1. Erica is the chief buyer for housewares at a large department store. She must decide how many Three Kings baking dishes to purchase for her upcoming promotion. Forecasted demand is normally distributed with mean 980 and standard deviation 354. Leftover cake dishes are sold to a discounter for $15. But now the department store just instituted a new policy regarding stockout. If a promotion item is out of stock, then a customer can request a comparable item for the same price as the stock-out item. For example, if the store runs out of Three King baking dished, then a customer can request instead a regular baking dish and pay the Three King price. The department has plenty of regular baking dishes, so there is no risk of running out of them. Furthermore, Erica believes that all of her Three King customers would be willing to switch to the regular baking dishes should they experience a stockout. Data on the Three King baking dishes as well as the regular baking dishes follow.

	Three King baking dish	Regular Dish
Selling price	$40	$55
Purchase price	$16	$30
Shipping cost	$3	$1.2
Handling cost	$0.8	$0.8
Warehouse surcharge	$1.1	$1.65
Total	$20.9	$33.65

(a) How many Three King baking dishes should she purchase? 10%

(b) Suppose Erica now believes that only half of her Three King customers would be willing to substitute the regular baking dishes. Given this new belief, how many Three King baking dishes should she purchase? 10%

2. Sigma/Q is a leading manufacturer of quality packaging in Northland Central America serving various markets across the globe. The company's primary goal was to improve plant performance and reduce operational costs. A useful way to analyze and describe the effects of waste is the Overall Equipment Effectiveness (OEE) framework which used widely by Mckinsey and other consulting firms. The following table below contains Sigma/Q data to be used for a complete OEE calculation. Please find OEE for Sigma/Q. 20%

Item	Data
Shift Length	8 hours = 480 min.
Short Breaks	2 @ 15 min. = 30 min.
Meal Break	1 @ 30 min. = 30 min.
Down Time	47 minutes
Ideal Run Rate	60 pieces per minute
Total Pieces	19,271 pieces
Reject Pieces	423 pieces

3. There are two major tools for process structuring in service and manufacturing industries respectively. One is the service process matrix which classifies service industry firms based on the characteristics of the individual firm's service processes i.e., the degree of labor intensity versus a degree of customer interaction and customization. The other one for manufacturing is the product-process matrix which effectively connects the manufactured product with its process. Please present these two matrices and make an examples for each classification in matrix accordingly. 20%

4. The quality assurance manager is assessing the capability of a process that puts pressurized grease in an aerosol can. The design specifications call for an average of 60 pounds per square inch (psi) of pressure in each can with an upper specification limit of 65 psi and a lower specification limit of 55 psi. A sample is taken from production and it is found that the cans average 61 psi with a standard deviation of 2 psi. Please find

(a) The capability of the process. 10%

(b) The probability of producing a defect. 10%

注意：背面尚有試題

5. Due to globalization and intensive communication between supply chains, the basis for competition is changing. Supply chain management (SCM) has emerged as one of the major areas for companies to gain competitive edge in a world of increasing uncertainties. Please propose a framework for understanding supply chain strategies based on demand and supply uncertainty. In your framework, the types of supply chain and examples under each case of high/low uncertainty in demand and supply are presented. 20%

Tables of the Normal Distribution

Probability Content from -oo to Z

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990