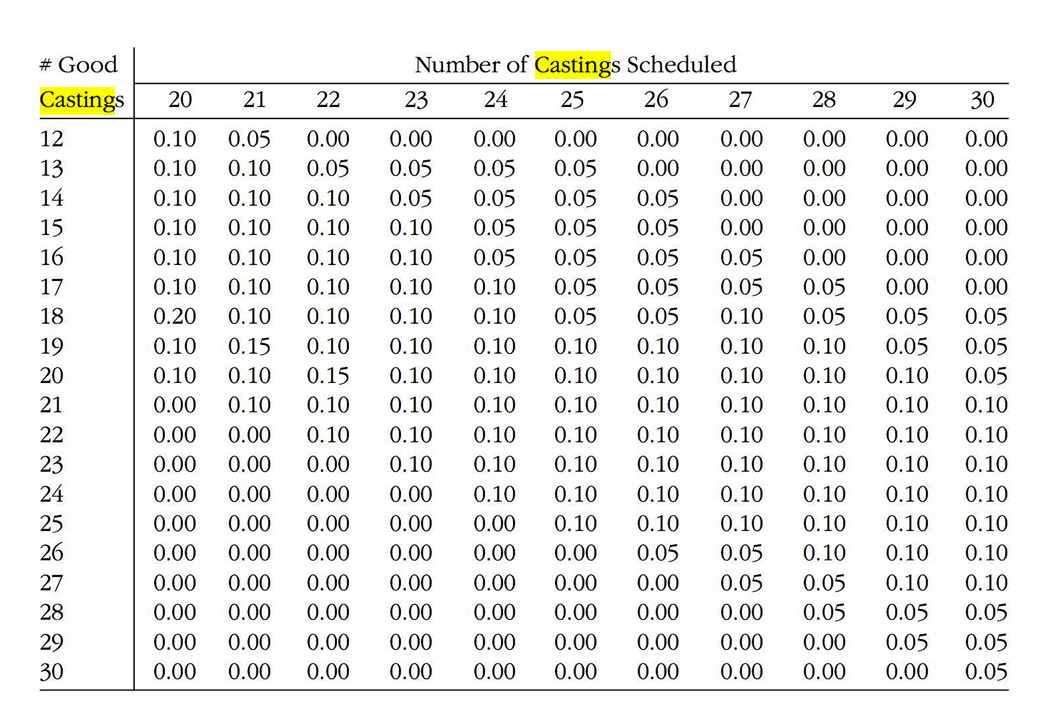
# Question

A foundry has received an order for 20 custom-designed castings. The casting process costs $700 per unit scheduled. If a casting is good, then it is machined to specifications at an added cost of $500 per unit. If a casting is not sold, it has a recycle value of $300. The customer has indicated a willingness to pay $2000 per casting for 20 acceptable castings; the customer has also agreed to pay $1500 each for one or two additional castings. However, the customer is unwilling to purchase fewer than 20 or more than 22 castings. Based on historical records, the following probability distributions have been estimated. How many castings should be scheduled for production to maximize expected profit? What is the probability of losing money?



其中这个概率表，纵坐标12-30指的是优良的产品的数量X，而横坐标指的是计划生产数量Q,那么中间的指的是当在Q的情况时优良产品的数量为X的概率（用中文回答我）正确解答方法如下：接下来是收入和成本正确答案计算：x是良品的数量,Q时实际生产数量。第一个R(Q,X)是利润方程，当x小于19时，买家不收货，则利润是300\*Q。当x大于等于20，小于等于22时，利润是20\*2000+1500\*(X-20)+300\*(Q-X). 当x大于等于23且小于等于Q时，利润是2000\*20+1500\*2+300\*（Q-22). 成本是这样计算：当x小于等于19时，成本等于700\*Q. 当x大于等于20小于等于22时，成本是700\*Q+500\*X. 当x大于等于23小于等于Q时，成本时700\*Q+500\*22 利润=收入减去成本

最优解：

Q=31

在其它条件不变的情况下，请修改我的最优解代码来求解这30个你刚才生成的问题（不用再随机生成了）并将答案储存在excel文件中。excel文件名是“plan-questions-set5”，该文件一共有四列，第一列为“Problem Number” 代表着问题序号，第二列是“Scenario Description",是问题的名称。请将每一道题的答案输入到相同相同的第三和第四列中，在“ChatGPT Response”格式如下：chatgpt: When the customer can accept a maximum of {问题值} additional castings with the total {问题值} price reduction, the maximum expected profit is${最优期望利润}, which is a decrease {or increase) of {与原条件差值} compared to the original value.在‘DeepSeek Response”格式如下：deepseek: When the customer can accept a maximum of {问题值} additional castings with the total {问题值} price reduction, the maximum expected profit is${最优期望利润}, which is a decrease {or increase) of {与原条件差值} compared to the original value.一个问题和答案请重复九次（一个问题占9行），且这个文件第一行只有“Problem Number”，“Scenario Description"，DeepSeek Response’

干的漂亮，请继续下一步工作，写python修改刚才输出的plan-questions-set2。要求如下, 对于每一个问题请改写出8个句子，意思相同且不要衍生，句与句的格式和表达尽量不同，每一个问题之间句与句的格式和表达尽量. 然后将改写的句子替换Scenario Description中每一个问题后的8行内容，但每一个问题第一行保留原问题

改写句子请从这20个范例句中抽取8句三个情景，第一个是疑问句（10句，着重问发生了什么变化 类似what happen，可以是两句话。第二个疑问句（5句全部以利润变化为核心），第三个是陈述句（5句全部要求利润计算）没有从每类中随机抽取指定数量的句子的要求

Question 1

1. What would happen if the order become {value} custom-designed castings and the customer is unwilling to purchase fewer than {value} or more than {value} +2 castings

{value}=from 10 to 43 except 20

1. What would happen if the order becomes 17 custom-designed castings and the customer is unwilling to purchase fewer than 17 or more than 19 castings
2. What would happen if the order becomes 33 custom-designed castings and the customer is unwilling to purchase fewer than 33 or more than 35 castings
3. What would happen if the order becomes 12 custom-designed castings and the customer is unwilling to purchase fewer than 12 or more than 14 castings
4. What would happen if the order becomes 41 custom-designed castings and the customer is unwilling to purchase fewer than 41 or more than 43 castings
5. What would happen if the order becomes 25 custom-designed castings and the customer is unwilling to purchase fewer than 25 or more than 27 castings
6. What would happen if the order becomes 29 custom-designed castings and the customer is unwilling to purchase fewer than 29 or more than 31 castings
7. What would happen if the order becomes 15 custom-designed castings and the customer is unwilling to purchase fewer than 15 or more than 17 castings
8. What would happen if the order becomes 37 custom-designed castings and the customer is unwilling to purchase fewer than 37 or more than 39 castings
9. What would happen if the order becomes 22 custom-designed castings and the customer is unwilling to purchase fewer than 22 or more than 24 castings
10. What would happen if the order becomes 31 custom-designed castings and the customer is unwilling to purchase fewer than 31 or more than 33 castings
11. What would happen if the order becomes 13 custom-designed castings and the customer is unwilling to purchase fewer than 13 or more than 15 castings
12. What would happen if the order becomes 38 custom-designed castings and the customer is unwilling to purchase fewer than 38 or more than 40 castings
13. What would happen if the order becomes 19 custom-designed castings and the customer is unwilling to purchase fewer than 19 or more than 21 castings
14. What would happen if the order becomes 27 custom-designed castings and the customer is unwilling to purchase fewer than 27 or more than 29 castings
15. What would happen if the order becomes 34 custom-designed castings and the customer is unwilling to purchase fewer than 34 or more than 36 castings
16. What would happen if the order becomes 11 custom-designed castings and the customer is unwilling to purchase fewer than 11 or more than 13 castings
17. What would happen if the order becomes 42 custom-designed castings and the customer is unwilling to purchase fewer than 42 or more than 44 castings
18. What would happen if the order becomes 23 custom-designed castings and the customer is unwilling to purchase fewer than 23 or more than 25 castings
19. What would happen if the order becomes 16 custom-designed castings and the customer is unwilling to purchase fewer than 16 or more than 18 castings
20. What would happen if the order becomes 36 custom-designed castings and the customer is unwilling to purchase fewer than 36 or more than 38 castings
21. What would happen if the order becomes 14 custom-designed castings and the customer is unwilling to purchase fewer than 14 or more than 16 castings
22. What would happen if the order becomes 39 custom-designed castings and the customer is unwilling to purchase fewer than 39 or more than 41 castings
23. What would happen if the order becomes 26 custom-designed castings and the customer is unwilling to purchase fewer than 26 or more than 28 castings
24. What would happen if the order becomes 32 custom-designed castings and the customer is unwilling to purchase fewer than 32 or more than 34 castings
25. What would happen if the order becomes 18 custom-designed castings and the customer is unwilling to purchase fewer than 18 or more than 20 castings
26. What would happen if the order becomes 35 custom-designed castings and the customer is unwilling to purchase fewer than 35 or more than 37 castings
27. What would happen if the order becomes 24 custom-designed castings and the customer is unwilling to purchase fewer than 24 or more than 26 castings
28. What would happen if the order becomes 30 custom-designed castings and the customer is unwilling to purchase fewer than 30 or more than 32 castings
29. What would happen if the order becomes 21 custom-designed castings and the customer is unwilling to purchase fewer than 21 or more than 23 castings
30. What would happen if the order becomes 28 custom-designed castings and the customer is unwilling to purchase fewer than 28 or more than 30 castings

# Question 2

What would happen if the customer want to pay {value} per casting for 20 acceptable castings?

{value}=from 1500 to 3000(除了2000), 单位为30

1. What would happen if the customer wants to pay $1530 per casting for 20 acceptable castings?
2. What would happen if the customer wants to pay $2970 per casting for 20 acceptable castings?
3. What would happen if the customer wants to pay $1710 per casting for 20 acceptable castings?
4. What would happen if the customer wants to pay $2370 per casting for 20 acceptable castings?
5. What would happen if the customer wants to pay $1650 per casting for 20 acceptable castings?
6. What would happen if the customer wants to pay $2850 per casting for 20 acceptable castings?
7. What would happen if the customer wants to pay $1830 per casting for 20 acceptable castings?
8. What would happen if the customer wants to pay $2430 per casting for 20 acceptable castings?
9. What would happen if the customer wants to pay $1950 per casting for 20 acceptable castings?
10. What would happen if the customer wants to pay $2730 per casting for 20 acceptable castings?
11. What would happen if the customer wants to pay $2070 per casting for 20 acceptable castings?
12. What would happen if the customer wants to pay $2550 per casting for 20 acceptable castings?
13. What would happen if the customer wants to pay $2190 per casting for 20 acceptable castings?
14. What would happen if the customer wants to pay $2610 per casting for 20 acceptable castings?
15. What would happen if the customer wants to pay $2250 per casting for 20 acceptable castings?
16. What would happen if the customer wants to pay $1890 per casting for 20 acceptable castings?
17. What would happen if the customer wants to pay $1590 per casting for 20 acceptable castings?
18. What would happen if the customer wants to pay $2910 per casting for 20 acceptable castings?
19. What would happen if the customer wants to pay $1770 per casting for 20 acceptable castings?
20. What would happen if the customer wants to pay $2310 per casting for 20 acceptable castings?
21. What would happen if the customer wants to pay $1680 per casting for 20 acceptable castings?
22. What would happen if the customer wants to pay $2820 per casting for 20 acceptable castings?
23. What would happen if the customer wants to pay $1860 per casting for 20 acceptable castings?
24. What would happen if the customer wants to pay $2460 per casting for 20 acceptable castings?
25. What would happen if the customer wants to pay $1980 per casting for 20 acceptable castings?
26. What would happen if the customer wants to pay $2760 per casting for 20 acceptable castings?
27. What would happen if the customer wants to pay $2100 per casting for 20 acceptable castings?
28. What would happen if the customer wants to pay $2580 per casting for 20 acceptable castings?
29. What would happen if the customer wants to pay $2220 per casting for 20 acceptable castings?
30. What would happen if the customer wants to pay $2640 per casting for 20 acceptable castings?

# Question 3

The per-unit casting process cost is now ${value}. How does that affect the profit?

{value}=from 500 to 1000（除了700）, 单位为10，比如550，780

1. The per-unit casting cost is now $540. How does that affect the profit?
2. The per-unit casting cost is now $890. How does that affect the profit?
3. The per-unit casting cost is now $620. How does that affect the profit?
4. The per-unit casting cost is now $970. How does that affect the profit?
5. The per-unit casting cost is now $550. How does that affect the profit?
6. The per-unit casting cost is now $830. How does that affect the profit?
7. The per-unit casting cost is now $580. How does that affect the profit?
8. The per-unit casting cost is now $920. How does that affect the profit?
9. The per-unit casting cost is now $660. How does that affect the profit?
10. The per-unit casting cost is now $780. How does that affect the profit?
11. The per-unit casting cost is now $510. How does that affect the profit?
12. The per-unit casting cost is now $950. How does that affect the profit?
13. The per-unit casting cost is now $530. How does that affect the profit?
14. The per-unit casting cost is now $880. How does that affect the profit?
15. The per-unit casting cost is now $590. How does that affect the profit?
16. The per-unit casting cost is now $840. How does that affect the profit?
17. The per-unit casting cost is now $650. How does that affect the profit?
18. The per-unit casting cost is now $990. How does that affect the profit?
19. The per-unit casting cost is now $560. How does that affect the profit?
20. The per-unit casting cost is now $810. How does that affect the profit?
21. The per-unit casting cost is now $500. How does that affect the profit?
22. The per-unit casting cost is now $930. How does that affect the profit?
23. The per-unit casting cost is now $570. How does that affect the profit?
24. The per-unit casting cost is now $860. How does that affect the profit?
25. The per-unit casting cost is now $630. How does that affect the profit?
26. The per-unit casting cost is now $980. How does that affect the profit?
27. The per-unit casting cost is now $520. How does that affect the profit?
28. The per-unit casting cost is now $850. How does that affect the profit?
29. The per-unit casting cost is now $600. How does that affect the profit?
30. The per-unit casting cost is now $1000. How does that affect the profit?

Question 4

What effect will this have if recycle value drops to {value} per unit?

{value} =from 0 to 200

1. **What effect will this have if recycle value drops to $0 per unit?**
2. **What effect will this have if recycle value drops to $10 per unit?**
3. **What effect will this have if recycle value drops to $20 per unit?**
4. **What effect will this have if recycle value drops to $30 per unit?**
5. **What effect will this have if recycle value drops to $40 per unit?**
6. **What effect will this have if recycle value drops to $50 per unit?**
7. **What effect will this have if recycle value drops to $60 per unit?**
8. **What effect will this have if recycle value drops to $70 per unit?**
9. **What effect will this have if recycle value drops to $80 per unit?**
10. **What effect will this have if recycle value drops to $90 per unit?**
11. **What effect will this have if recycle value drops to $100 per unit?**
12. **What effect will this have if recycle value drops to $110 per unit?**
13. **What effect will this have if recycle value drops to $120 per unit?**
14. **What effect will this have if recycle value drops to $130 per unit?**
15. **What effect will this have if recycle value drops to $140 per unit?**
16. **What effect will this have if recycle value drops to $150 per unit?**
17. **What effect will this have if recycle value drops to $160 per unit?**
18. **What effect will this have if recycle value drops to $170 per unit?**
19. **What effect will this have if recycle value drops to $180 per unit?**
20. **What effect will this have if recycle value drops to $190 per unit?**
21. **What effect will this have if recycle value drops to $200 per unit?**
22. **What effect will this have if recycle value drops to $5 per unit?**
23. **What effect will this have if recycle value drops to $25 per unit?**
24. **What effect will this have if recycle value drops to $45 per unit?**
25. **What effect will this have if recycle value drops to $65 per unit?**
26. **What effect will this have if recycle value drops to $85 per unit?**
27. **What effect will this have if recycle value drops to $105 per unit?**
28. **What effect will this have if recycle value drops to $125 per unit?**
29. **What effect will this have if recycle value drops to $145 per unit?**
30. **What effect will this have if recycle value drops to $175 per unit?**

# Question 5

What if the customer accepts a maximum of {value} additional products additional castings with the total {value2}% price reduction?

{value1}=from 3 to 10

{value2} = from 10% -20 %

1. What if the customer accepts a maximum of 3 additional castings with the total 12% price reduction?
2. What if the customer accepts a maximum of 4 additional castings with the total 15% price reduction?
3. What if the customer accepts a maximum of 5 additional castings with the total 18% price reduction?
4. What if the customer accepts a maximum of 6 additional castings with the total 11% price reduction?
5. What if the customer accepts a maximum of 3 additional castings with the total 14% price reduction?
6. What if the customer accepts a maximum of 4 additional castings with the total 17% price reduction?
7. What if the customer accepts a maximum of 5 additional castings with the total 10% price reduction?
8. What if the customer accepts a maximum of 6 additional castings with the total 19% price reduction?
9. What if the customer accepts a maximum of 3 additional castings with the total 16% price reduction?
10. What if the customer accepts a maximum of 4 additional castings with the total 13% price reduction?
11. What if the customer accepts a maximum of 5 additional castings with the total 20% price reduction?
12. What if the customer accepts a maximum of 6 additional castings with the total 12% price reduction?
13. What if the customer accepts a maximum of 3 additional castings with the total 15% price reduction?
14. What if the customer accepts a maximum of 4 additional castings with the total 18% price reduction?
15. What if the customer accepts a maximum of 5 additional castings with the total 11% price reduction?
16. What if the customer accepts a maximum of 6 additional castings with the total 14% price reduction?
17. What if the customer accepts a maximum of 3 additional castings with the total 17% price reduction?
18. What if the customer accepts a maximum of 4 additional castings with the total 10% price reduction?
19. What if the customer accepts a maximum of 5 additional castings with the total 19% price reduction?
20. What if the customer accepts a maximum of 6 additional castings with the total 16% price reduction?
21. What if the customer accepts a maximum of 3 additional castings with the total 13% price reduction?
22. What if the customer accepts a maximum of 4 additional castings with the total 20% price reduction?
23. What if the customer accepts a maximum of 5 additional castings with the total 12% price reduction?
24. What if the customer accepts a maximum of 6 additional castings with the total 15% price reduction?
25. What if the customer accepts a maximum of 3 additional castings with the total 18% price reduction?
26. What if the customer accepts a maximum of 4 additional castings with the total 11% price reduction?
27. What if the customer accepts a maximum of 5 additional castings with the total 14% price reduction?
28. What if the customer accepts a maximum of 6 additional castings with the total 17% price reduction?
29. What if the customer accepts a maximum of 3 additional castings with the total 20% price reduction?
30. What if the customer accepts a maximum of 4 additional castings with the total 12% price reduction?

# Question 6

If we can pay {value} to rework the bad castings per unit, what is the expected profit if the number of casting scheduled is {value2}

{value} = from 100 to 500, 单位为10，比如550，250

{value2}= from 20-25, 共6个

1. If we can pay 120 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 22?
2. If we can pay 180 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 24?
3. If we can pay 230 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 20?
4. If we can pay 310 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 25?
5. If we can pay 150 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 21?
6. If we can pay 270 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 23?
7. If we can pay 390 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 22?
8. If we can pay 110 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 24?
9. If we can pay 440 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 20?
10. If we can pay 200 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 25?
11. If we can pay 330 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 21?
12. If we can pay 170 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 23?
13. If we can pay 290 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 22?
14. If we can pay 410 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 24?
15. If we can pay 130 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 20?
16. If we can pay 250 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 25?
17. If we can pay 370 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 21?
18. If we can pay 490 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 23?
19. If we can pay 140 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 22?
20. If we can pay 220 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 24?
21. If we can pay 350 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 20?
22. If we can pay 470 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 25?
23. If we can pay 160 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 21?
24. If we can pay 280 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 23?
25. If we can pay 400 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 22?
26. If we can pay 190 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 24?
27. If we can pay 320 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 20?
28. If we can pay 450 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 25?
29. If we can pay 240 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 21?
30. If we can pay 380 to rework the bad castings per unit, what is the expected profit when the number of casting scheduled is 23?

# Question 7

Why casting yield rates often follow a normal distribution？