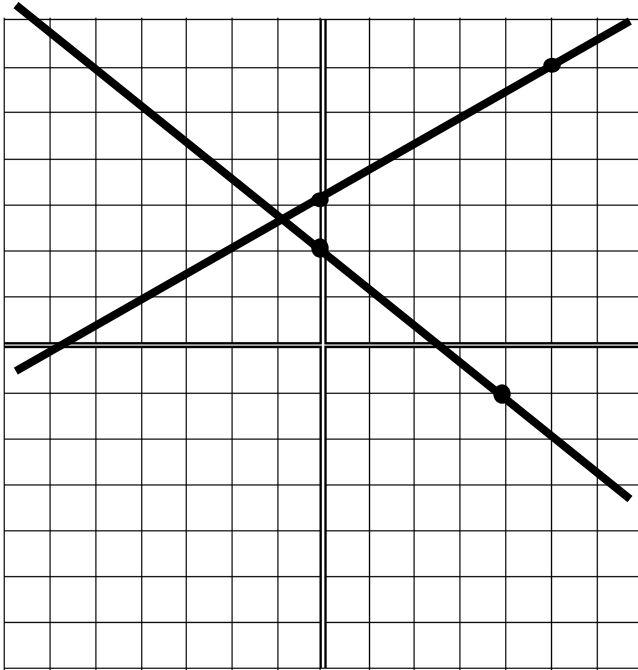


Answers for Classroom Review Worksheet for Exam 2, Spring 2016

- 1) A a) $m = \frac{9}{8}$, b) $9x - 8y = -19$
 B a) $m = \frac{7}{5}$, b) $14x - 10y = 1$
- 2) vertical line: $x = -5$, horizontal line: $y = 3$
 3) answers (left to right) are: negative, zero, undefined, positive
 4)



- 5) (a) average rate of change is -32
 (b) average rate of change is $\frac{3}{5}$
- 6) $v(5) = 15$
- 7) (a) average rate of change in profit is \$1000 per item
 (b) instantaneous rate of change in profit when $x = 2$ is \$400 per item
- 8) average rate of change in the interval is \$800 per item
- 9) There are no derivatives when $x = -3, -1, 0, 2, 3,$ and 5
- 10) average rate of change is \$95.53 per unit
- 11)
 a) $f'(x) = 6x - 2$
 $f'(-2) = -14, f'(0) = -2, f'(3) = 16$
 b) $f'(x) = -\frac{3}{x^2}$
 $f'(-2) = -\frac{3}{4}, f'(0)$ is undefined, $f'(3) = -\frac{1}{3}$
- 12) a) $y = 3x - 4$ b) $y = 1$ and $y = 6x - 18$

13)

- a) marginal revenue is \$0/item when 500 are produced and sold
b) marginal revenue is $-\$200$ /item (loss of \$200 per item) when 600 are sold
An estimation of the revenue from the 601st item after 600 have been sold is a loss of \$200.

14)

- a) $C'(x) = -0.0075x + 1.5$
b) $C'(100) = \$0.75$ /taco (Costs are increasing by about \$0.75 per taco when 100 are produced and sold.
c) The actual cost of the 101st taco is \$0.75.
d) parts b and c are equivalent

15) $\frac{dy}{dx} = 15x^4 - 18x^2 + x - 2$

16) $f'(x) = -\frac{40}{x^5} + \frac{21}{x^4} + 3$

17) $g'(x) = 8x(2x^2 - 5)$

18) $\frac{dy}{dx} = 24x^3 - 36x^2 + 22x - 4$

19) $q'(x) = \frac{-7(x^2 + 2)}{(x^2 - 2)^2}$

20) $r'(x) = \frac{15x^2 - 8x}{2\sqrt{5x^3 - 4x^2}}$ or $\frac{15x - 8}{2\sqrt{5x - 4}}$

21) $f'(2) = 19$

22) $(-4, -6)$ and $(-2, -20)$

23) $y = -2x + 9$

24) $x = 0, x = -2$

25) At 5 hours, the population is increasing by 6000 million or 6,000,000,000 bacteria per hour. At 8 hours, the population is increasing by 3072 million or 3,072,000,000 bacteria per hour.

26) $f'(5) = 42$

27) $R'(10) = 990$ When 10 stereo systems have been sold, the revenue is increasing by \$990 per system. Or, the approximate revenue made from the sale of the 11th system would be about \$990.

28) a) BMI = 32.1

b) $BMI' = f'(x) = -\frac{175750}{h^3}$ c) $f'(65) = -0.64$ per inch

29)

$$v(t) = 36t - 13$$

$$v(0) = -13 \text{ ft./sec.}$$

$$v(5) = 167 \text{ ft./sec.}$$

$$v(10) = 347 \text{ ft./sec.}$$

30) $h'(x) = \frac{18x^2 + 48x - 1}{(3x + 4)^2}$

31) $h'(3) = -\frac{13}{16}$

32) $y = 11x - 6$

33) $x = 3 - \sqrt{2}, 3 + \sqrt{2}$

34) a) $N'(t) = 6t^2 - 645 + 128$

b) $N'(10) = 88$

After 10 hours the bacteria are increasing by 88 million per hour.

35) $f'(t) = \frac{-100}{(11t - 10)^2}$

a) -100 facts/hour

b) $-\frac{1}{100}$ of a fact per hour

36) a) 742 (b) 458

37) $f(x) = x^{3/2}$ and $g(x) = 6x - 2$ is the most obvious choice

38) $m'(x) = 9(2x^5 + 3)^3(14x^5 + 1)$

39) $f'(x) = \frac{2(2x-3)^3(6x^2+9x+8)}{(3x+2)^2}$

40) $y = \frac{4}{3}x + \frac{4}{3}$

41) $x = -\frac{2}{\sqrt{7}}, \frac{2}{\sqrt{7}}$