

Homework #7 Solutions

4.6: 1, 2, 9, 10, 12, 13

1a) quantity demanded decreases by $0.5(3\%) = 1.5\%$

b) quantity demanded increases by $0.5(3\%) = 1.5\%$

2. (a) 6% (b) 6%

9. $E = \frac{2}{3}$, since $E < 1$, the demand is inelastic

10. $E = 1.25$ so the % change in demand $\cong 2 \cdot 1.25 = 2.5$.

12. (a) 4960

(b). $E = 0.016$, since $E < 1$, demand is inelastic

13. (a) $q = 4960$ so Revenue = \$9,920

(b) $p = \$12.91$

(c) At $p = \$12.91/\text{pound}$, the quantity sold is 333.32

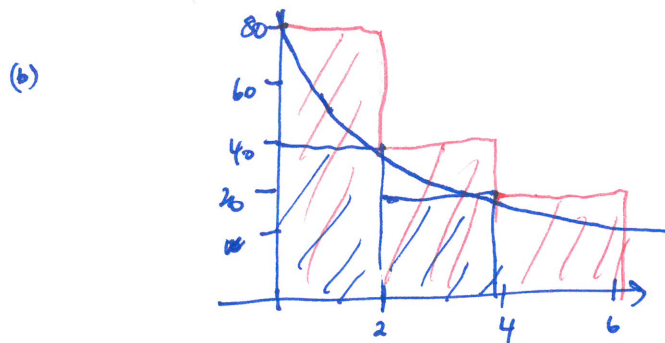
total Revenue is $R = pq = \$43,033.16$

(d) $E \cong 1$. $E = \frac{20(12.91)^2}{333.32} \cong 1$

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5.1 4, 11, 14, 17, 28

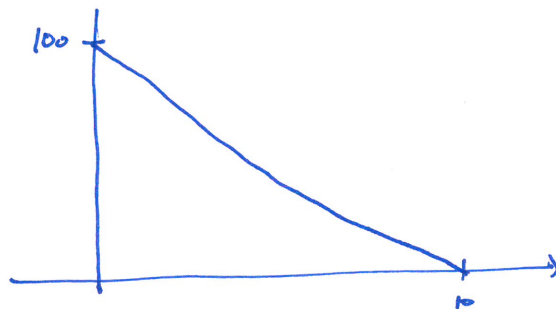
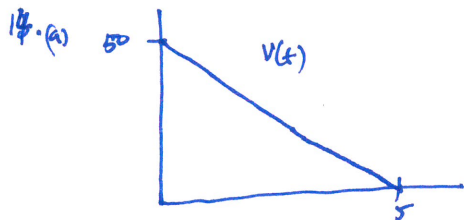
4. (a) lower estimate = 122 ft upper estimate = 298 feet



lower estimate

upper estimate

11. 250 metres



(b) Distance travelled = 125 feet.

(c) If the initial velocity is doubled. Distance = $\frac{1}{2} \cdot 10 \cdot 100 = 500$ ft.

17 (a) Car A has largest maximum velocity

(b) Car A stops first

(c) Car B travels farther.

26. (a) Left sum = 700 billion

(b) Since the amount of CO₂ is increasing left hand sums give an under estimate

(c) Right hand sum = 808 billion

(d) Right sum is an upper estimate

5.2 7, 8, 9

7. To estimate $\int_0^{40} f(x) dx$ Left sum = 16,450
Right sum = 17,550

$$\int_0^{40} f(x) dx \cong \frac{16,450 + 17,550}{2} = \underline{17,000}$$

8. $\int_0^{15} f(x) dx \cong 543.$

9. $\int_8^4 w(t) dt \cong \frac{18.4 + 13.8}{2} = 16.1$

5.3 7, 11, 13, 20

- 7(a) Negative, since $f \leq 0$ for $-5 \leq x \leq -4$
- (b) Positive, since $f \geq 0$ for $-4 \leq x \leq -1$
- (c) Negative since the graph of f has more area under the x -axis than above.
- (d) Positive, since the graph of f has more area above the x -axis than underneath on $-5 \leq x \leq 3$.

11. (a) $\int_0^1 f(x) dx = -0.25$

(b) $\int_{-1}^1 f(x) dx = 0.25 + (-0.25) = 0$

(c) Total shaded area = $0.25 + 0.25 = 0.5$

$$13. (a) \int_a^b f(x) dx = 13$$

$$(b) \int_a^c f(x) dx = -2$$

$$(c) \int_a^c f(x) dx = 13 - 2 = 11$$

$$(d) \int_c^d |f(x)| dx = 15$$

$$20 \text{ Area} \approx 337.5$$

$$5.4 \quad \underline{1, 3, 7, 16}$$

1. $\int_1^3 v(t) dt$ represents the total change in position between $t=1$ and $t=3$.

3. $\int_{2005}^{2011} f(t) dt$ - change in world population between 2005 and 2011.

$$7. \quad 13.295 \text{ Billion}$$

16. (a) A graph of the length function has an inflection point when length is maximum.

$$(b) \text{ Total length} = \text{Area under graph} = 50.2 \text{ cm}$$

8.

$$(a) \int_0^{400} c'(q) dq = 8650 \quad (\text{left and right sum average})$$

$$\begin{aligned} \text{Total cost} &= \text{Fixed costs} + \text{Variable costs} \\ &= \$10,000 + \$8,650 = \$18,650 \end{aligned}$$

(b) $C'(400) = \$28.$

9. $C(0) = 500$ so the fixed costs are \$500.

Variable costs of producing 20 units

$$\int_0^{20} c'(q) dq \quad [\text{stop here since no table is provided}]$$

$$\text{Total cost} = 500 + \int_0^{20} c'(q) dq.$$