Answers to Section 2.2 Supplementary Assignment

$\boxed{1}$ $f(0) = -3$, $f(3) = 42$, $f(-3) = (-3)^3 + 2(-3)^2 - 3 = -12$, $f(1/a) = \frac{1}{a^3} + \frac{2}{a^2} - 3$,
$f(-x) = (-x)^3 + 2(-x)^2 - 3 = -x^3 + 2x^2 - 3$.

$\boxed{2}$ $g(1) = 0$, $g(-1) = 0$, $g(3/2) = \frac{3}{2} - \frac{1}{3/2} = \frac{5}{6}$, $g(a+3) = (a+3) - \frac{1}{a+3} = a+3 - \frac{1}{a+3}$,
$g(1/a) = \frac{1}{a} - \frac{1}{1/a} = \frac{1}{a} - a$

$\boxed{3}$ $\mathcal{D}om\, f = [-4,3]$, $\mathcal{R}an\, f = [1,17]$

$\boxed{4}$ $\mathcal{D}om\, f = [-3,7]$, $\mathcal{R}an\, f = [-19,11]$

$\boxed{5}$ $\mathcal{D}om\, f = (-\infty, 7/4]$, $\mathcal{R}an\, f = [0,\infty)$

$\boxed{6}$ $\mathcal{D}om\, f = (-\infty,-5] \cup [5,\infty)$, $\mathcal{R}an\, f = [0,\infty)$

$\boxed{7}$ $\mathcal{D}om\, f = (-\infty,\infty)$, $\mathcal{R}an\, f = [-5,\infty)$

$\boxed{8}$ $\mathcal{D}om\, f = (-\infty,0) \cup (0,\infty) = \mathcal{R}an\, f$

$\boxed{9}$ $\mathcal{D}om\, f = (-\infty,\infty)$

$\boxed{10}$ $\mathcal{D}om\, g = [0,\infty)$, since $\sqrt{x}$ is real valued only if $x \geq 0$

$\boxed{11}$ $\mathcal{D}om\, h = [6,\infty)$, which comes from solving $x - 6 \geq 0$

$\boxed{12}$ $\mathcal{D}om\, j = (-\infty,-3] \cup [1/2,\infty)$, from solving $2x^2 + 5x - 3 \geq 0$

$\boxed{13}$ $\mathcal{D}om\, k = (-\infty,-5) \cup (-5,\infty)$, since $x \neq -5$

$\boxed{14}$ $\mathcal{D}om\, l = (-\infty,-9) \cup (-9,3) \cup (3,\infty)$, since $x^2 + 6x - 27 \neq 0$

$\boxed{15}$ $\mathcal{D}om\, p = (-\infty,-4) \cup (-4,4) \cup (4,\infty)$, since $x^2 - 16 \neq 0$ (don't reduce the fraction!)

$\boxed{16}$ $\mathcal{D}om\, q = (-\infty,5)$, which comes from solving $5 - x > 0$

$\boxed{17}$ $\mathcal{D}om\, r = (-\infty,-3) \cup (1,\infty)$ — note the term $3x$ poses no problems: solve $x^2 + 2x - 3 > 0$

$\boxed{18}$ $\mathcal{D}om\, s = (-\infty,-1] \cup (4,\infty)$, which comes from solving the inequality $\frac{x+1}{x-4} \geq 0$ (see Section 1.7)

$\boxed{19}$ $\mathcal{D}om\, u = (-2,0] \cup [3,\infty)$, which comes from solving $\frac{x(x-3)}{x+2} \geq 0$

$\boxed{20}$ $\mathcal{D}om\, v = [4,\infty)$, since we need $x \geq 4$ <u>&</u> $x \geq -8$

$\boxed{21}$ $\mathcal{D}om\, w = [4,12]$, since we need $x \geq 4$ <u>&</u> $x \leq 12$

$\boxed{22}$ $\mathcal{D}om\, z = ((-\infty,-3] \cup [3,\infty)) \cap [1/2,\infty) = [3,\infty)$

Note: $\sqrt[3]{x-2}$ imposes no restrictions on x

$\sqrt[4]{x^2-9}$ requires $x^2 - 9 \geq 0$, so we need $x \leq -3$ or $x \geq 3$; that is, $x \in (-\infty,-3] \cup [3,\infty)$

$\sqrt[6]{2x-1}$ requires $2x - 1 \geq 0$, so we need $x \geq 1/2$; that is, $x \in [1/2,\infty)$

So we must have $x \in (-\infty,-3] \cup [3,\infty)$ <u>and</u> $x \in [1/2,\infty)$.