

### 22.3

a  $200 + y; 10 + 5y$

b  $\frac{200}{y} + 1; 1; \frac{10}{y} + 5; 5$

c Shovel; hydraulic smasher; 48

### 22.8

a  $4y + \frac{16}{y}$

b  $8y$

c 2

d  $4y$

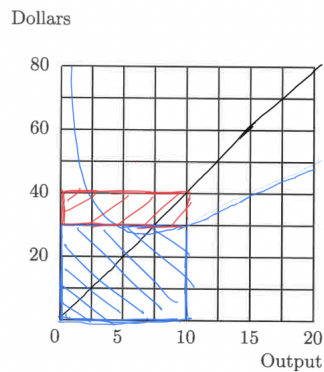
e  $y = 0$

### 23.1

a  $2s + \frac{100}{s}; 2s; 4s$

b 5; 10

c The graph is as below; note that the 45 degree line is supply curve; blue curve is the average total cost; blue shaded area marks total cost; red shaded area marks total profit and their summation (the square) represents total revenue.

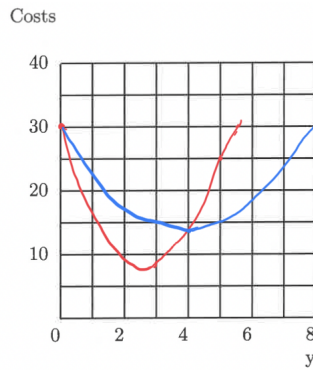


### 23.2

a  $3y^2 - 16y + 30$

b  $y^2 - 8y + 30$

c See the graph below. Note that the red curve is MC while the blue one is the AVC. They intersect at two points (0, 30) and (4, 14).



d 4; 4

e 4

f 14

g 4; 42 (hint: let price equal to the marginal cost when producing 6)

### 23.7

a  $3y^{\frac{1}{2}}; \frac{p^2}{9}; \frac{p^2}{324}$

b  $3w_1^{\frac{1}{2}}w_2^{\frac{1}{2}}y^{\frac{1}{2}}; \frac{p^2}{9w_1w_2}$

### 23.9

a  $\frac{y^3}{8};$

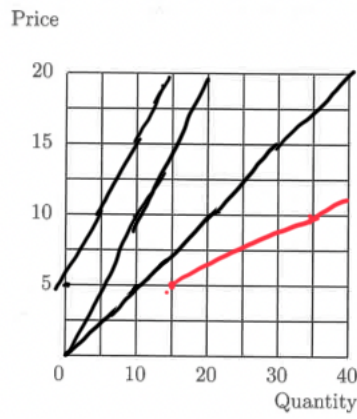
b  $\frac{y^3w}{8}$

c  $\sqrt{\frac{p}{3}}; \sqrt{\frac{8p}{3w}}$

d  $20 \cdot \sqrt{\frac{8p}{3w}}$

24.7

Please see the graph below. Three black curves represent the supply curves of three firms, and the red one is the aggregate supply.



a 5; 15; 5, 0, 10