1) Non-excludability (inability to exclude people from consuming).

2) Pure Public Goods  Pure Private Goods  Common Resources  Natural Monopoly Goods
Excludable?  No  Yes  No  Yes
Rival?  No  Yes  Yes  No

3) Charge someone willing to pay. If unable to charge the ships, a port which benefits from the lighthouse could be charged. They would be willing to pay, since without the lighthouse their business would decrease as ships went to safer ports. The lighthouse would have difficulty collecting money if ships which benefited went to many different ports. Information about the danger of the coast is provided.

4) Non-Excludable – like a common resource.

5) Charge $2 per pound of muck; or $40 per ton of steel. Shift up supply in a parallel manner.

6) No – In this example, a scheme of tradable pollution permits can not reduce pollution to 18 tons with any lower social cost than a law forcing both producers to reduce their pollution to 9 tons each. This is because the cost of factory B reducing from 9 to 8 tons is larger than factory B reducing from 10 to 9 tons. Tradable pollution permits will offer a more efficient method of reducing total pollution only if some firms can reduce their pollution (to below targets) at much lower cost than other firms.

7) MTR = 300/1000 = 30%;  ATR = 10% (when income = $30,000);  ATR \approx 10.6\% (3300/31000), (when income = $31,000).

8) Person with $100K income must pay: .15(25)+.28(25)+.36(50) = 28.75 thousand.  ATR = 28.75/100 = 28.75%

9) Federal: i) individual income tax, and ii) social insurance tax. State and Local: i) sales tax, ii) property tax; iii) individual income tax.

10) The tax on navy beans is more likely to be regressive since poor people spend a larger percentage of their income on navy beans than rich people, and this is not true for fine wine.

11) When MTR ↑, the incentive to work ↓. Tax base shrinks as MTR ↑. If the tax base shrinks enough, increasing tax rates can actually decrease tax revenue – this would be seen by the region of the Laffer curve with negative slope.

12) Yes: consider a tax where individuals earning: i) 25K, ii) 50K and iii) 100K must pay: i) 4K, ii) 6K, and iii) 10K in taxes, respectively. Those with higher incomes pay more money in tax, but at lower average tax rates: i) 16%, ii) 12%; and iii) 10%, respectively.

13) Given Profit=$100, TC=$40, and Price = $2 per unit. Quantity sold = Output (Q) = (100+40)/2 = 70 units.

14) Given FC=5 and VC=20. So Total Cost (TC) = 25. Given Q=5; then ATC= 5; AFC=1; and AVC=4.
15) Output (Q) | Average Total Cost (ATC) | Average Variable Cost (AVC) 
---|---|---
4 | $2.70 | (10.8-6)/4 = $1.20 
5 | $2.60 | (13-6)/5 = $1.40 
6 | $2.60 | (15.6-6)/6 = $1.60 

When Q increases from 4 to 5 units, MC = (13-10.8) = $2.20; and when Q increases from 5 to 6 units, MC = (15.6-13) = $2.60

16) ATC is at a minimum when ATC = MC. AVC is at a minimum when AVC = MC. The difference: ATC – AVC = AFC by definition. This difference decreases, that is ATC and AVC become closer together, as Q↑. (This is obvious if you remember AFC = FC/Q).

17) Economic cost includes all implicit and explicit costs. Explicit costs represent monetary outlays, implicit costs do not. Implicit costs include a “normal” return to investors. Fixed Cost (FC) is constant as quantity produced changes. Cost curves depict economic costs (a firm earning zero economic profit earns “normal” accounting profit).

18) Production Function (“Total Product Curve”) shape is the same as Total Cost function shape flipped (axes interchanged).

19) Technology and Capital (in short-run Capital is fixed, in the long run it is not).

20) Yes - economies of scale imply down sloping LRATC & diseconomies of scale imply upward sloping LRATC curve.

21) Econ of Scale from: “learning by doing” “adoption of mass production techniques” and “specialization in tasks”. Diseconomies from: increasing cost (per unit of output) of command and coordination.

22) Sunk Cost is a cost incurred in the past, which can’t be changed - it should have no effect on current decisions. Fixed Cost does not change as output changes. Fixed Cost of a machine incurred in the past is a sunk cost if the machine has no salvage value (and can not be re-sold to other firms).

23) LRATC will be a horizontal line.

24) (i and ii) will shift up per unit cost curves (MC ATC AVC and AFC) and cause Total Cost to pivot up and to the left; (iii) will cause per-unit cost curves to shift downward and the TC curve to pivot downward to the right. The change in technology (iii) will also shift the production function.

25) TC = FC+VC; ATC = AFC + AVC; MC = change in TC/change in Q = ∆TC/∆Q