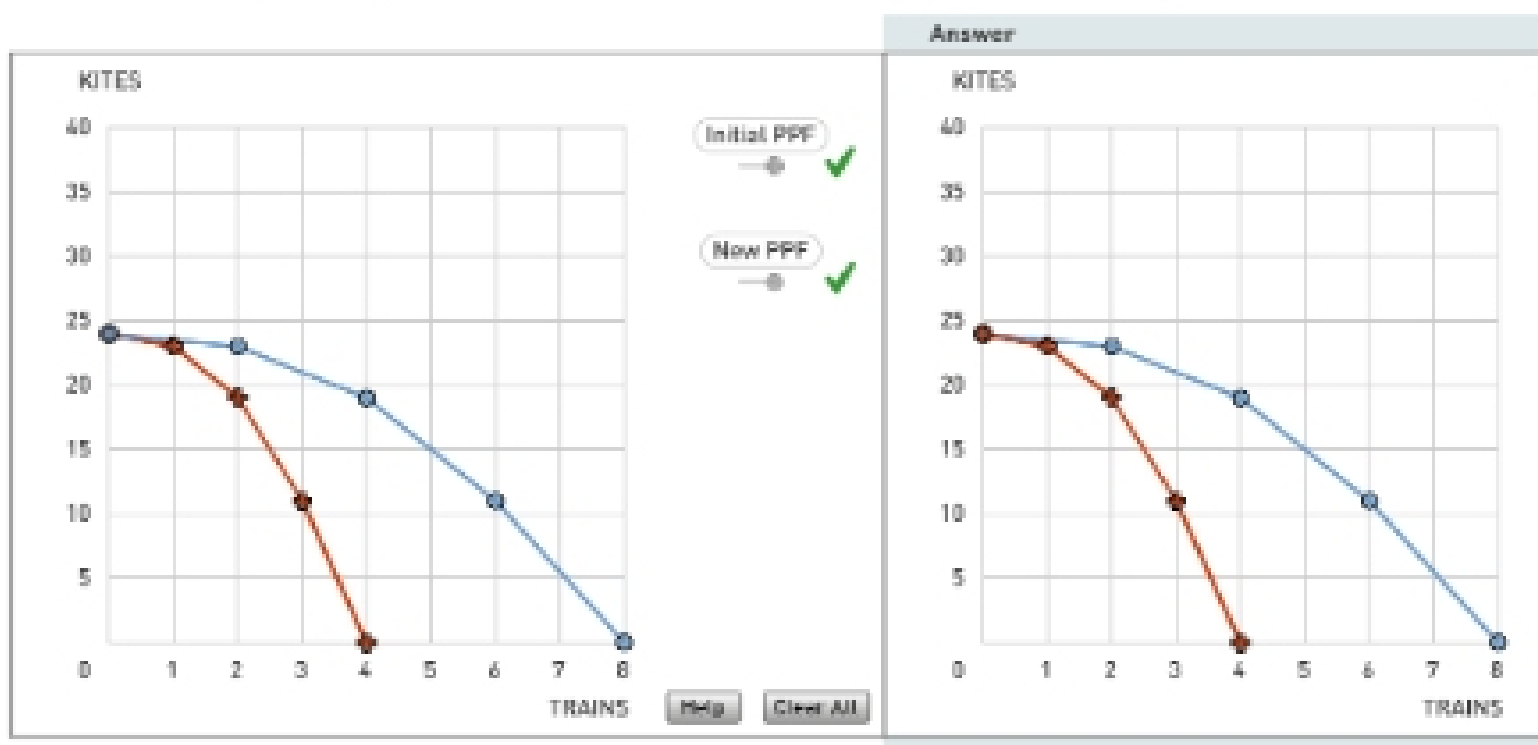


2. Opportunity cost and production possibilities

Robert is a skilled toy maker who is able to produce both trains and kites. He has eight hours a day to produce toys. The following table shows the daily output resulting from various possible combinations of his time.

| Choice | Hours Producing Trains | Hours Producing Kites | Trains Produced | Kites Produced |
|--------|------------------------|-----------------------|-----------------|----------------|
| A | 8 | 0 | 4 | 0 |
| B | 6 | 2 | 3 | 11 |
| C | 4 | 4 | 2 | 19 |
| D | 2 | 6 | 1 | 23 |
| E | 0 | 8 | 0 | 24 |

On the following graph, use the red points (cross symbol) to plot Robert's initial production possibilities frontier (PPF). Plot your points in order, either from left to right or right to left. Line segments will connect the points automatically.



Explanation:

Close ^

Each row of the table refers to one point on the production possibilities frontier. For example, if Robert chooses to spend all of his time producing trains, then he can produce 4 trains and no kites, so (4, 0) is one of the points on his initial PPF. Similarly, if he splits his time evenly between producing trains and kites, he will produce 2 trains and 19 kites; so (2, 19) is another point on his initial PPF.

Suppose Robert is currently using combination D, producing 1 train. What is his opportunity cost of producing a second train? 4 kites ✓

Explanation:

Close ^

When using combination D, Robert produces 1 train and 23 kites each day. Producing a second train each day would require him to use combination C, reducing his production of kites to 19. Since this change involves producing 4 fewer kites ($23 - 19 = 4$), the opportunity cost of producing the second train is 4 kites.

Now, suppose Robert is currently using combination C, producing 2 trains. What is his opportunity cost of producing a third train? 8 kites ✓

Explanation:

Close ^

Using combination C, Robert produces 2 trains and 19 kites each day. Producing a third train each day would require him to use combination B, reducing his production of kites to 11. Since this change involves producing 8 fewer kites ($19 - 11 = 8$), the opportunity cost of producing the third train is 8 kites.

As Robert increases his production of trains, his opportunity cost of producing one more train increases ✓ .

Explanation:

Close ^

Robert's opportunity cost of producing the second train is 4 kites, while the opportunity cost of producing the third train is 8 kites. Therefore, as Robert increases his production of trains, his opportunity cost of producing more trains increases. This reflects the *principle of increasing opportunity costs*.

Suppose Robert buys a new tool that allows him to produce twice as many trains per hour as before but doesn't affect his ability to produce kites. Use the blue points (circle symbol) to plot his new PPF on the previous graph. Because he can now make more trains per hour, Robert's opportunity cost of producing kites is lower than ✗ it was previously.

Explanation:

Close ^

The new tool causes Robert's PPF to pivot to the right. In other words, for each point on his PPF, the vertical coordinate is the same as before, but the horizontal coordinate is twice its initial value.

For example, consider combination D, in which Robert spends 2 hours producing trains and 6 hours producing kites. Before he bought the new tool, he could have produced 1 train and 23 kites, so (1, 23) was a point on his initial PPF. With the new tool, the same allocation of time results in 2 trains and 23 kites, so (2, 23) is a point on his new PPF.

The shift in Robert's PPF is reflected in a corresponding change in his opportunity costs. Again, consider combination D, and consider the effects of moving from there to combination E. Both before and after Robert buys the tool, he can produce 23 kites if he devotes 6 hours to producing them, and 24 kites if he devotes 8 hours to producing them. Therefore, spending his last 2 hours producing kites results in 1 additional kite. Before he bought the tool, that would have meant giving up 1 train, but now that he has the tool, it means giving up 2 trains. Therefore, Robert's increased ability to produce trains increases his opportunity cost of producing kites.