

1. State the definition of $\lim_{x \rightarrow a} f(x) = L$ using either complete sentences or the formal ϵ - δ version. (2pts)

Look for the definition in the book if you don't yet know it.

- Evaluate the following limits if they exist. Choose one to justify each step involved. (8pts)

$$2. \lim_{x \rightarrow 3} \frac{x^2 - 3x}{x^2 + x - 12} = \lim_{x \rightarrow 3} \frac{x(x-3)}{(x-3)(x+4)} = \lim_{x \rightarrow 3} \frac{x}{x+4} = \frac{3}{7}$$

\uparrow since $x \neq 3$ \uparrow direct substitution of a rational function

$$3. \lim_{h \rightarrow 0} \frac{2(4+h)^2 - 32}{h} = \lim_{h \rightarrow 0} \frac{2(16 + 8h + h^2) - 32}{h}$$

$$= \lim_{h \rightarrow 0} \frac{32 + 16h + 2h^2 - 32}{h}$$

$$= \lim_{h \rightarrow 0} \frac{h(16 + 2h)}{h} = \lim_{h \rightarrow 0} 16 + 2h = 16$$

since $h \neq 0$ direct substitution of a polynomial

$$4. \lim_{t \rightarrow 5} \left(\frac{t^2 - 5t - 7}{t-5} + \frac{2t-3}{t-5} \right) = \lim_{t \rightarrow 5} \frac{t^2 - 3t - 10}{t-5} = \lim_{t \rightarrow 5} \frac{(t-5)(t+2)}{t-5}$$

$$= \lim_{t \rightarrow 5} t+2 = 7$$

\uparrow direct substitution of a polynomial