Managerial Economics and Business Strategy 10th edition Baye Solutions Manual

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Chapter 1
The Fundamentals of Managerial Economics
Answers to Questions and Problems

1. This situation best represents producer-producer rivalry. Here, Southwest is a producer attempting to steal customers away from other producers in the form of lower prices.

2. The maximum you would be willing to pay for this asset is the present value, which is

$$PV = \frac{250{,}000}{(1+0.08)} + \frac{250{,}000}{(1+0.08)^2} + \frac{250{,}000}{(1+0.08)^3} + \frac{250{,}000}{(1+0.08)^4} + \frac{250{,}000}{(1+0.08)^5}$$
$$= \$998{,}177.51$$

3.
   a. Net benefits are $N(Q) = 20 + 24Q - 4Q^2$.
   b. Net benefits when $Q = 1$ are $N(1) = 20 + 24 - 4 = 40$ and when $Q = 5$ they are $N(5) = 20 + 24(5) - 4(5)^2 = 40$.
   c. Marginal net benefits are $MNB(Q) = 24 - 8Q$.
   d. Marginal net benefits when $Q = 1$ are $MNB(1) = 24 - 8(1) = 16$ and when $Q = 5$ they are $MNB(5) = 24 - 8(5) = -16$.
   e. Setting $MNB(Q) = 24 - 8Q = 0$ and solving for Q, we see that net benefits are maximized when $Q = 3$.
   f. When net benefits are maximized at $Q = 3$, marginal net benefits are zero. That is, $MNB(3) = 24 - 8(3) = 0$.

4.
   a. The value of the firm before it pays out current dividends is

$$PV_{firm} = \$400{,}000\left(\frac{1+0.06}{0.06-0.04}\right)$$
$$= \$21.2 \text{ million.}$$

   b. The value of the firm immediately after paying the dividend is

$$PV_{firm}^{Ex-Dividend} = \$400{,}000\left(\frac{1+0.04}{0.06-0.04}\right)$$
$$= \$20.8 \text{ million.}$$

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5. The present value of the perpetual stream of cash flows. This is given by

$$PV_{Perpetuity} = \frac{CF}{i} = \frac{\$120}{0.03} = \$4{,}000$$

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6. The completed table looks like this:

Control Variable Q	Total Benefits B(Q)	Total Cost C(Q)	Net Benefits N(Q)	Marginal Benefit MB(Q)	Marginal Cost MC(Q)	Marginal Net Benefit MNB(Q)
100	1200	950	250	210	60	150
101	1400	1020	380	200	70	130
102	1590	1100	490	190	80	110
103	1770	1190	580	180	90	90
104	1940	1290	650	170	100	70
105	2100	1400	700	160	110	50
106	2250	1520	730	150	120	30
107	2390	1650	740	140	130	10
108	2520	1790	730	130	140	-10
109	2640	1940	700	120	150	-30
110	2750	2100	650	110	160	-50

a. Net benefits are maximized at $Q = 107$.
b. Marginal cost is slightly smaller than marginal benefit ($MC = 130$ and $MB = 140$). This is due to the discrete nature of the control variable.

7.

a. The net present value of attending school is the present value of the benefits derived from attending school (including the stream of higher earnings and the value to you of the work environment and prestige that your education provides), minus the opportunity cost of attending school. As noted in the text, the opportunity cost of attending school is generally greater than the cost of books and tuition. It is rational for an individual to enroll in graduate school when his or her net present value is greater than zero.
b. Since this decreases the opportunity cost of getting an M.B.A., one would expect more students to apply for admission into M.B.A. Programs.

8.

a. Her accounting profits are $170,000. These are computed as the difference between revenues ($200,000) and explicit costs ($30,000).
b. By working as a painter, Jaynet gives up the $110,000 she could have earned under her next best alternative. This implicit cost of $110,000 is in addition to the $30,000 in explicit costs. Since her economic costs are $140,000, her economic profits are $200,000 - $140,000 = $60,000.

9.

a. Total benefit when $Q = 2$ is $B(2) = 20(2) - 2*2^2 = 32$. When $Q = 10$, $B(10) = 20(10) - 2*10^2 = 0$.

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b. Marginal benefit when $Q = 2$ is MB(2) = 20 – 4(2) = 12. When $Q = 10$, it is MB(10) = 20 – 4(10) = -20.

c. The level of Q that maximizes total benefits satisfies MB(Q) = 20 – 4Q = 0, so Q = 5.

d. Total cost when $Q = 2$ is C(2) = 4 + 2*2^2 = 12. When $Q = 10$ C(Q) = 4 + 2*10^2 = 204.

e. Marginal cost when $Q = 2$ is MC(Q) = 4(2) = 8. When $Q = 10$ MC(Q) = 4(10) = 40.

f. The level of Q that minimizes total cost is MC(Q) = 4Q = 0, or Q = 0.

g. Net benefits are maximized when MNB(Q) = MB(Q) - MC(Q) = 0, or 20 – 4Q – 4Q = 0. Some algebra leads to Q = 20/8 = 2.5 as the level of output that maximizes net benefits.

10.

a. The present value of the stream of accounting profits is

$$PV = \frac{(150{,}000 - 50{,}000)}{1.07} + \frac{(150{,}000 - 50{,}000)}{(1.07)^2} + \frac{(150{,}000 - 50{,}000)}{(1.07)^3} = \$262{,}431.60$$

b. The present value of the stream of economic profits is

$$PV = \frac{(150{,}000 - 50{,}000 - 65{,}000)}{1.07} + \frac{(150{,}000 - 50{,}000 - 65{,}000)}{(1.07)^2} + \frac{(150{,}000 - 50{,}000 - 65{,}000)}{(1.07)^3} = \$91{,}851.06$$

11. First, recall the equation for the value of a firm: $PV_{firm} = \pi_0 \left(\frac{1+i}{i-g}\right)$. Next, solve this equation for g to obtain $g = i - \frac{(1+i)\pi_0}{PV_{firm}}$. Substituting in the known values implies a growth rate of: $g = 0.09 - \frac{(1+0.09)25{,}000}{500{,}000} = 0.0355$ or 3.55 percent. This would seem to be a reasonable rate of growth: 0.0355 < 0.09 ($g < i$).

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12. Effectively, this question boils down to the question of whether it is a good investment to spend an extra $250 on a refrigerator that will save you $40 at the end of each year for five years. The net present value of this investment is

$$NPV = \frac{\$40}{1.06} + \frac{\$40}{(1.06)^2} + \frac{\$40}{(1.06)^3} + \frac{\$40}{(1.06)^4} + \frac{\$40}{(1.06)^5} - \$250$$

$$= \$168.49 - \$250$$

$$= -\$81.51.$$

You should buy the standard model, since doing so saves you $81.51 in present value terms.

13. Under a flat hourly wage, employees have little incentive to work hard as working hard will not directly benefit them. This adversely affects the firm, since its profits will be lower than the $25,000 per store that is obtainable each day when employees perform at their peak. Under the proposed pay structure, employees have a strong incentive to increase effort, and this will benefit the firm. In particular, under the fixed hourly wage, an employee receives $160 per day whether he or she works hard or not. Under the new pay structure, an employee receives $330 per day if the store achieves its maximum possible daily profit and only $80 if the store's daily profit is zero. This provides employees an incentive to work hard and to exert peer pressure on employees who might otherwise goof off. By providing employees an incentive to earn extra money by working hard, both the firm and the employees will benefit.

14.

a. Accounting costs equal $145,000 per year in overhead and operating expenses. Her implicit cost is the $75,000 salary that must be given up to start the new business. Her opportunity cost includes both implicit and explicit costs: $145,000 + $75,000 = $220,000.
b. To earn positive accounting profits, the revenues per year should greater than $145,000. To earn positive economic profits, the revenues per year must be greater than $220,000.

15. First, note that the $200 million spent to date is irrelevant. It is a sunk cost that will be lost regardless of the decision. The relevant question is whether the incremental benefits (the present value of the profits generated from the drug) exceed the incremental costs (the $60 million needed to keep the project alive). Since these costs and benefits span time, it is appropriate to compute the net present value. Here, the net present value of DAS's R&D initiative is

$$NPV = \frac{12{,}000{,}000}{(1+0.05)^5} + \frac{13{,}400{,}000}{(1+0.05)^6} + \frac{17{,}200{,}000}{(1+0.05)^7} + \frac{20{,}700{,}000}{(1+0.05)^8} + \frac{22{,}450{,}000}{(1+0.05)^9} - 60{,}000{,}00$$

$$= \$107{,}364.15$$

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Since this is positive, DAS should spend the $60 million. Doing so adds over $100,000 to the firm's value.

16. Disagree. In particular, the optimal strategy is the high advertising strategy. To see this, note that the present value of the profits from each advertising strategy are as follows:

$$PV_{High} = \frac{\$20{,}000{,}000}{(1+0.09)} + \frac{\$80{,}000{,}000}{(1+0.09)^2} + \frac{\$300{,}000{,}000}{(1+0.09)^3} = \$317{,}338{,}067.33$$

$$PV_{Mod} = \frac{\$40{,}000{,}000}{(1+0.09)} + \frac{\$80{,}000{,}000}{(1+0.09)^2} + \frac{\$135{,}000{,}000}{(1+0.09)^3} = \$208{,}276{,}416.98$$

$$PV_{Low} = \frac{\$75{,}000{,}000}{(1+0.09)} + \frac{\$110{,}000{,}000}{(1+0.09)^2} + \frac{\$118{,}000{,}000}{(1+0.09)^3} = \$252{,}509{,}789.36$$

Since high advertising results in the profit stream with the greatest present value, it is the best option.

17.

a. Since the profits grow faster than the interest rate, the value of the firm would be infinite. This illustrates a limitation of using these simple formulas to estimate the value of a firm when the assumed growth rate is greater than the interest rate.

b. $PV_{firm} = \pi\left[\frac{1+i}{i-g}\right] = \$3.2\left[\frac{1.06}{0.04}\right] = \$84.8$ billion.

c. $PV_{firm} = \pi\left[\frac{1+i}{i-g}\right] = \$3.2\left[\frac{1.06}{0.06}\right] = \$56.5$ billion.

d. $PV_{firm} = \pi\left[\frac{1+i}{i-g}\right] = \$3.2\left[\frac{1.06}{0.10}\right] = \$33.9$ billion.

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18. If she invests $2,500 in pre-tax money each year in a traditional IRA, at the end of 4 years the taxable value of her traditional IRA will be

$$\$2{,}500(1.07)^4 + \$2{,}500(1.07)^3 + \$2{,}500(1.07)^2 + \$2{,}500(1.07) = \$11{,}876.85$$

She gets to keep only 81 percent of this (her tax rate is 19 percent), so her spendable income when she withdraws her funds at the end of 4 years is (0.81)($11,876.85) = $9,620.25. In contrast, if she has $2,500 in pre-tax income to devote to investing in an IRA, she can only invest $2,025 in a Roth IRA each year (the remaining $475 must be paid to Uncle Sam). Since she doesn't have to pay taxes on her earnings, the value of her Roth IRA account at the end of 4 years represents her spendable income upon retirement if she uses a Roth IRA. This amount is

$$\$2{,}025(1.07)^4 + \$2{,}025(1.07)^3 + \$2{,}025(1.07)^2 + \$2{,}025(1.07) = \$9{,}620.25.$$

Notice that, ignoring set-up fees, the Roth and traditional IRAs result in exactly the same after-tax income at retirement. Therefore, she should adopt the plan with the lowest set-up fees. In this case, this means choosing the Roth IRA, thus avoiding the $50 set-up fee charged for the traditional IRA. In other words, the net present value of her after-tax retirement funds if she chooses a Roth IRA,

$$NPV_{Roth} = \frac{\$9{,}620.25}{(1.07)^4} - \$0 = \$7{,}339.24$$

is $50 higher than under a traditional IRA.

19. Yes. To see this, first note that your direct and indirect costs are the same regardless of whether you adopt the project and therefore are irrelevant to your decision. In contrast, note that your revenues increase by $13,369,300 if you adopt the project. This change in revenues stemming from the adoption from the ad campaign represents your incremental revenues. To earn these additional revenues, however, you must spend an additional $2,860,050 in TV airtime and $1,141,870 for additional ad development labor. The sum of these costs – $4,001,920 – represents the explicit incremental cost of the new advertising campaign. In addition to these explicit costs, we must add $8,000,000 in implicit costs – the profits lost from foreign operations. Thus, based on the economically correct measure of costs – opportunity costs – the incremental cost of the new campaign is $12,001,920. Since these incremental costs are less than the incremental revenues of $13,369,300, you should proceed with the new advertising campaign. Going forward with the plan would increase the firm's bottom line by $1,367,380. Expressed differently, the extra accounting profits earned in the U. S. would offset the accounting profits lost from foreign operations.

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20. Under the projected 2% annual growth rate, analysts would view the acquisition unfavorably since $PV_{firm} = \$39.60\left(\frac{1+0.09}{0.09-0.02}\right) = \$616.63 < \$625.00$ (in millions). However, with an annual growth rate of 4% the acquisition is justified since $PV_{firm} = \$39.60\left(\frac{1+0.09}{0.09-0.04}\right) = \$863.28 > \$625.00$ (in millions).

21. Producer-producer rivalry exists between the European Steel Association and GOES producers from Russia, Japan, China, South Korea, and the United States. A consumer-producer rivalry exists between the European Steel Association and European transformer manufacturers. Sustainability of profits in the GOES market is questionable given the current circumstances. There are few low-cost alternatives to GOES, but the presence of at least five separate countries producing at a level generating significant exports indicates significant industry rivalry in the global market. One result is that the intense rivalry between exporting countries and the European Steel Association puts downward pressure on price. The GOES consumers, represented by transformer manufacturers, and GOES producers, represented by the European Steel Association and governments of the other five countries, are well organized. The sustainability of profits in the European GOES market will be determined by the relative success of buyers and sellers of GOES at convincing the EU governments of the merits for the minimum price restriction and the amount of time to keep it in place.

22. Online price comparison sites are generally markets of intense producer-producer rivalry. Using the five forces framework, one would expect that profits in this industry would be low. Given that there are many sellers, products are identical across sellers, and that the main basis for competition is price, the industry rivalry would be very high and prices would be expected to be close to cost. Furthermore, barriers to entry are low, so that any profits would be competed away by new firms entering the market. Also, consumers have a variety of substitutes available, both for the products and the retail outlets from which they purchase. For these reasons, economic profits would likely be close to zero for The Local Electronics Shop.

23. While the incentive plan has been effective in increasing the sales for the dealership, it has not increased profitability. This is because the manager, who must approve all sales, gets paid a commission regardless of whether the sale is profitable for the dealership or not; she has an incentive to increase sales, not profits. A better incentive system would pay the manager a commission based on the amount of the profit on each sale. Doing this would give the sales manager an incentive to sell more cars and maintain high profit margins. In this way, the incentives of the manager are better aligned with the incentives of the dealership's owners. Many car dealerships pay the manager 20-30% of the gross profit, the difference between the selling price and the cost to the dealership.

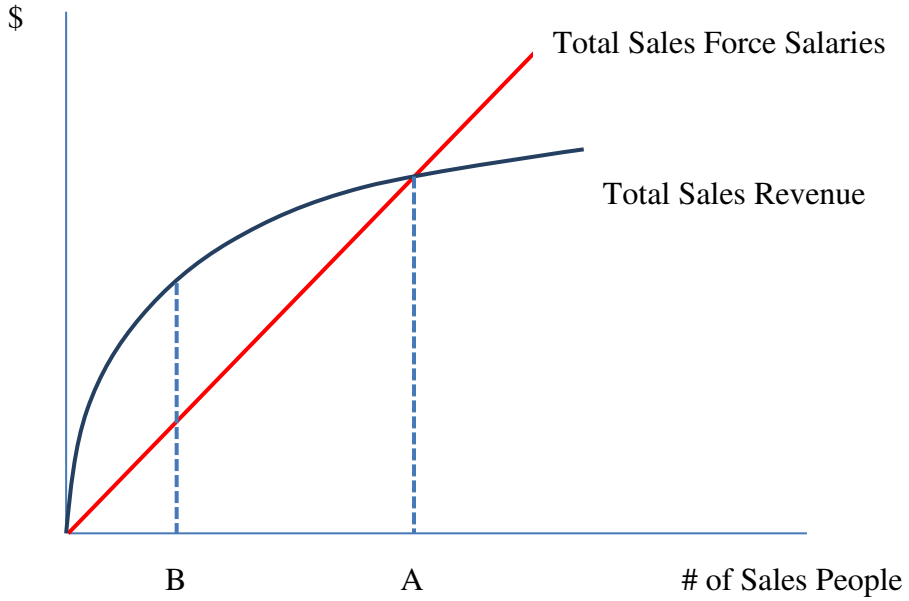
24. Marginal analysis can help us answer this question. Let's revisit the figure, reproduced below. Looking at Point A, it is clear that hiring this many sales people

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ensures that benefits (revenues) equal costs (salaries), meaning net benefits are exactly zero! However, Ms. Stevens' objective is to maximize net benefits, and it is easy to see from the figure that she can achieve net benefits much higher than zero. We know that maximizing net benefits requires us to set marginal benefits equal to marginal costs, which occurs at Point B in the figure (where the slope of total revenue equals the slope of total salaries). At Point B, benefits are well above costs, so net benefits are well above zero. Consequently, it appears Ms. Stevens' sales division would have done much better with a smaller sales force, as the analysts argued.

Figure 1-4



25.

a. Cost = $0.74 + 0.10X^2$, where X is website analysis. The square of website analysis is statistically significant, since its t-statistic is above 2 in absolute value (12.96).
b. Revenue = $24.60 + 11.09X - 0.10X^2$. Both X and X^2 are statistically significant, since both have t-statistics above 2 in absolute value (8.38 and -2.27, respectively).
c. Set MB(X) = MC(X) to find the level that maximizes net benefits. This means we set $11.09 - 0.2X = 0.21X$. Solving for X yields X = 27.05.

26.

a. Revenue = $968.68 + 71.77*X - 0.12*X^2$, where X is focus group size. Both focus group size and the square of focus group size are significant, since both have t-statistics great than 2 in absolute value (32.42 and -4.58, respectively).

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b. Costs = $510.70 + 49.17X + 0.11X^2$, where X is focus group size. Both focus group size and the square of focus group size are significant, since both have t-statistics great than 2 in absolute value (22.01 and 4.13, respectively).
c. Set MB(X) = MC(X) to find the level that maximizes net benefits. This means we set $71.77 – 0.24X = 49.17 + 0.22X$. Solving for X yields X = 49.

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Time Warner Cable Solution to MEMO 1: Revenue from EPIX

Using the **Epix.xls** data file, estimation of a linear regression will give the following output:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9463
R Square	0.8955
Adjusted R Square	0.8900
Standard Error	2.6757
Observations	21

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1166.15	1166.15	162.88	0.000
Residual	19	136.03	7.16		
Total	20	1302.17			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	39.057	2.015	19.383	0.000	34.840	43.274
Price	-2.461	0.193	-12.763	0.000	-2.865	-2.058

The output indicates that the regression model has a good fit, as indicated by the *R*-Square and the *F*-Statistic. The coefficient on Price is negative, indicating that the law of demand holds.

The estimated demand curve is $Q = 39.057 - 2.461 \times P$, where Q is the quantity of subscribers (in thousands). At the current price of $9.75 per month, we can estimate the own-price elasticity of demand: $\varepsilon_{Q,P} = -2.461\left(\frac{9.75}{15.059}\right) = -1.594$. Since the absolute value of the elasticity of demand is greater than 1, demand is currently on the elastic portion of the demand curve. Therefore a small decrease in the price will lead to higher revenues.

To calculate the revenue-maximizing price, we need to solve for marginal revenue. Since our linear demand function is $Q = 39.057 - 2.461 \times P$, we can solve for the inverse demand function as $P = 15.869 - .406Q$. Since the marginal revenue for linear demand has the same intercept and twice the slope of the inverse demand curve, marginal revenue is given as $MR = 15.869 - .813Q$. Setting $MR = 0$ and solving for Q, we get $Q = 19.528$. This is the revenue maximizing quantity.

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Putting this quantity into the inverse demand curve and solving gives us a price of $7.93. Based on that combination, the maximum revenue that can be generated is $154,944.

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