



LIMITS COURSE

LESSON 6 Factorization

HOMEWORK



Part 1: TEST

Select the correct answer (only one is true).

Question 1

$$\lim_{x \rightarrow 4} \frac{x^2 - 4}{x - 2}$$

In this example, do we need to use the factoring method?

- a) Yes
- b) No

Question 2

Which formula does **not** lead to factoring a polynomial?

- a) $a^2 - b^2 = (a - b)(a + b)$
- b) $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
- c) $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
- d) $a^2 + b^2 = (a + b)(a - b)$

Question 3

$$\lim_{x \rightarrow \frac{1}{2}} \frac{x^2 - \frac{1}{4}}{x - \frac{1}{2}}$$

How should we factor the numerator in this limit?

- a) It is impossible.
- b) It is unnecessary.
- c) $x^2 - \frac{1}{4} = (x - \frac{1}{2})(x + \frac{1}{2})$
- d) $x^2 - \frac{1}{4} = (x - \frac{1}{16})(x + \frac{1}{16})$

Question 4

$$\lim_{x \rightarrow 5} \frac{x-5}{(x-5)(x+5)}$$

What is the value of this limit?

- a) 10
- b) $\frac{1}{10}$
- c) 0
- d) $\frac{1}{x+5}$

Question 5

The correct identity is:

- a) $3-2x = -(2-3x)$
- b) $3-2x = -(2x-3)$
- c) $3-2x = -(3-2x)$
- d) $3-2x = -(-3-2x)$

Question 6

$$x^2 - x$$

How should this expression be factored?

- a) Use the formula: $a^2 - b^2 = (a-b)(a+b)$
- b) Factor out the common factor
- c) It is impossible
- d) Factor out the highest power



Question 7

$$x^2 + 2x + 5$$

$$\Delta = -16$$

How can this expression be factored?

- a) $x^2 + 2x + 5 = (x + 3)(x - 1)$
- b) $x^2 + 2x + 5 = x(x + 2) + 5$
- c) It is impossible.
- d) Factor out a common factor.

Question 8

$$x^3 - 64$$

How can this expression be factored?

- a) $x^3 - 64 = (x - 8)(x^2 + 8x + 8^2)$
- b) $x^3 - 64 = (x - 4)(x^2 + 8x + 4^2)$
- c) $x^3 - 64 = (x - 4)(x^2 + 4x + 4^2)$
- d) $x^3 - 64 = (x + 4)(x^2 - 4x + 4^2)$

Question 9

$$\lim_{x \rightarrow \infty} \frac{x^2 - 4x + 3}{x^2 + 3x - 4}$$

How should we evaluate this limit?

- a) Factor both numerator and denominator.
- b) Substitute the value that x tends to (∞) and read the result directly.
- c) Factor out common factors in numerator and denominator.
- d) Factor out the highest powers in numerator and denominator.



Question 10

$$x^3 + x^2 + x + 1$$

Is it possible to factor this polynomial?

- a) Yes
- b) No

Part 2: EXERCISES

Ex. 1

Solve the following limits:

1) $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$

2) $\lim_{x \rightarrow -2} \frac{3x^2 + 5x - 2}{x^2 - 4}$

3) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 - 3x}$

4) $\lim_{x \rightarrow 0} \frac{7x^2 - 2x}{3x}$

5) $\lim_{x \rightarrow 0} \frac{3x^2 + 2x}{6x^2 - 2x}$

6) $\lim_{x \rightarrow 3} \frac{x^3 - 27}{x - 3}$

7) $\lim_{x \rightarrow 3} \frac{x^2 - 4x + 3}{2x - 6}$

8) $\lim_{x \rightarrow -4} \frac{x^2 + 6x + 8}{x^2 - 2x - 24}$

9) $\lim_{x \rightarrow 1} \frac{x^3 - x}{1 - x}$

10) $\lim_{x \rightarrow 1\frac{1}{2}} \frac{4x^2 - 9}{3 - 2x}$

11) $\lim_{x \rightarrow 7} \frac{x^2 - 14x + 49}{49 - x^2}$

12) $\lim_{x \rightarrow -5} \frac{x^2 + 2x - 15}{2x^2 - 50}$

13) $\lim_{x \rightarrow -2} \frac{x^3 + x^2 - 4x - 4}{x^2 + 3x + 2}$

END