Pre-Calc AB Worksheet #49 : Answers

1. $f : \mathbb{R}$,
   $g : \mathbb{R}$,
   $p : (-\infty, 3)$ and $(3, \infty)$,
   $q : (-\infty, 3)$ and $(3, \infty)$

2. **I:** (a) $(-\infty, -2)$ and $(0, 2)$ and $(2, \infty)$
   (b) $(-2, -1)$ and $(-1, 0)$
   (c) None
   (d) $(-\infty, -1)$ and $(-1, \infty)$
   (e) $\mathbb{R}$
   (f) Local Max: $(-2, 3)$ and Local Min: $(0, 0)$

   II: (a) $(-\infty, -2)$ and $(-1, 2)$ and $(2, \infty)$
   (b) $(-2, -1)$
   (c) None
   (d) $(-\infty, 2)$ and $(2, \infty)$
   (e) $\mathbb{R}$
   (f) Local Max: $(-2, 1)$ and Local Min: $(-1, -1)$

   III: (a) $(-2, 1)$ and $(1, 4)$
   (b) None
   (c) None
   (d) $[-2, 1)$ and $(1, 4]$
   (e) $[-1, 1,)$ and $(1, 3]$
   (f) None

   IV: (a) $(-4, -2)$ and $(0, 1)$ and $(3, 4)$
   (b) $(-2, 0)$ and $(1, 3)$
   (c) None
   (d) $[-4, -2)$ and $(-2, 0)$ and $(0, 4]$
   (e) $[-1, \infty)$
   (f) Local Max: $(1, 3)$ and Local Min: $(3, -1)$

3. (a) Increasing: $(1, \infty)$, Decreasing: $(-\infty, 1)$
   (b) Increasing: $(4, \infty)$, Decreasing: $(-\infty, 4)$

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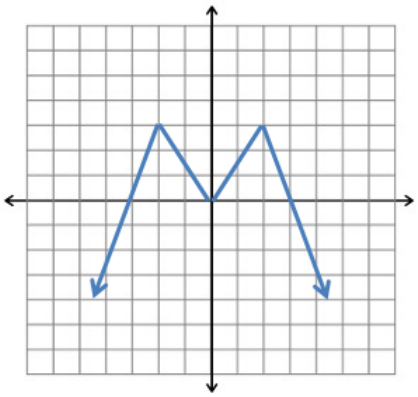
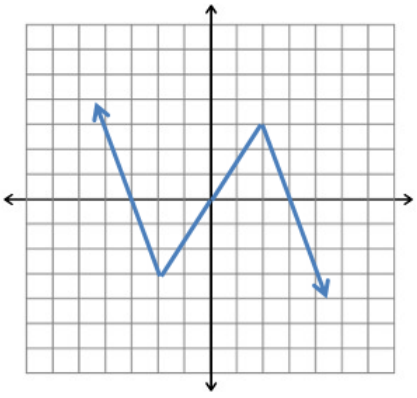
4. (a)



   (b)



5. (a) Even, $f(-x) = f(x)$
   (b) Even, $g(-x) = g(x)$
   (c) Neither, $h(-x) = \sqrt{x^2} - x^3$
   (d) Odd, $k(-x) = -k(x)$

6. (a) Domain: $(-\infty, -3]$ and $[3, \infty)$, Range: $[0, \infty)$

   (b) Domain: $(-\infty, -2)$ and $(-2, 2)$ and $(2, \infty)$

   (c) i. $f(-2) =$ undefined

   ii. $f(-x) - g(a) = \sqrt{x^2 - 9} - \dfrac{1}{a^2 - 4}$

   iii. $\dfrac{g(x+h) - g(x)}{h} = \dfrac{-2x - h}{(x^2 - 4)((x+h)^2 - 4)}$

   (d) i. $f \circ g(x) = \sqrt{\dfrac{1}{(x^2 - 4)^2} - 9}$

   ii. $g \circ f(x) = \dfrac{1}{(\sqrt{x^2 - 9})^2 - 4}$