Marginal Analysis

Answer Key — All Values

Q	Price (P)	Revenue (R)	Marginal Revenue	Total Cost	Marginal Cost	Profit (π = R − TC)
0	100	0	92	20	8	−20
1	92	92	76	28	4	64
2	84	168	60	32	4	136
3	76	228	44	36	8	192
4	68	272	28	44	14	228
5	**60**	**300**	**12**	**58**	**22**	**242**
6	52	312	−4	80	34	232
7	44	308	−20	114	50	194
8	36	288	−36	164	68	124
9	28	252	−52	232	88	20
10	20	200	—	320	—	−120

Formulas:
• Revenue: $R(Q) = P(Q) \times Q$ where $P(Q)$ is the price at quantity Q and $R(Q)$ is the revenue at quantity Q
• Marginal Revenue: $MR(Q) = R(Q+1) - R(Q)$
• Marginal Cost: $MC(Q) = TC(Q+1) - TC(Q)$
• Profit: $\pi = R - TC$

Underlying functions:
Demand: $P = 100 - 8Q$ | Cost: $TC = 0.5Q^3 - 3Q^2 + 10Q + 20$

Key observations:
• Maximum profit ($242) occurs at Q = 5, highlighted in green
• At Q = 4: MR (28) > MC (14) — still profitable to produce more
• At Q = 5: MR (12) < MC (22) — producing more reduces profit
• Profit-maximizing output is between Q = 4 and Q = 5 (closest integer: Q = 5)