1. Illustrate the following demand on a graph:

Price (per pair) $100 $80 $60 $40 $20

Quantity demanded (pairs per day) 10 14 18 22 26

(*a*) How many pairs will be demanded when the price is $70?

(b) How much money will be spent on shoes at a price of (*i*) $50

(*ii*) $90

3. According to the News stories on pages 95 and 96 (see below), by how much would cigarette prices have

to rise to get a 50 percent reduction in smoking by

(*a*) Teenagers?

(*b*) Adults (short-run)?

4. Suppose consumers buy 20 million packs of cigarettes per month at a price of $2 per pack. If a

$1 tax is added to that price,

(*a*) By what percent does price change? (Use midpoint formula on p. 92.) %

(*b*) By what percent will cigarette sales decline in the short run? (See Table 5.1 for clue.) %

(c) According to Gary Becker, by how much will sales decline in the long run?

(See News, page 96.)(see below)

7. According to the calculation on page 100 (see below), by how much will popcorn sales increase if

average income goes up by 5 percent?

8. Use the following table to compute the income elasticity of the demand for air travel:

**Income Vacations Income Elasticity**

**(per year) (per year) of Demand**

*a.* $ 20,000 0

*b.* 50,000 1 *b* to *c \_\_\_\_\_\_\_\_\_\_*

c. 100,000 3 *c to d \_\_\_\_\_\_\_\_\_\_*

*d.* 200,000 5

10. Use the following data to illustrate the (*a*) demand curve and (*b*) total revenue curve:

Price $1 2 3 4 5 6 7 8 9 10

Quantity 18 16 14 12 10 8 6 4 2 0

(*a*) At what price is total revenue maximized? $

(*b*) At that price what is the elasticity of demand? *E* \_

(c) Indicate the elastic and inelastic regions of each curve on the graphs.

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**Dramatic Rise in Teenage Smoking**

Smoking among youths in the United States rose precipitously

starting in 1992 after declining for the previous 15 years. By

1997, the proportion of teenage smokers had risen by onethird

from its 1991 trough.

A prominent explanation for the rise in youth smoking over

the 1990s was a sharp decline in cigarette prices in the early

1990s, caused by a price war between the tobacco companies.

Gruber and Zinman find that young people are very sensitive

to the price of cigarettes in their smoking decisions. The

authors estimate that for every 10 percent decline in the price,

youth smoking rises by almost 7 percent, a much stronger

price sensitivity than is typically found for adult smokers. As a

result, the price decline of the early 1990s can explain about a

quarter of the smoking rise from 1992 through 1997. Similarly,

the significant decline in youth smoking observed in 1998 is at

least partially explainable by the first steep rise in cigarette

prices since the early 1990s. The authors also find that black

youths and those with less-educated parents are much more

responsive to changes in cigarette prices than are white teens

and those with more-educated parents.

However, price does not appear to be an important determinant

of smoking by younger teens. This may be because they

are more experimental smokers.

Source: National Bureau of Economic Research, *NBER Digest,* October

2000. www.nber.org/digest

**Analysis:** The effectiveness of higher cigarette prices in curbing teen smoking depends on the price elasticity of demand.

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**New York City’s Costly Smokes**

New York City has the nation’s costliest smokes. NYC Mayor

Michael Bloomberg raised the city’s excise tax from 8 cents a

pack to $1.50 effective July 2002. Together with state and federal

taxes, that raised the retail price of smokes in NYC to

nearly $8 a pack.

Mayor Bloomberg expected the city to reap a tax bonanza

from the 350 million packs of cigarettes sold annually in

NYC. What he got instead was a lesson in elasticity. NYC

smokers can buy cigarettes for a lot less money outside the

city limits. Or they can stay home and buy cigarettes on the

Internet from (untaxed) Indian reservations, delivered by

UPS. They can also buy cigarettes smuggled in from low-tax

states like Kentucky, Virginia, and North Carolina. What matters

isn’t the price elasticity of demand for cigarettes in general

(around 0.4), but the elasticity of demand for *NYC-taxed*

cigarettes. That turned out to be quite high. Unit sales of

NYC cigarettes plummeted by 44 percent after the “Bloomberg

tax” was imposed.

Source: “*NewsFlash,*” *Economy Today,* October 2002.

**Analysis:** If demand is price-elastic, a price increase will lead to a disproportionate drop in unit sales. In this case, the ready

availability of substitutes (cigarettes from other jurisdictions) made demand highly price-elastic.

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**FIGURE 5.7**

**Income Elasticity**

If income changes, the demand

curve *shifts*. In this case, an increase

in income enables consumers to

buy more popcorn at every price. At

a price of 25 cents, the quantity

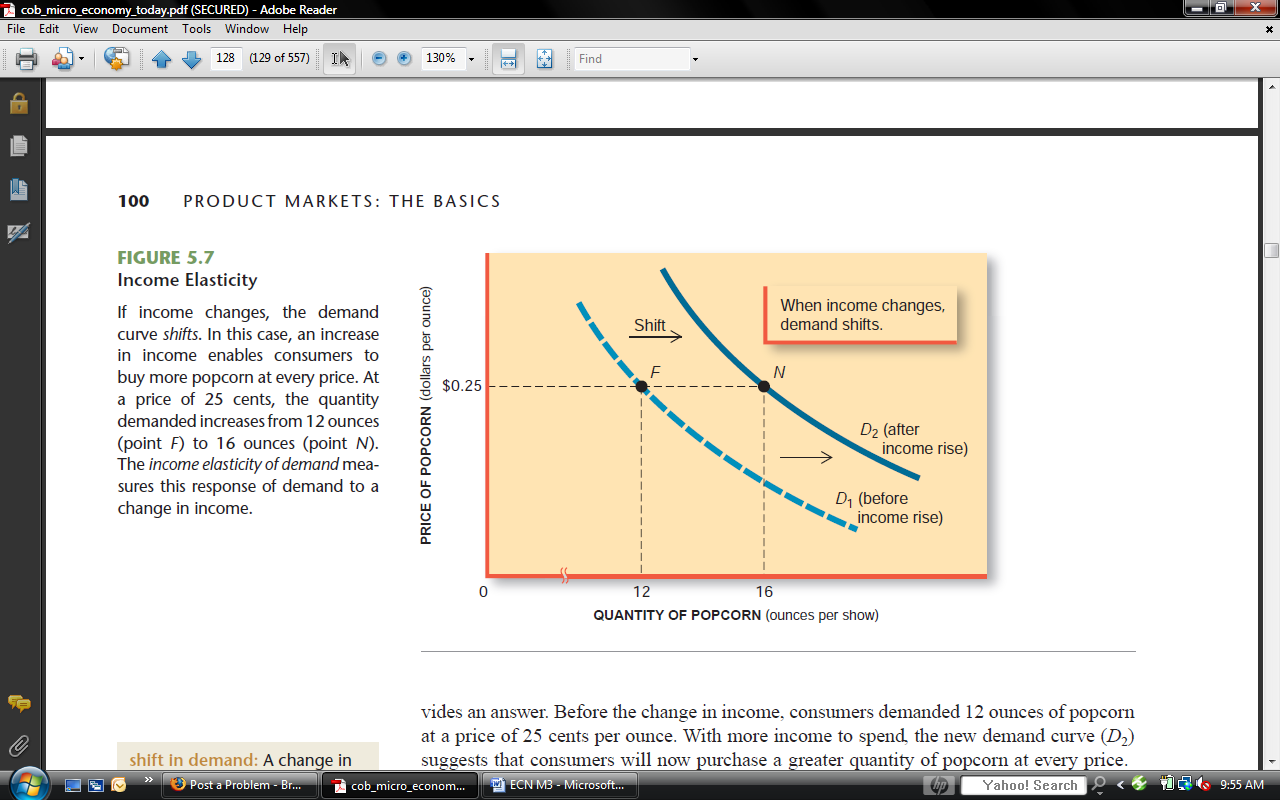
demanded increases from 12 ounces

(point *F*) to 16 ounces (point *N*).

The *income elasticity of demand* measures

this response of demand to a

change in income.

******

***When the underlying determinants of demand change, the entire demand curve shifts.***

These shifts also alter consumer behavior. The *price* elasticity of demand is of no use in

gauging these behavioral responses, since it refers to price changes (movements along a

constant demand curve) for that good only.

A change in any determinant of demand will shift the demand curve. Suppose consumer

incomes were to increase. How would popcorn consumption be affected? Figure 5.7 pro-

vides an answer. Before the change in income, consumers demanded 12 ounces of popcorn

at a price of 25 cents per ounce. With more income to spend, the new demand curve ( *D* 2)

suggests that consumers will now purchase a greater quantity of popcorn at every price.

The increase in income has caused a rightward **shift in demand.** If popcorn continues to

sell for 25 cents per ounce, consumers will now buy 16 ounces per show (point *N* ) rather

than only 12 ounces (point *F* ).

It appears that changes in income have a substantial impact on consumer demand for

popcorn. The graph in Figure 5.7 doesn’t tell us, however, how large the change in income

was. Will a *small* increase in income cause such a shift, or does popcorn demand increase

only when moviegoers have a *lot* more money to spend?

Figure 5.7 doesn’t answer these questions. But a little math will. Specifically, the **income**

**elasticity of demand** relates the *percentage* change in quantity demanded to the *percentage*

change in income—that is,

Income elasticity

of demand \_

% change in

quantity demanded

(at given price)

% change in

income

The similarity to the price elasticity of demand is apparent. In this case, however, the

denominator is *income* (a determinant of demand), not *price.*

**Computing Income Elasticity.** As was the case with price elasticity, we compute income

elasticity with *average* values for the changes in quantity and income. Suppose that the shift

in popcorn demand illustrated in Figure 5.7 occurred when income increased from $110 per

week to $120 per week. We would then compute

Income elasticity \_

change in quantity demanded

average quantity

change in income

average income

\_

16 ounces – 12 ounces

14 ounces

$120 – $110

$115