Answers to Review Worksheet for Exam 1, Summer 2016

1)   (a)   function, $D = \{-1, 2, 3\}$ $R = \{5\}$

      (b)   function, $D = (-\infty, \infty)$ $R = (-1, \infty)$

      (c)   function, $D = \{x \mid \frac{1}{2} \le x \le 5\}$ $R = \{y \mid 0 \le y \le 3\}$

      (d)   function, $D = \{0, 2, 4, 5, 7, 8\}$ $R = \{-5, -4, -3, -2\}$

2)   (a) $f(-1) = \dfrac{15}{2}$ (b) $f(2) = 6$ (c) $f(2x) = 6x^2 - 4x + 4$

      (d) $f(-x) = \frac{3}{2}x^2 + 2x + 4$ (e) $f(x) + 1 = \frac{3}{2}x^2 - 2x + 5$

      (f) $f(x-2) = \frac{3}{2}x^2 - 8x + 14$

3)   (a) $g(-1)$ DNE   (b) $g(4) = \dfrac{26}{5}$ (c)   DNE

4)   (a) $h(7) = -4$ (b) $h(a+2) = \dfrac{a+3}{-2}$ or $\dfrac{-a-3}{2}$

      (c) $h(a) + h(2) = \dfrac{a+4}{-2}$ or $\dfrac{-a-4}{2}$ (d) $h\left(\dfrac{3}{a}\right) = \dfrac{a+3}{-2a}$ or $\dfrac{-a-3}{2a}$

5) $x = \dfrac{8}{3}$ and $f(0) = -8$

6)   (a) $D = (-\infty, 5]$ (b) $D = (-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, 4) \cup (4, \infty)$

      (c) $D = (-\infty, \infty)$ (d) $D = (-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

      (e) $D = [\frac{12}{5}, 4) \cup (4, \infty)$ (f) $D = (-\infty, \infty)$

7) $D = (0, \infty)$, $V(4) = 64$, $x = 8$

8) $h(1.75) = 531$

9) $C(x) = 0.92x^2 + \dfrac{20482.56}{x}$ 10) $-\dfrac{5}{7}$

11) $\dfrac{x^2 + 16}{4(1 - 4x)}$ or $\dfrac{x^2 + 16}{4 - 16x}$ 12) $\dfrac{2x^2 + 4x + 8}{x^2 + 3x - 1}$

13) $\dfrac{3(8x - 1)}{4x - 1}$ or $\dfrac{24x - 3}{4x - 1}$ 14) $\dfrac{32 - 4\sqrt{x}}{64 - x}$

15) $\dfrac{1}{3x + 8}$ 16) $(2x + 11)(\sqrt{2x} - \sqrt{11})$

17) $\dfrac{x - 5}{x - 2}$ 18) $\dfrac{a}{5a + 2}$

19) $\dfrac{15x^3 - 10x^2 + 12x - 4}{x^2(3x - 2)(3x - 1)}$ 20) $\dfrac{4(2y + 5)}{y + 2}$

21) $\dfrac{-2(2x + h)}{x^2(x + h)^2}$ 22) $m + n$

23) $\dfrac{ab}{(a + b)(a - b)}$ 24) $2(3x - 2)^3(x^2 + 5)(15x^2 - 4x + 45)$

25) $\dfrac{(3x + 1)^5(39x - 89)}{\sqrt{2x - 5}}$ or $\dfrac{(3x + 1)^5(39x - 89)}{(2x - 5)^{1/2}}$ 26) $\dfrac{8(9x^2 + 8x + 42)}{(x^2 + 5)^5(3 - 8x)^{10}}$

27) $\dfrac{(2x+1)^{1/4}(4x+6)}{(2x+5)^{1/6}}$

28) (a) $x^2-8x-13$ (b) $11x^3+46x^2+39x$

     (c) $\dfrac{9}{2}$ (d) 448

29) (a) 5   (b) 60

     (c) DNE   (d) 40

30) (a) 10   (b) 9

31) (a) $\dfrac{5}{4x^2}+4$ or $\dfrac{5+16x^2}{4x^2}$ (b) $D=(-\infty,0)\cup(0,\infty)$

     (c) $\dfrac{1}{10x^2+8}$ (d) $D=(-\infty,\infty)$

32) $\dfrac{11x-11}{-4x+9}$ $D=(-\infty,-\tfrac{9}{4})\cup(-\tfrac{9}{4},\tfrac{4}{3})\cup(\tfrac{4}{3},\infty)$

33) (a) 3 feet per year   (b) $h(t)=3t-2$

     (c) 22 feet   (d) $8\tfrac{2}{3}$ years

34) $d(t)=(12\sqrt{5})t$

35) $A(t)=36\pi t^2$

36) average rate of change $=9$ 37) average rate of change $=4x+2h+1$
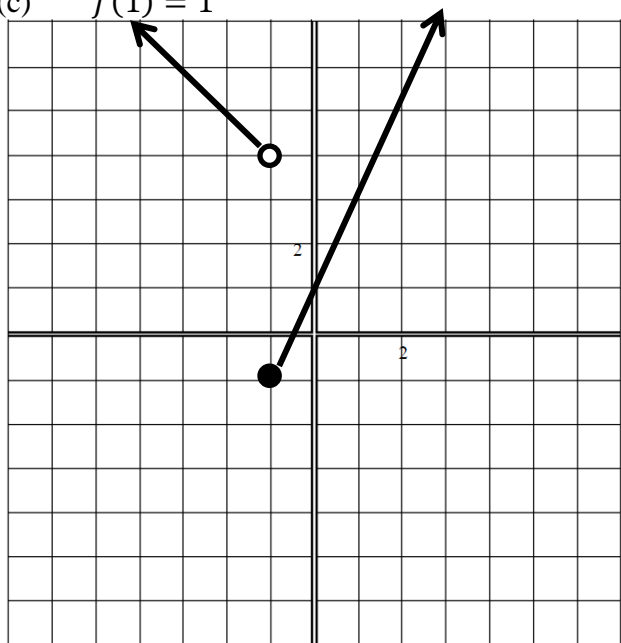
38) $2x+h+2$ 39) 2

40) $h+17$ 41) $\dfrac{5}{\sqrt{5x+5h}+\sqrt{5x}}$

42) $f(x)=\begin{cases} -2x-4 & \text{if } x<-1 \\ x+1 & \text{if } x\geq-1 \end{cases}$

43) (a) $f(-2)=-3$ (b) $f(0)=2$

     (c) $f(1)=1$

44)

     (a) $D=(-\infty,\infty)$ $R=[-1,\infty)$

45) $C_1=\begin{cases} 30 & \text{if } 0\leq x\leq 100 \\ 0.25x+5 & \text{if } x>100 \end{cases}$ $C_2=\begin{cases} 50 & \text{if } 0\leq x\leq 180 \\ 0.4x-22 & \text{if } x>180 \end{cases}$

46) (a) $y=(x+5)^5+55$ (b) upward   (c) $V(-5,55)$

    (d) minimum value of 55 when $x=-5$

47) $f(x)=-2(x+1)^2+3$

48) $V\left(-\dfrac{5}{6},-\dfrac{31}{6}\right)$

49) maximum value is 8 and occurs when $x=-1$

50) zeros: $\dfrac{5}{2}$ and -1 y-intercept: $(0,-5)$

51) $y=(x-2)^2+1$ 52) not enough information was given

53) 49   54) $x=\dfrac{500}{3}$ yards, $y=250$ yards

55) rental rate: \$105 per day