

1.1 Factor the following completely:

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

2. $x^2 + 2x - 15$
 $(x+5)(x-3)$
 $x^2 + 5x - 3x - 15$
 $x(x+5) - 3(x+5)$
 $(x-3)(x+5)$

3. $3x^2 - 24$
 $3(x^2 - 8)$
 $3(x-2)(x+2)$

1.2 Factor each polynomial equation by factoring:

1. $x^2 + 2x - 15 = 0$
 $(x+5)(x-3) = 0$
 $x+5 = 0$ or $x-3 = 0$
 $x = -5$ or $x = 3$

2. $x^2 - 16 = 0$
 $(x-4)(x+4) = 0$
 $x-4 = 0$ or $x+4 = 0$
 $x = 4$ or $x = -4$

3. $x^2 + 5x + 6 = 0$
 $(x+2)(x+3) = 0$
 $x+2 = 0$ or $x+3 = 0$
 $x = -2$ or $x = -3$

4. $x^2 - 9 = 0$
 $(x-3)(x+3) = 0$
 $x-3 = 0$ or $x+3 = 0$
 $x = 3$ or $x = -3$

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

1. $f(x) = \frac{1}{x-2}$ Vertical Asymptote: $x=2$
 2. $f(x) = \frac{1}{x^2-4}$ Vertical Asymptotes: $x=2, x=-2$
 3. $f(x) = \frac{1}{x^2+4}$ No vertical asymptotes

4. $f(x) = \frac{1}{x^2-1}$ Vertical Asymptotes: $x=1, x=-1$
 5. $f(x) = \frac{1}{x^2+1}$ No vertical asymptotes