

(1) [3] Expand and simplify: $y^4(6-y)(5+y)$

$$\begin{aligned}
 y^4(6-y)(5+y) &= y^4(30 - 5y + 6y - y^2) \\
 &= y^4(30 + y - y^2) \\
 &= \boxed{-y^6 + y^5 + 30y^4}
 \end{aligned}$$

(2) [3] Determine an equation of the line through (2, 1) and (1, 6).

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 1}{1 - 2} = \frac{5}{-1} = -5$$

$$\therefore \boxed{y - 6 = -5(x - 1)}$$

$$\parallel y - 1 = -5(x - 2)$$

$$\parallel y = -5x + 11$$

(3) [3] Rationalize the numerator and simplify: $\frac{x\sqrt{x} - 8}{x - 4}$

$$\begin{aligned}
 \frac{x\sqrt{x} - 8}{x - 4} \cdot \frac{x\sqrt{x} + 8}{x\sqrt{x} + 8} &= \frac{(x^2)(x) - 64}{(x - 4)(x\sqrt{x} + 8)} \\
 &= \frac{x^3 - 64}{(x - 4)(x\sqrt{x} + 8)} \\
 &= \frac{\cancel{(x - 4)}(x^2 + 4x + 16)}{\cancel{(x - 4)}(x\sqrt{x} + 8)} = \boxed{\frac{x^2 + 4x + 16}{x\sqrt{x} + 8}}
 \end{aligned}$$

(4) [3] Simplify (state your final answer as a single simplified fraction): $u+1 + \frac{u}{u+1}$

$$\begin{aligned}u+1 + \frac{u}{u+1} &= \frac{(u+1)(u+1) + u}{(u+1)} \\&= \frac{u^2 + 2u + 1 + u}{u+1} \\&= \boxed{\frac{u^2 + 3u + 1}{u+1}}\end{aligned}$$

(5) [3] Factor: $6x^2 - 5x - 6$

$$\begin{aligned}6x^2 - 5x - 6 &= 6x^2 - 9x + 4x - 6 \\&= 3x(2x-3) + 2(2x-3) \\&= \boxed{(3x+2)(2x-3)}\end{aligned}$$