

MTH 380 Review Guide Answer Key

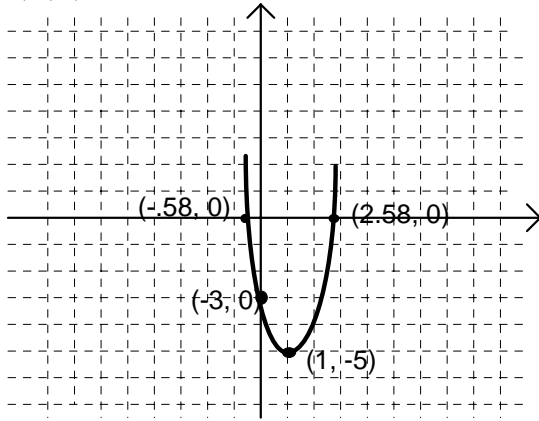
- I. 1. a.) -1      b.) -1.5 c.) -2      d.)  $-\infty$       e.)  $\infty$   
 f.) 2      g.) 1      h.)  $\infty$       j.) d.n.e.      k.) d.n.e.  
 l.) 0      m.) d.n.e.      n.) 1      o.) 0      p.) d.n.e.  
 q.)  $-\frac{1}{2}$       r.)  $\infty$       s.) 0
2. a.) 5      b.) 2      c.) d.n.e.      d.) 4      e.)  $\infty$   
 f.)  $-\infty$       g.)  $-\frac{3}{4}$       h.) 0

- II. 1. a.) -2, -1, 0, 2      b.)  $f(0) = -1.5$
2. a.)  $(-\infty, \infty)$       b.)  $(-\infty, 5) \cup (5, \infty)$       c.)  $(-\infty, 5]$       d.)  $(-\infty, 5)$   
 e.)  $(-\infty, -5) \cup (-5, 5) \cup (5, \infty)$       f.)  $(-\infty, -5) \cup (-5, \infty)$   
 g.)  $(-\infty, -5) \cup (-5, 5) \cup (5, \infty)$       h.)  $(-\infty, 5) \cup (5, \infty)$

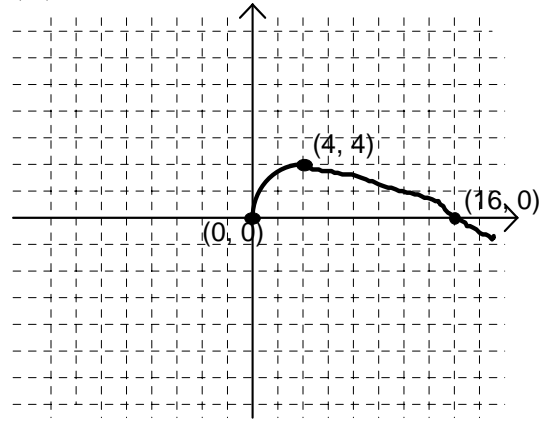
- III. 1.)  $f'(x) = 10x + 2$       2.)  $g'(x) = \frac{6x}{3x^2 + 2}$
- 3.)  $h'(x) = \frac{1}{2x\sqrt{\ln(2x)}}$       4.)  $f'(x) = \frac{3x^2}{(\ln 9)(x^3 - 1)}$
- 5.)  $g'(x) = \frac{-6x}{(x^2 + 1)^2}$       6.)  $h'(x) = 10(x^2 + 2x - 5)^9(2x + 2)$
- 7.)  $k'(x) = 2e^{5x^2 + 2x - 1} + 2x(10x + 2)e^{5x^2 + 2x - 1}$
- 8.)  $l'(x) = \frac{14x}{(3 - x^2)^2}$       9.)  $n'(x) = (\ln 5)5^x$
- 10.)  $p'(x) = 10x \ln 3(3^{x^2 + 2})$       11.)  $q'(x) = \frac{3x^3 + 2xe^{2x} + x^2e^{2x}}{\sqrt{e^{2x} + x^2}}$
- 12.)  $\frac{dy}{dx} = \frac{e^{3y+x} - 2x}{1 - 3e^{3y+x}}$       13.)  $\frac{dy}{dx} = \frac{y^2 - y}{x - 2xy}$

- IV. 1.) a = 1, b = 3, c = 1      2.) a = 2, b = 6
- 3.) (a.)-(iii.)      (b.)-(i.)(c.)-(v.)      (d.)-(vi.)      (e.)-(ii.)  
 (f.)-(vii.)
- 4.) (a.)-(v.)      (b.)-(iii.)      (c.)-(iv.)      (d.)-(ii.)

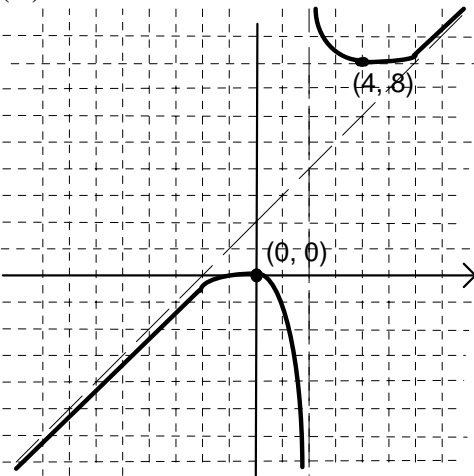
5.) (a.)



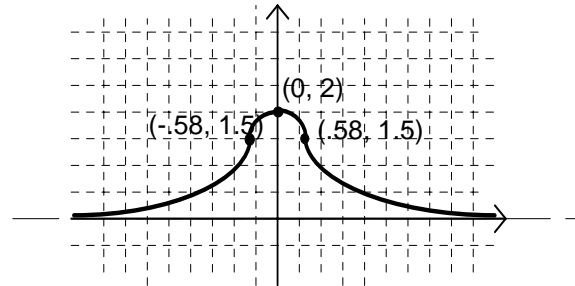
(b.)



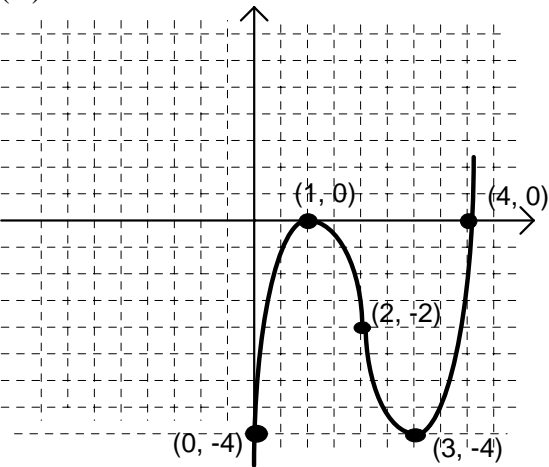
(c.)



(d.)



(e.)



- V.
- |     |                            |     |   |
|-----|----------------------------|-----|---|
| 1.) | $x + c$                    | 2.) | $\frac{1}{2}e^{2x} - \ln x  + c$        |
| 3.) | $\frac{1}{4}x^4 + x^2 + c$ | 4.) | $x^2 + \frac{5}{2}x - \frac{3}{2x} + c$ |
| 5.) | 18                         | 6.) | $f(x) = 6x^{1/3} + 2$                   |
- VI.
- |     |                                  |                           |
|-----|----------------------------------|---------------------------|
| 1.) | 5.101 billion people;            | .0102 billion people/year |
| 2.) | $e^9 = 8103$ units               |                           |
| 3.) | $C(x) = 300x + 0.01x^2 + 10,000$ |                           |
| 4.) | \$4200                           |                           |
| 5.) | $t = 6$ cents per dollar         |                           |
| 6.) | 374.88 dollars/week              |                           |
| 7.) | (a.) \$140                       | (b.) \$139                |
| 8.) | (a.) 0.4 million dollars/year    | $P'(5) = 0.5 - 0.02(5)$   |
|     | (b.) 0.4 million dollars/year    | $(P(6) - P(4))/2$         |