

1.1 Factor the following completely:

1. $2x^2 - 5x$
 $2x^2 - 5x = x(2x - 5)$

2. $x^2 + 2x + 1$
 $(x+1)(x+1) = (x+1)^2$
 $x^2 + 2x + 1 = (x+1)^2$

3. $3x^2 - 12$
 $3x^2 - 12 = 3(x^2 - 4)$
 $3(x^2 - 4) = 3(x-2)(x+2)$

1.2 Factor the following quadratics by factoring:

1. $x^2 + 5x + 6 = 0$
 $(x+2)(x+3) = 0$
 $x+2 = 0 \Rightarrow x = -2$
 $x+3 = 0 \Rightarrow x = -3$
 $x = -2, -3$

2. $x^2 - 7x + 12 = 0$
 $(x-3)(x-4) = 0$
 $x-3 = 0 \Rightarrow x = 3$
 $x-4 = 0 \Rightarrow x = 4$
 $x = 3, 4$

3. $x^2 - 10x + 24 = 0$
 $(x-4)(x-6) = 0$
 $x-4 = 0 \Rightarrow x = 4$
 $x-6 = 0 \Rightarrow x = 6$
 $x = 4, 6$

4. $x^2 + 11x + 28 = 0$
 $(x+4)(x+7) = 0$
 $x+4 = 0 \Rightarrow x = -4$
 $x+7 = 0 \Rightarrow x = -7$
 $x = -4, -7$

1.3 Identify the domain of each function and state the restrictions:

1. $f(x) = \frac{1}{x-3}$
 Domain: $x \neq 3$
 Restriction: $x \neq 3$

2. $g(x) = \frac{1}{x^2 - 4}$
 Domain: $x \neq 2, -2$
 Restriction: $x \neq 2, -2$

3. $h(x) = \frac{1}{x^2 + 1}$
 Domain: $x \in \mathbb{R}$
 Restriction: None

4. $k(x) = \frac{1}{x^2 - 9}$
 Domain: $x \neq 3, -3$
 Restriction: $x \neq 3, -3$

5. $l(x) = \frac{1}{x^2 + 4x + 4}$
 Domain: $x \neq -2$
 Restriction: $x \neq -2$

6. $m(x) = \frac{1}{x^2 - 1}$
 Domain: $x \neq 1, -1$
 Restriction: $x \neq 1, -1$