Topic: Solving with factoring

Question: Use factoring to find the limit.

$$\lim_{t \to -1} \frac{(t+1)(t^2 - t + 1)}{t+1}$$

Answer choices:

A 0

B 3

C -1

D ∞

Solution: B

The numerator and denominator share a common factor of $t+1$, which can be canceled from the function.

$$\lim_{t\to -1} \frac{(t+1)(t^2-t+1)}{t+1}$$

$$\lim_{t\to -1} (t^2-t+1)$$

Now use substitution to evaluate the limit.

$$(-1)^2-(-1)+1$$

$$1+1+1$$

$$3$$

Topic: Solving with factoring

Question: Use factoring to find the limit.

$$\lim_{x \to 2} \frac{x^2 - 2x}{x - 2}$$

Answer choices:

A 4

B -4

C 2

D -2

Solution: C

Factor the numerator and denominator as completely as possible.

$$\lim_{x \to 2} \frac{x^2 - 2x}{x - 2}$$

$$\lim_{x \to 2} \frac{x(x - 2)}{x - 2}$$

Cancel the common factor of $x - 2$.

$$\lim_{x \to 2} x$$

Then use direct substitution to evaluate the limit.

$$2$$

Topic: Solving with factoring

Question: Use factoring to find the limit.

$$\lim_{x \to 3} \frac{x^2 - 7x + 12}{x^2 - 9}$$

Answer choices:

A $\frac{1}{3}$

B $-\frac{1}{3}$

C $\frac{1}{6}$

D $-\frac{1}{6}$

Solution: D

Factor the numerator and denominator as completely as possible.

$$\lim_{x\to 3} \frac{x^2-7x+12}{x^2-9}$$

$$\lim_{x\to 3} \frac{(x-4)(x-3)}{(x+3)(x-3)}$$

Cancel the common factor of $x-3$.

$$\lim_{x\to 3} \frac{x-4}{x+3}$$

Then use direct substitution to evaluate the limit.

$$\frac{3-4}{3+3}$$

$$-\frac{1}{6}$$