

(1)[5 points] Find k if $(2, 0)$ is an x -intercept of the graph of $f(x) = kx^5 - x^2 + 5x + 8$.

$$f(2) = 0, \quad \therefore 0 = k \cdot 2^5 - 2^2 + 5(2) + 8$$

$$k = \frac{4 - 10 - 8}{32}$$

$$k = -\frac{14}{32} = \boxed{-\frac{7}{8}}$$

(2)[5 points] Use long division to find the quotient $q(x)$ and remainder $r(x)$ if $f(x) = 27x^3 + x - 2$ is divided by $d(x) = 3x^2 - x$.

$$\begin{array}{r} 3x^2 - x + 0 \overline{) 27x^3 + 0x^2 + x - 2} \\ \underline{-(27x^3 - 9x^2 + 0x)} \\ 9x^2 + x - 2 \\ \underline{-(9x^2 - 3x + 0)} \\ 4x - 2 \end{array}$$

$$\therefore q(x) = 9x + 3$$

$$r(x) = 4x - 2$$

(3)[5 points] Find the remainder if $f(x) = x^4 - x^3 + 2x^2 + 3x - 5$ is divided by $x - 3$.

$$\begin{array}{r|rrrrr} 3 & 1 & -1 & 2 & 3 & -5 \\ & & 3 & 6 & 24 & 81 \\ \hline & 1 & 2 & 8 & 27 & \boxed{76} \end{array}$$

∴ $\boxed{r = 76}$