Domain of A Function

Case 1 Fraction – when the unknown variable is in the denominator of a fraction.

$f(x) = \frac{6}{x-3}$ Set denominator equal to zero and solve for x.

x - 3 =0
+3 +3
x=3

Domain: x ≠ 3 (all real numbers except 3)
Interval notation: $(-\infty, 3) \cup (3, \infty)$

Case 2 Square Root – when the unknown variable is under the square root sign.

f(x) = $\sqrt{4-x}$ The expression under the radical sign must be positive. So set this expression to be $\geq$ 0.

4-x $\geq$ 0
-4 -4

$\frac{-x}{-1} \geq \frac{-4}{-1}$

Domain: x $\leq$ 4
Interval notation: $(-\infty, 4]$

Case 3 Any other type of function.
Ex: $f(x) = 3x^2 - 5x + 2$

Domain: All real numbers.
Interval notation: $(-\infty, \infty)$