

UPEP Economics
Calculation Drilling (SAMPLE)

Effects of imposing a unit tax

Sample question

Guided learning



◇ Gemini AI*



Video

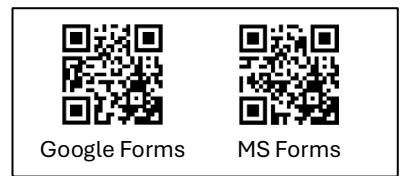
The following table shows the supply and demand schedules of a good.

Unit price (\$)	10	11	12	13	14	15
Quantity demanded (units)	120	110	100	90	80	70
Quantity supplied (units)	90	110	130	150	170	190

Suppose the government imposes a unit tax of \$3 on the good.

- (a) Calculate consumers' total expenditure on the good.
- (b) Calculate the producers' total revenue (net of tax).
- (c) Calculate the consumers' and producers' tax burden.

* A Gemini AI account is required. AI may make mistake, so consult your teachers if you have any doubts about the output.



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Drilling exercises

Stage 1: Find the new supply schedule after tax

1.1 Suppose the government imposes a unit tax of \$2.

Unit price (\$)	1	2	3	4	5
Quantity demanded (units)	40	35	30	25	20
Quantity supplied (units)	30	35	40	45	50

1.2 Suppose the government imposes a unit tax of \$3.

Unit price (\$)	10	11	12	13	14
Quantity demanded (units)	110	100	90	80	70
Quantity supplied (units)	70	80	90	100	110

1.3 Suppose the government imposes a unit tax of \$2.

Unit price (\$)	2	4	6	8	10
Quantity demanded (units)	26	25	24	24	23
Quantity supplied (units)	20	22	24	26	28

Stage 2: Find the price and quantity transacted before and after tax

2.1 Suppose the government imposes a unit tax of \$2.

Unit price (\$)	1	2	3	4	5	6
Quantity demanded (units)	50	45	40	35	30	25
Quantity supplied (units)	40	45	50	55	60	65

Before tax: Market price = \$ _____; Quantity transacted = _____ units

After tax: Market price = \$ _____; Quantity transacted = _____ units

2.2 Suppose the government imposes a unit tax of \$4.

Unit price (\$)	10	11	12	13	14	15	16
Quantity demanded (units)	130	120	110	100	90	80	70
Quantity supplied (units)	90	100	110	120	130	140	150

Before tax: Market price = \$ _____; Quantity transacted = _____ units

After tax: Market price = \$ _____; Quantity transacted = _____ units

2.3 Suppose the government imposes a unit tax of \$6.

Unit price (\$)	2	4	6	8	10	12	14
Quantity demanded (units)	14	13	12	11	10	9	8
Quantity supplied (units)	8	10	12	14	16	18	20

Before tax: Market price = \$ _____; Quantity transacted = _____ units

After tax: Market price = \$ _____; Quantity transacted = _____ units

Stage 3: Calculate total expenditure and total revenue after tax

3.1 Suppose the government imposes a unit tax of \$2.

Unit price (\$)	2	3	4	5	6	7
Quantity demanded (units)	110	100	90	80	70	60
Quantity supplied (units)	70	80	90	100	110	120

Market price = \$ _____; Price that producers actually receive: \$ _____

Quantity transacted = _____ units

Consumers' total expenditure = _____

Producer's tax revenue (net of tax) = _____

3.2 Suppose the government imposes a unit tax of \$3.

Unit price (\$)	20	21	22	23	24	25
Quantity demanded (units)	16	15	14	13	12	11
Quantity supplied (units)	10	12	14	16	18	20

Consumers' total expenditure = _____

Producer's tax revenue (net of tax) = _____

3.3 Suppose the government imposes a unit tax of \$20.

Unit price (\$)	20	30	40	50	60	70
Quantity demanded (units)	420	440	460	480	500	520
Quantity supplied (units)	400	450	500	550	600	650

Consumers' total expenditure = _____

Producer's tax revenue (net of tax) = _____

Stage 4: Calculate tax burden

4.1 Suppose the government imposes a unit tax of \$3.

Unit price (\$)	2	3	4	5	6	7
Quantity demanded (units)	27	26	25	24	23	22
Quantity supplied (units)	21	23	25	27	29	31

Before tax: Market price = \$ _____

After tax: Price that consumers actually pay = \$ _____

Price that producers actually receive = \$ _____

Consumers' tax burden = _____

Producers' tax burden = _____

4.2 Suppose the government imposes a unit tax of \$6.

Unit price (\$)	12	14	16	18	20	22
Quantity demanded (units)	60	55	50	45	40	35
Quantity supplied (units)	30	40	50	60	70	80

Consumers' tax burden = _____

Producers' tax burden = _____

4.3 Suppose the government imposes a unit tax of \$10.

Unit price (\$)	40	45	50	55	60	65
Quantity demanded (units)	12	11	10	9	8	7
Quantity supplied (units)	8	9	10	11	12	13

Consumers' tax burden = _____

Producers' tax burden = _____

Answer

Sample question

Unit price (\$)	10	11	12	13	14	15
Quantity demanded (units)	120	110	100	90	80	70
Quantity supplied (units)	90	110	130	150	170	190
Quantity supplied after tax (units)	-	-	-	90	110	130

Before tax: Market price = \$11; Quantity transacted = 110 units

After tax: Market price = \$13; Quantity transacted = 90 units

Price that consumers actually pay = \$13

Consumers' total expenditure = $\$13 \times 90 = \$1,170$

Price that producers actually receive = $\$13 - \$3 = \$10$

Producer's tax revenue (net of tax) = $\$10 \times 90 = \900

Consumers' tax burden = $\$(13 - 11) \times 90 = \180

Producers' tax burden = $\$(11 - 10) \times 90 = \90

Drilling exercises

Stage 1

1.1

Unit price (\$)	1	2	3	4	5
Quantity demanded (units)	40	35	30	25	20
Quantity supplied (units)	30	35	40	45	50
Quantity supplied after tax (units)	-	-	30	35	40

1.2

Unit price (\$)	10	11	12	13	14
Quantity demanded (units)	110	100	90	80	70
Quantity supplied (units)	70	80	90	100	110
Quantity supplied after tax (units)	-	-	-	70	80

1.3

Unit price (\$)	2	4	6	8	10
Quantity demanded (units)	26	25	24	24	23
Quantity supplied (units)	20	22	24	26	28
Quantity supplied after tax (units)	-	20	22	24	26

Stage 2

2.1

Unit price (\$)	1	2	3	4	5	6
Quantity demanded (units)	50	45	40	35	30	25
Quantity supplied (units)	40	45	50	55	60	65
Quantity supplied after tax (units)	-	-	40	45	50	55

Before tax: Market price = \$2; Quantity transacted = 45 units

After tax: Market price = \$3; Quantity transacted = 40 units

2.2

Unit price (\$)	10	11	12	13	14	15	16
Quantity demanded (units)	130	120	110	100	90	80	70
Quantity supplied (units)	90	100	110	120	130	140	150
Quantity supplied after tax (units)	-	-	-	-	90	100	110

Before tax: Market price = \$12; Quantity transacted = 110 units

After tax: Market price = \$14; Quantity transacted = 90 units

2.3

Unit price (\$)	2	4	6	8	10	12	14
Quantity demanded (units)	14	13	12	11	10	9	8
Quantity supplied (units)	8	10	12	14	16	18	20
Quantity supplied after tax (units)	-	-	-	8	10	12	14

Before tax: Market price = \$6; Quantity transacted = 12 units

After tax: Market price = \$10; Quantity transacted = 10 units

Stage 3

3.1

Unit price (\$)	2	3	4	5	6	7
Quantity demanded (units)	110	100	90	80	70	60
Quantity supplied (units)	70	80	90	100	110	120
Quantity supplied after tax (units)	-	-	70	80	90	100

Market price = \$5; Price that producers actually receive: \$3

Quantity transacted = 80 units

Consumers' total expenditure = $\$5 \times 80 = \400

Producer's tax revenue (net of tax) = $\$3 \times 80 = \240

3.2

Unit price (\$)	20	21	22	23	24	25
Quantity demanded (units)	16	15	14	13	12	11
Quantity supplied (units)	10	12	14	16	18	20
Quantity supplied after tax (units)	-	-	-	10	12	14

Market price = \$24; Quantity transacted = 12 units

Consumers' total expenditure = $\$24 \times 12 = \288

Producer's tax revenue (net of tax) = $\$(24 - 3) \times 12 = \252

3.3

Unit price (\$)	20	30	40	50	60	70
Quantity demanded (units)	420	440	460	480	500	520
Quantity supplied (units)	400	450	500	550	600	650
Quantity supplied after tax (units)	-	-	400	450	500	550

Market price = \$60; Quantity transacted = 500 units

Consumers' total expenditure = $\$60 \times 500 = \$3,000$

Producer's tax revenue (net of tax) = $\$(60 - 20) \times 500 = \$2,000$