Problems for Section 2.4

1. For the function graphed in Figure 2.38, are the following nonzero quantities positive or negative?

(a) $f(2)$ **(b)** $f'(2)$ **(c)** $f''(2)$

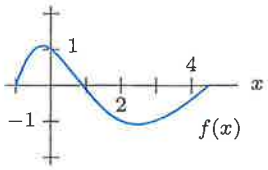
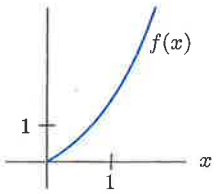


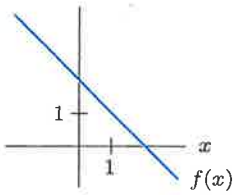
Figure 2.38

For Problems 3–8, give the signs of the first and second derivatives for the following functions. Each derivative is either positive everywhere, zero everywhere, or negative everywhere.

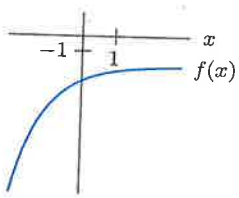
3.



5.



7.



15. The table gives the number of passenger cars, $C = f(t)$, in millions,[17] in the US in the year t.

(a) Do $f'(t)$ and $f''(t)$ appear to be positive or negative during the period 1940–1980?

(b) Estimate $f'(1975)$. Using units, interpret your answer in terms of passenger cars.

t	1940	1950	1960	1970	1980	1990	2000
C	27.5	40.3	61.7	89.2	121.6	133.7	133.6

Problems for Section 2.5

1. The function $C(q)$ gives the cost in dollars to produce q barrels of olive oil.

(a) What are the units of marginal cost?

(b) What is the practical meaning of the statement $MC = 3$ for $q = 100$?

3. In Figure 2.53, is marginal cost greater at $q = 5$ or at $q = 30$? At $q = 20$ or at $q = 40$? Explain.

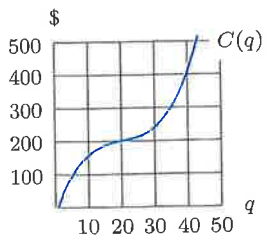


Figure 2.53

11. Let $C(q)$ represent the cost and $R(q)$ represent the revenue, in dollars, of producing q items.

(a) If $C(50) = 4300$ and $C'(50) = 24$, estimate $C(52)$.

(b) If $C'(50) = 24$ and $R'(50) = 35$, approximately how much profit is earned by the 51^{st} item?

(c) If $C'(100) = 38$ and $R'(100) = 35$, should the company produce the 101^{st} item? Why or why not?

Homework #9

Math 211

Section 2.4

1 (a) Negative
(b) Negative
(c) Positive

3 $f'(x) > 0$
$f''(x) > 0$

5 $f'(x) < 0$
$f''(x) = 0$

7 $f'(x) > 0$
$f''(x) < 0$

11 $s'(t)$: positive
$s''(t)$: positive or zero

13 A positive second derivative indicates a successful campaign
A negative second derivative indicates an unsuccessful campaign

15 (a) Positive; positive
(b) Number of cars increasing at 3.24 million cars per year in 1975

Section 2.5

1 (a) Dollars/barrel
(b) 101 barrels cost about \$3 more than 100 barrels

3 At $q = 5$;
At $q = 40$

5 About \$16.67 (answers may vary)

7 $C'(2000) \approx \$0.37$/ton
The marginal cost is smallest on the interval $2500 \leq q \leq 3000$.

9 (a) About \$2408
(b) About \$2192

11 (a) About \$4348
(b) \$11 profit
(c) No, company will lose money

13 (a) \$1850 profit
(b) About \$0.40 increase; increase production
(c) About \$0.45 decrease; decrease production

15 (a) Fixed costs
(b) Decreases slowly, then increases