x = pizzas

y = sammich(lol)

A pizza is sold for $50 and it costs $25 to make

pizza: 50 - 25 = 25

A sandwich is sold for $20 and it costs $5 to make

sammich: 20 - 5 = 15

Objective Function:

profit = 25x + 15y

Constraints:

Time: 8x + 3y ≤ 60

total\_items: x + y ≤ 10

x and y are ints: x ≥ 0, y ≥ 0

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Time | Num Items | Profit |
| Pizza - x | 8 | 1 | 25 |
| Sammich - y | 3 | 1 | 15 |
| Totals | ≤60 | ≤10 |  |

Only Pizzas:

y = 0

8x + 3(0) ≤ 60

8x ≤ 60

x ≤ 60 ÷ 8

x ≤ 7.5

x = 7 # Can't make half a pizza, so we use the whole number.

Pizza Profit:

P = 25x + 15y

P = 25(7) + 15(0)

P = 175 + 0

P = $175

Profit for pizza only is $175

Only Sammich:

x = 0

x + y ≤ 10

0 + y ≤ 10

y ≤ 10

Y = 10

Making sure we are good on sammich prep time:

3 x 10 = 30

30 ≤ 60

Sammich Profit:

P = 25x + 15y

P = 25(0) + 15(10)

P = 0 + 150

P = $150

Profit for sammich only is $150

Balanced Options:

8x + 3y = 60

x + y = 10

y = 10 – x # solving for y

8x + 3(10-x) = 60 # substituting

8x + 30 – 3x = 60

(8x – 3x) + 30 = 60

5x + 30 = 60

5x = 60 – 30

5x = 30

x = 30 ÷ 5

x = 6

That means:

Y = 10 – x

Y = 10 – 6

Y = 4

Balanced profit:

P = 25x + 15y

P = 25(6) + 15(4)

P = 150 + 60

P = $210

Quick Validation for time and item limits:

8 x 6 = 48

3 x 4 = 12

48 + 12 = 60

6 pizzas + 4 sammich = 10

Profit for 6 pizzas and 4 sammich is $210

Only Pizza: Profit for 7 Pizza = $175

Only Sammich: Profit for 10 Sammich = $150

Pizza & Sammich: Profit for 6 Pizza and 4 Sammich = $210

As we can see, a combination of 6 pizza and 4 sammich coming in at a whopping $210 is where the fancy food truck would get the best bang for their buck. This keeps that at the 10 item limit and within the 60 min time limit.