Chain Rule:

④ $G(x) = \sqrt{x^4 - x + 1} = (x^4 - x + 1)^{1/2}$

$G'(x) = \frac{1}{2}(x^4 - x + 1)^{-1/2}(4x^3 - 1)$

$G'(x) = \frac{1}{2(x^4 - x + 1)^{1/2}} \cdot (4x^3 - 1)$

$G'(x) = \frac{4x^3 - 1}{2\sqrt{x^4 - x + 1}}$

⑧ $y = \frac{4}{\sqrt{9 - x^2}} = \frac{4}{(9 - x^2)^{1/2}} = 4(9 - x^2)^{-1/2}$

$y' = -2(9 - x^2)^{-3/2}(-2x)$

$y' = 4x(9 - x^2)^{-3/2}$

$y' = \frac{4x}{(9 - x^2)^{3/2}} = \frac{4x}{\sqrt{(9 - x^2)^3}}$

⑩ $y = \sqrt{x + \sqrt{x}} = (x + \sqrt{x})^{1/2} = (x + x^{1/2})^{1/2}$

$y' = \frac{1}{2}(x + x^{1/2})^{-1/2}\left(1 + \frac{1}{2}x^{-1/2}\right)$

Add by finding common denom

$y' = \left[\frac{1}{2(x + \sqrt{x})^{1/2}}\right]\left[\frac{1}{1} + \frac{1}{2\sqrt{x}}\right]$

$y' = \left[\frac{1}{2\sqrt{x + \sqrt{x}}}\right]\left[\frac{2\sqrt{x} + 1}{2\sqrt{x}}\right]$

$y' = \frac{2\sqrt{x} + 1}{4\sqrt{x}\sqrt{x + \sqrt{x}}}$ or $\frac{2\sqrt{x} + 1}{4\sqrt{x^2 + x^{3/2}}}$

Limits

① a) $$\lim_{x\to 0} \frac{\cancel{(x+2)}\,\frac{2}{\cancel{x+2}} - \frac{1}{1}\,(x+2)}{x\,(x+2)}$$

$$\lim_{x\to 0} \frac{2-(x+2)}{x(x+2)}$$

$$\lim_{x\to 0} \frac{\cancel{2}-x-\cancel{2}}{x(x+2)}$$

$$\lim_{x\to 0} \frac{-\cancel{x}}{\cancel{x}(x+2)} = \boxed{-\frac{1}{2}}$$

b) $$\lim_{x\to \infty} \frac{(2-3x^2)^2}{6x^4-7x^2-5}$$

$$\lim_{x\to \infty} \frac{4-12x^2\boxed{+9}x^4}{\boxed{6}x^4-7x^2-5} = \frac{9}{6} = \boxed{\frac{3}{2}}$$

Review:

④ $g(x) = (x^2 - 3x + 4)(2x^2 + 4x)$

$g'(x) = (x^2 - 3x + 4)(4x + 4) + (2x - 3)(2x^2 + 4x)$

$g'(x) = 4x^3 + 4x^2 - 12x^2 - 12x + 16x + 16 + 4x^3 + 8x^2 - 6x^2 - 12x$

$g'(x) = 8x^3 - 6x^2 - 8x + 16$