1. Compute the following limit: $\lim_{x\to -4} \dfrac{x^2+7x+12}{x^2-16}$

2. Compute the following limit: $\lim_{x\to -3} \dfrac{x^2+4x+3}{x^2+3x}$

3. Compute the following limit: $\lim_{x\to -3} \dfrac{x^2+5x+6}{x^2+7x+12}$

4. Compute the following limit: $\lim_{x\to 2} \dfrac{x^2-6x+8}{x^2-7x+10}$

5. Compute the following limit: $\lim_{x\to 4} \dfrac{x^2-6x+8}{x^2-2x-8}$

6. Compute the following limit: $\lim_{x\to -2} \dfrac{x^2+x-2}{x^2-3x-10}$

7. Compute the following limit: $\lim_{x\to -5} \dfrac{x^2-25}{x^2+x-20}$

8. Compute the following limit: $\lim_{x\to -3} \dfrac{x^2-9}{x^2+6x+9}$

9. Compute the following limit: $\lim_{x\to 2} \dfrac{x^2+2x-8}{x^2-4x+4}$

10. Compute the following limit: $\lim_{x\to 1} \dfrac{x^2-2x+1}{x^2-1}$

Answers: 1. $\frac{1}{8}$ 2. $\frac{2}{3}$ 3. -1 4. $\frac{2}{3}$ 5. $\frac{1}{3}$ 6. $\frac{3}{7}$ 7. $\frac{10}{9}$ 8. DNE 9. DNE 10. 0

Solutions:

1. $\lim_{x\to -4} \dfrac{x^2+7x+12}{x^2-16}$ ▶ Factorize:

$= \lim_{x\to -4} \dfrac{(x+4)(x+3)}{(x+4)(x-4)}$ ▶ Simplify the common factor:

$= \lim_{x\to -4} \dfrac{x+3}{x-4}$ ▶ Use substitution to compute the limit:

$= \dfrac{-4+3}{-4-4}$ ▶ Simplify:

$= \dfrac{1}{8}$

2. $\lim_{x\to -3} \dfrac{x^2+4x+3}{x^2+3x}$ ▶ Factorize:

$= \lim_{x\to -3} \dfrac{(x+3)(x+1)}{(x+3)(x)}$ ▶ Simplify the common factor:

$= \lim_{x\to -3} \dfrac{x+1}{x}$ ▶ Use substitution to compute the limit:

$= \dfrac{-3+1}{-3}$ ▶ Simplify:

$= \dfrac{2}{3}$

3. $\lim_{x\to -3} \dfrac{x^2+5x+6}{x^2+7x+12}$ ▶ Factorize:

$= \lim_{x\to -3} \dfrac{(x+3)(x+2)}{(x+3)(x+4)}$ ▶ Simplify the common factor:

$= \lim_{x\to -3} \dfrac{x+2}{x+4}$ ▶ Use substitution to compute the limit:

$= \dfrac{-3+2}{-3+4}$ ▶ Simplify:

$= -1$

4. $\lim_{x\to 2} \dfrac{x^2-6x+8}{x^2-7x+10}$ ▶ Factorize:

$= \lim_{x\to 2} \dfrac{(x-2)(x-4)}{(x-2)(x-5)}$ ▶ Simplify the common factor:

$= \lim_{x\to 2} \dfrac{x-4}{x-5}$ ▶ Use substitution to compute the limit:

$= \dfrac{2-4}{2-5}$ ▶ Simplify:

$= \dfrac{2}{3}$

5. $\lim_{x\to 4} \dfrac{x^2-6x+8}{x^2-2x-8}$ ▶ Factorize:

$= \lim_{x\to 4} \dfrac{(x-4)(x-2)}{(x-4)(x+2)}$ ▶ Simplify the common factor:

$= \lim_{x\to 4} \dfrac{x-2}{x+2}$ ▶ Use substitution to compute the limit:

$= \dfrac{4-2}{4+2}$ ▶ Simplify:

$= \dfrac{1}{3}$

6. $\lim_{x\to -2} \dfrac{x^2+x-2}{x^2-3x-10}$ ▶ Factorize:

$= \lim_{x\to -2} \dfrac{(x+2)(x-1)}{(x+2)(x-5)}$ ▶ Simplify the common factor:

$= \lim_{x\to -2} \dfrac{x-1}{x-5}$ ▶ Use substitution to compute the limit:

$= \dfrac{-2-1}{-2-5}$ ▶ Simplify:

$= \dfrac{3}{7}$

7. $\lim_{x\to -5} \dfrac{x^2-25}{x^2+x-20}$ ▶ Factorize:

$= \lim_{x\to -5} \dfrac{(x+5)(x-5)}{(x+5)(x-4)}$ ▶ Simplify the common factor:

$= \lim_{x\to -5} \dfrac{x-5}{x-4}$ ▶ Use substitution to compute the limit:

$= \dfrac{-5-5}{-5-4}$ ▶ Simplify:

$= \dfrac{10}{9}$

8. $\lim_{x\to -3} \dfrac{x^2-9}{x^2+6x+9}$ ▶ Factorize:

$= \lim_{x\to -3} \dfrac{(x+3)(x-3)}{(x+3)(x+3)}$ ▶ Simplify the common factor:

$= \lim_{x\to -3} \dfrac{x-3}{x+3}$ ▶ Use substitution to compute the limit:

$= \dfrac{-3-3}{-3+3}$ ▶ Simplify:

$= DNE$

9. $\lim_{x\to 2} \dfrac{x^2+2x-8}{x^2-4x+4}$ ▶ Factorize:

$= \lim_{x\to 2} \dfrac{(x-2)(x+4)}{(x-2)(x-2)}$ ▶ Simplify the common factor:

$= \lim_{x\to 2} \dfrac{x+4}{x-2}$ ▶ Use substitution to compute the limit:

$= \dfrac{2+4}{2-2}$ ▶ Simplify:

$= DNE$

10. $\lim\limits_{x\to 1} \dfrac{x^2-2x+1}{x^2-1}$ ▶ Factorize:

$= \lim\limits_{x\to 1} \dfrac{(x-1)(x-1)}{(x-1)(x+1)}$ ▶ Simplify the common factor:

$= \lim\limits_{x\to 1} \dfrac{x-1}{x+1}$ ▶ Use substitution to compute the limit:

$= \dfrac{1-1}{1+1}$ ▶ Simplify:

$= 0$

