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3, 9, 25, 33, 37, 51, 70-73, 89, 93, 94

3. $h(x) = -x^3$

domain: $\mathbb{R}$ end behavior: $\lim_{x \to -\infty} h(x) = \infty$ increasing: never

range: $\mathbb{R}$ $\lim_{x \to \infty} h(x) = -\infty$ decreasing: $(-\infty, \infty)$

intercepts: $(0,0)$ continuity: everywhere

9. $f(x) = 2x^{-4}$

domain: $x \neq 0$ end behavior: $\lim_{x \to \pm\infty} f(x) = 0$ increasing: $(-\infty, 0)$

range: $y > 0$ decreasing: $(0, \infty)$

intercepts: none continuity: infinite disc. @ $x = 0$

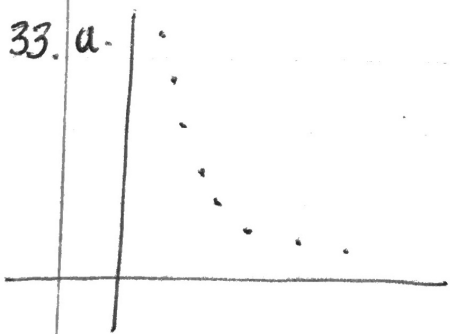
25. $f(x) = x^{-2/3}$

domain: $x \neq 0$ end behavior: $\lim_{x \to \pm\infty} f(x) = 0$ increasing: $(-\infty, 0)$

range: $y > 0$ decreasing: $(0, \infty)$

intercepts: none continuity: infinite disc. @ $x = 0$

33. a.



b. $y = 55.142x^{-0.797}$

c. $y = 55.142(65)^{-0.0797}$

$y = 39.54°F$

37. $h(x) = 4 + \sqrt{7x-12}$

domain: $x \geq \frac{12}{7}$ end behavior: $\lim_{x \to \infty} h(x) = \infty$ increasing: $(\frac{12}{7}, \infty)$

range: $y \geq 4$ decreasing: never

intercepts: none continuity: $x \geq \frac{12}{7}$

51. $x = 5 + \sqrt{x+1}$

$(x-5)^2 = (\sqrt{x+1})^2$

$x^2 - 10x + 25 = x + 1$

$x^2 - 11x + 24 = 0$

$(x-8)(x-3) = 0$

$x = 8$ ~~$x = 3$~~ ← extraneous solution

check: $8 = 5 + \sqrt{8+1}$

$8 = 5 + \sqrt{9}$

$8 = 5 + 3$

$8 = 8$ ✓

$3 = 5 + \sqrt{3+1}$

$3 = 5 + \sqrt{4}$

$3 = 5 + 2$

$3 = 7$ ✗

70. b 71. c 72. a 73. d

89. $(f+g)(x) = \frac{x}{x+1} + x^2 - 1$

$= \frac{x}{x+1} + \frac{(x+1)(x^2-1)}{x+1}$

$= \frac{x + x^3 + x^2 - x - 1}{x+1}$

$= \frac{x^3 + x^2 - 1}{x+1}$

domain: $x \neq -1$

$(f-g)(x) = \frac{x}{x+1} - (x^2-1)$

$= \frac{x}{x+1} - \frac{(x+1)(x^2-1)}{x+1}$

$= \frac{x - (x^3 + x^2 - x - 1)}{x+1}$

$= \frac{-x^3 - x^2 + 2x + 1}{x+1}$

domain: $x \neq -1$

$(f \cdot g)(x) = (\frac{x}{x+1})(x^2-1)$

$= \frac{x^3 - x}{x+1}$

$= \frac{x(x^2-1)}{x+1}$

$= \frac{x(x-1)(x+1)}{x+1}$

$= x^2 - x$

domain: $x \neq -1$

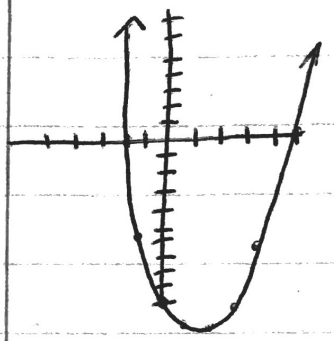
$(\frac{f}{g})(x) = \frac{\frac{x}{x+1}}{x^2-1}$

$= \frac{x}{x+1} \cdot \frac{1}{x^2-1}$

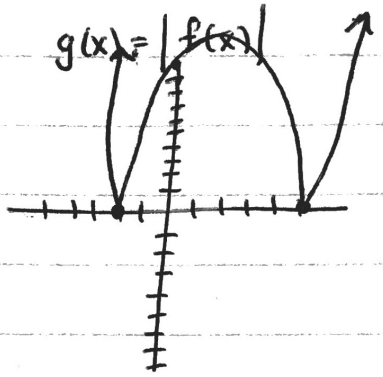
$= \frac{x}{x^3 + x^2 - x - 1}$

domain: $x \neq \pm 1$

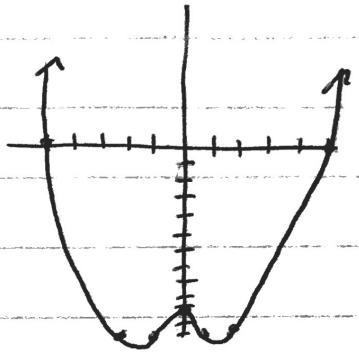
93. $f(x) = x^2 - 3x - 10$



$g(x) = |f(x)|$



$h(x) = f(|x|)$



94. increasing: $(-\infty, -3) \cup (0.5, \infty)$

decreasing: $(-3, 0.5)$

constant: $x = -3$, $x = 0.5$