\$250/2000 \text{ lbs}$

WUB CHARGES  $\$.69/\text{lb}$  ... CUB makes  $\$1380/2000 \text{ lbs}$

1) A Banana grower needs to ship early when prices are high and spoilage is low. She now has 20 tons on hand and can add two tons a week by waiting. The current profit is  $\$250$  per ton, but it will reduce by  $\$20$  per ton for each week she delays. How can she optimize her profit?

TOTAL BANANAS =  $20 + 2W$

W: # OF WEEKS WAITING.

PROFIT =  $250 - 20W$

REVENUE = (# OF BANANAS) (COST OF BANANAS)

$R = (20 + 2W)(250 - 20W)$

NO \$ MADE:  
(X-INTS)

$0 = 20 + 2W$      $0 = 250 - 20W$

$-20 = 2W$      $-250 = -20W$

$-10 = W$   
Weeks

$-20 = -20$

$12.5 = W$   
Weeks

TOO LATE, ROTTEN AND WORTH NOTHING

10 WEEKS EARLY... TOO EARLY!  
UNREALISTIC

(makes sense... who wants a BROWN OR GREEN BANANA... UNLESS YOU'RE STARTING A BREAD COMPANY)

MAX \$ MADE  
(VERTEX)

$\frac{-10 + 12.5}{2} = \frac{2.5}{2} = 1.25$

SHE SHOULD SHIP IN 1.25 WEEKS

$R = (20 + 2(1.25))(250 - 20(1.25))$   
 $(22.5) (\$225)$   
↑ TONS    PER TON

SHE WILL THEN SHIP 22.5 TONS FOR  $\$25/\text{TON}$

THIS seems realistically early to get yellow BANANAS! 22.5 TONS

2) An airplane company charges \$225 per ticket and currently averages 200,000 flyers per day. The company needs to optimize revenue but found that for each \$50 increase in ticket price the company would lose 10,000 flyers. How can the transit company optimize their revenue?

$$\text{REVENUE} = (\# \text{ OF FLYERS}) (\text{COST PER FLYER})$$

$$R = (200,000 - 10,000T)(225 + 50T)$$

T: # OF INCREASES IN TICKET PRICE (OF \$25)

WHEN WILL REV BE \$0?  
(X-INTS)

$$0 = (200,000 - 10,000T)(225 + 50T)$$

$$0 = 200,000 - 10,000T \quad 0 = 225 + 50T$$

$$-200,000 = -10,000T \quad -225 = 50T$$

20 = T  
INCREASES IN TICKET PRICE WOULD RESULT IN NO FLYERS - REALISTIC b/c IT COSTS TOO MUCH! THEY'D GO TO ANOTHER COMPANY.

-4.5 = T  
INCREASES IN TICKETS WOULD BE a \$50(-4.5) = -\$225 OR a \$225 CUT IN PRICE. HEY! FREE FLIGHTS! GOOD LUCK MAKING \$!

MAX THAT \$ MADE! 😊  
(VERTEX)

$$\frac{20 + (-4.5)}{2} = 7.75 \text{ increases in ticket price optimizes revenue}$$

$$R = (200,000 - 10,000(7.75))(225 + 50(7.75))$$

FLYERS/TRAVELERS COST PER FLYER

$$R = (122,500)(612.50)$$

R = \$75,031,250 is the max revenue.

THE CO. WILL MAX REVENUE WITH \$612.50 per ticket SPENDY! UNLESS YOU'RE FLYING INTERNATIONAL. THERE WILL BE 122,500 FLYERS - THEY'VE LOST 77,500 FLYERS, BUT THEY'RE MAKING MORE \$.

Accurate: WE DON'T KNOW DETAILS OF THE AIRLINE... IS IT WORTH IT?!