1.

(a) Not a function, one member of the domain corresponds to more than one member of the range.

(b) Function, one member of the domain corresponds to exactly one member of the range.

2.

(a) Function, passes the vertical line test. The vertical line cuts the graph at exactly one point.

(b) Not a Function, fails the vertical line test. The vertical line cuts the graph at more than one point.

3.

(a) $f(4) = 2$

(b) Domain: [-5,5]

(c) -2,2

(d) Range: [-2,5]

4.

(a) $(-\infty, \infty)$.

(b) $(-\infty, 5) \cup (5, \infty)$.

(c) $(-\infty, \infty)$.

(d) $(-\infty, -7) \cup (-7, -5) \cup (-5, \infty)$.

5.

(a) $x^2 - 5x + 2$ (b) $x^2 + 5x - 2$ (c) $3,807$ (d) $\dfrac{-5x+2}{x^2}$

6. (a) $\dfrac{x^2}{9} - 25 \ or \ \dfrac{x^2 - 225}{9}$ (b) $\dfrac{x^2 - 25}{3}$ (c) 416

7. (a) $-12x^7y^{11}$ (b) $4x^5 - 4x^4 - 3x^3 + 14x^2 + 4x - 5$

(c) $4x^2 + 12xy + 9y^2$ (d) $x^4 - 16$

(e) $4x^2 - 9y^2$ (f) $-8x^8 + 12x^7 - 4x^6 - 20x^5$

(g) $8x^3 - 36x^2y + 54xy^2 - 27y^3$

8. (a) $(x - 5)^2$ (b) $(2x + 3)^2$ (c) $(3x - 2)(3x + 2)$ (d) $(2x - 1)(3x + 5)$

(e) $(x - 2)(x + 6)$ (f) $2x(x - 2)(x^2 + 2x + 4)$ (g) $(2x + 3)(x - 1)$

(h) $(3x - 2)(4x + 5)$ (i) $2xy(y - 8)(y - 3)$ (j) $(9x - 2)^2$

(k) $2y(3x^2 - 2)(9x^4 + 6x^2 + 4)$

9. (a) 1 (b) $\dfrac{3x^2 - 5x - 4}{12x^3}$ (c) $\dfrac{2y^2 - 9y - 6}{(y-2)^2(y+2)}$ (d) $\dfrac{1}{y+1}$

(e) $-\dfrac{1}{x}$ (f) $\dfrac{2x-1}{x-2}$ (g) $\dfrac{1}{2x+3y}$

10. (a) $\dfrac{x-y}{y}$ (b) $-\dfrac{1}{x(x+h)}$ (c) $\dfrac{(x+6)(x-5)}{(x-7)(x-4)}$ (d) $\dfrac{wz(w-z)}{w^2 - wz + z^2}$

11. (a) $x - 2 + \dfrac{4x+3}{2x^2+x-1}$, or $x - 2, R\ 4x + 3$

(b) $2x^2 - 3x + 4 + \dfrac{-26}{3x+4}$, or $2x^2 - 3x + 4, R - 26$

(c) $3x^2 + 2x - 5 + \dfrac{2x-5}{x^2-2}$, or $3x^2 + 2x - 5, R\ 2x - 5$

12. (a) $x = 1, 2$ (b) $x = -1$ (c) All real numbers except $x = -2, x = -1$ (d) $x = 3$