Honors Precalculus Summer Packet Answers 2022

1. a. $-1 \leq x < 1$ b. $x \leq 4$ c. $x < 5$ d. $-2 \leq x < 2$ e. $-1 < x < 2$ f. $x \geq 5$

2. a. $(-3, \infty)$ b. $(-7, -2)$ c. $(-2, 1)$ d. $[-1,\infty)$ e. $(-3, 4]$ f. $(0, \infty)$

3. a. $-3 < x \leq 4$ b. $-3 < x < -1$ c. $x < 5$ d. $x \geq -6$

4. a. $\approx 3.35\ secs$ b. 2500 ft

5. $\left\{ \pm \sqrt{\frac{13}{3}} \right\}$ 6. { -22, 0}   7. {-1, 4}   8. { -1.5, 4}

9. $\left\{ -\frac{7}{2} \pm \frac{\sqrt{105}}{2} \right\}$ 10. {6, -2}   11. {5}   12. $\left\{ \frac{3}{2} - \frac{\sqrt{5}}{2} \right\}$

13. Yes   14. No   15. No   16. Yes

17. Yes   18. No   19. No   20. Yes

21. a. $(-\infty, \infty)$ b. $(-\infty, 3) \cup (3, \infty)$ c. $(-\infty, -3) \cup (-3, 1) \cup (1, \infty)$
d. $(-\infty, 0) \cup (0, 3) \cup (3, \infty)$ e. $(-\infty, 0) \cup (0, 5) \cup (5, \infty)$

22. a. $(-\infty, 10]$ b. $[5, \infty)$

23. a. Local Maxima (-1,4) (5, 5) Local Minima at (2,2)
    In $(-\infty, -1] \cup [2, 5]$ De $[-1,2] \cup [5, \infty)$

   b. Local Minimum (1,2), (3, 3) is neither,   Local Maximum at (5,7)
      De $(-\infty, -1] \cup [5, \infty)$ In [1,5]

   c. Local Minima (-1,1) (3, 1), Local Maxima (1, 6) (5,4)
      De $(-\infty, -1] \cup (1, 3] \cup [5, \infty)$ In $[-1, 1] \cup [3, 5]$

24. a. Graph De $(-\infty, -2]$ In $[-2, \infty)$ b. Graph De $(-\infty, -1]$ In $[1, \infty)$
    c. Graph In $(-\infty, 1]$ De $[1, \infty)$

25. a. local minimum of y = 3.75 @ x = 0.5, no maximum
     b. local minimum of y≈-4.09 @ x ≈ -0.82 local maximum y≈ -1.91 @ x≈.82
     c. local maximum y≈ 9.16 @ $x \approx -3.2$ local minimum y=0 @ x= 0 and y= 0 @ x= -4
26. a. Even   b. Odd   c. Even   d. Even   e. Neither   f. Odd
**26. Requires Algebraic justification using f(-x)

27. a. y = 1 x= 1   b. y = -1 x = 3   c. y = 0   d. y = 0

28. a. 5; -6   b. 8; 3

29. a. $f(g(x)) = 3x - 1$ D: $(- \infty, \infty)$ $g(f(x)) = 3x + 1$ D: $(- \infty, \infty)$

 b. $f(g(x)) = x - 1$ D: $[- 1, \infty)$ $g(f(x)) = \sqrt{x^2 - 1}$ D: $(- \infty, 1] \cup [1, \infty)$

 c. $f(g(x)) = 1 - x^2$ D: $[- 1, 1]$ $g(f(x)) = \sqrt{1 - x^4}$ D: $[- 1, 1]$

 d. $f(g(x)) = \frac{3x}{2}$ D: $(- \infty, 0) \cup (0, \infty)$ $g(f(x)) = \frac{2x}{3}$ D: $(- \infty, 0) \cup (0, \infty)$

30. a. a. No b. Yes   b. a. Yes b. No   c. a. Yes b. Yes   d. a. No b. Yes

31. a. $f^{-1}(x) = \frac{1}{3}x + 2$ D; $(- \infty, \infty)$ b. $f^{-1}(x) = x^2 + 3$ D: $[0, \infty)$

 c. $f^{-1}(x) = \sqrt[3]{x}$ D: $(- \infty, \infty)$ d. $f^{-1}(x) = x^3 - 5$ D: $(- \infty, \infty)$

32. a. Vertex (1, 5) axis x = 1   b. Vertex (1, - 7) axis x = 1

33. a. Vertex $\left(- \frac{5}{6}, - \frac{73}{12}\right)$ axis x = $- \frac{5}{6}$ $f(x) = 3(x + \frac{5}{6})^2 - \frac{73}{12}$

 b. Vertex (4, 19) axis x = 4 $f(x) = - (x - 4)^2 + 19$

 c. vertex $\left(\frac{3}{5}, \frac{11}{5}\right)$ axis $x = \frac{3}{5}$ $f(x) = 5(x - \frac{3}{5})^2 + \frac{11}{5}$

34. a. $f(x) = (x - 2)^2 + 2$ b. $f(x) = - (x + 8)^2 + 74$ c. $f(x) = 2(x + \frac{3}{2})^2 + \frac{5}{2}$

35. a. {-4, 2}   b. $\left\{\frac{2}{3}, - \frac{1}{3}\right\}$ c. $\left\{0, - \frac{2}{3}, 1\right\}$

36. Work shown provides the answer.