

1-  $x^r - ax + b$

$$\frac{1}{+ \phi - \phi +}$$

$$\begin{aligned} & \xrightarrow{a=1} 1 - a + b = 0 \rightarrow 1 - 1 + b = 0 \rightarrow b = 1 \\ & \xrightarrow{a=1} 1 - 1 + b = 0 \rightarrow b = 1 \\ & \xrightarrow{a=1} 1 - 1 + b = 0 \rightarrow b = 1 \end{aligned}$$

$$\Rightarrow a + b = 1 + 1 = \boxed{2}$$

2-  $y = ((k-r)x + m-1)(x-rn)^r$

$$\frac{m+k=r}{n}$$

$$\frac{-1}{+ \phi + \phi -}$$

$$\Rightarrow ((k-r)x + m-1)(x-rn)^r$$

$$\xrightarrow{a=1} (k-r)x + m-1 = 0$$

$$\xrightarrow{a=1} -1 - rn = 0 \Rightarrow -1 = rn \Rightarrow \frac{-1}{r} = n$$

3-  $k=1 \rightarrow (-x+1)(x+1)^r$

$$\xrightarrow{a=1} m + r(k-r) = 9 \rightarrow m + r(1-1) = 9 \rightarrow m = 9$$

$$\xrightarrow{a=1} 1 - 1 + m = 0 \Rightarrow m = 1$$

$$\Rightarrow \frac{9}{1} + 1 = 10 \Rightarrow -10 + 1 = \boxed{-9}$$

4-  $y = -\frac{1}{r}x^r + rx + y$

$$\xrightarrow{a=1} x^r - rx - 1 = 0$$

$$\xrightarrow{a=1} (x-1)(x+1) < 0$$

$$\Rightarrow (-1, 1) \Rightarrow b-a \Rightarrow 1-1 = \boxed{0}$$

5-  $P(x) = x^3 - px^2 - x + p$

$$-x^2(-x+p) + (-x+p) = (-x+p)(1-x^2) = (-x+p)(1-x)(1+x)$$

$$\frac{-1}{+ \phi - \phi +}$$

$$\Rightarrow (1, 3) \Rightarrow \frac{1+3}{2} = 2$$

6-  $(a-1)x^r + (a-1)x + 1$

$$\frac{m}{m-r} > 0$$

$$\frac{m}{m-r} > 0 \Rightarrow m = (r, +\infty)$$

7-  $\frac{(x^r - x - r)(x-1)^r}{(x^r + x + 1)(r-x)^r} < 0$

$$\frac{(x-r)(x+r)(x-1)^r}{(r-x)^r} < 0$$

$$\frac{-r}{+ \phi - \phi + \phi + \phi -}$$

$$m \in (-r, r) \cup (r, +\infty)$$

8-  $P(x) = \frac{rx^r - rx}{x^r + r} - \frac{rx^r - rx}{x^r + r} - r < 0$

$$\Rightarrow \frac{rx^r - rx - r}{x^r + r} < 0$$

$$\frac{-r}{+ \phi - \phi +}$$

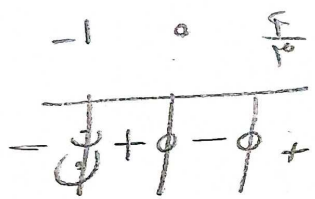
$$\Rightarrow b-a = r-r = \boxed{0}$$

$$-1 < \frac{x^2 - x}{x+1} < 0$$

$$-1 < \frac{x(x-1)}{x+1} < 0$$

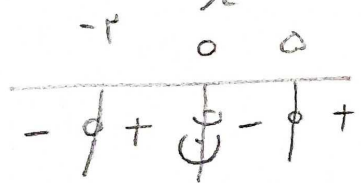
$$\frac{x}{x+1}$$

$$0 < \frac{x^2 - x}{x+1} < 1$$



$$\frac{x^2 - 1}{x} < 1$$

$$\rightarrow \frac{x^2 - 1 - x}{x} < 0 \Rightarrow \frac{x^2 - x - 1}{x} < 0$$



$$\frac{x^2 - x - 1}{x} < 0$$

$$\frac{(x-1)(x+1)}{x} < 0$$

$\Rightarrow$   $(-\infty, -1) \cup (0, \frac{1}{x}) \cap$   
 $\Rightarrow$   $(-1, 0) \cup (0, 1) \cap$   
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$$x = (-\infty, -1] \cup (0, 1]$$