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(1) Yes, a prime number.

$$(2) (x-1)^5$$

$$= (x-1)^{3+2}$$

$$= (x-1)^3 \times (x-1)^2$$

$$= (x^3 - 3x^2 + 3x - 1)(x^2 - 2x + 1)$$

$$= x^5 - 2x^4 + x^3 - 3x^4 + 6x^3 - 3x^2 + 3x^3 - 6x^2 + 3x - x^2 + 2x - 1$$

$$= x^5 - 5x^4 + 10x^3 - 10x^2 + 5x - 1 //$$

$$(3) \frac{3x^2 + x}{x^3 \sqrt{x^6 + 1}} = 0$$

$$\frac{x(3x+1)}{x^3 \sqrt{x^6 + 1}} = 0$$

$$\frac{3x+1}{x^2 \sqrt{x^6 + 1}} = 0$$

$$3x+1 = 0$$

$$3x = -1$$

$$x = -\frac{1}{3}$$

$$\textcircled{4} \frac{3x^2 + x}{x^3 \sqrt{x^6 + 1}} > 0$$

$$\frac{3x^2 \cdot x(3x+1)}{x^3 \sqrt{x^6 + 1}} > 0$$

$$\frac{3x+1}{x^2 \sqrt{x^6 + 1}}$$

$$3x+1 > 0$$

$$x > -\frac{1}{3}, x \neq 0,$$

$$x \in \left[-\frac{1}{3}, 0\right) \cup \left(0, +\infty\right),$$

$$\textcircled{5} \frac{x^3 - 7x^2 + 7x + 15}{x^2 - 1} = 0$$

$$\cancel{x^2(x-1)} \frac{x^3 + x^2 - 8x^2 - 8x + 15x + 15}{(x-1)^2} = 0 \therefore x \neq 1, x = -1$$

$$\frac{x^2 \cancel{(x+1)} - 8x(x+1) + 15(x+1)}{(x-1)^2} = 0$$

$$\frac{(x+1)(x^2 - 8x + 15)}{(x-1)(x+1)} = 0$$

$$x^2 - 8x + 15 = 0 \rightarrow x^2 - 3x - 5x + 15 = 0 \rightarrow (x-3)(x-5) = 0$$

$$\therefore x = 3$$

$$x = 5 \gg$$

$$\textcircled{6} \frac{x^2 - 7x^2 + 7x + 15}{x^2 - 1} > 0$$

$$\frac{x^2 + x^8 - 8x^2 + 8x + 15x + 15}{(x-1)(x+1)} > 0$$

$$\frac{x^2(x+1) - 8x(x+1) + 15(x+1)}{(x-1)(x+1)} > 0$$

$$\frac{(x+1)(x^2 - 8x + 15)}{(x-1)(x+1)} > 0$$

$$\frac{x^2 - 8x + 15}{(x-1)} > 0$$

$$\begin{array}{r} 15x^2 \\ / 1 \\ -3 \quad -8 \end{array}$$

$$\frac{x^2 - 3x - 5x + 15}{(x-1)} > 0$$

$$\frac{x(x-3) - 5(x-3)}{(x-1)} > 0$$

$$\frac{(x-5)(x-3)}{(x-1)} > 0$$

$$\begin{cases} (x-3)(x-5) > 0 \\ x-1 > 0 \end{cases}$$

$$\begin{cases} (x-3)(x-5) < 0 \\ x-1 < 0 \end{cases}$$

$$x \in (1, 3) \cup (5, +\infty)$$

$$\textcircled{7} \frac{a^6 - b^6}{a^3 + b^3}$$

$$\frac{(a^3 - b^3)(\cancel{a^3 + b^3})}{a^3 + \cancel{b^3}}$$

$$a^3 - b^3 //$$

$$\textcircled{8} : \text{gcd}$$

$$2145 = 714$$

$$2145 = 714 \cdot 3 + 117$$

$$714 = 12 \cdot 59.5$$

$$\text{gcd} = 12$$

$$\textcircled{8} \text{gcd} = 3 //$$

$$2145 = 714$$

$$2145 = 714 \cdot 3 + 0$$

$$2 \mid 714, 2145$$

$$3 \mid 357, 2145$$

$$5 \mid 119, 715$$

$$7 \mid 119, 143$$

$$11 \mid 17, 143$$

$$13 \mid 17, 13$$

$$17 \mid 17, 1$$

$$1 \quad 1$$

$$\text{LCM} = 2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 17$$

$$= 510510 //$$

9

10

11 $-3x^2 - 3x + 1 \geq 0$

~~$\frac{-3 \pm \sqrt{33}}{4}$~~

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4a}}{2a}$$

$$\frac{-(-3) \pm \sqrt{(-3)^2 - 4(-3)(1)}}{-6} = 0$$

$$\frac{+3 \pm \sqrt{9 + 12}}{-6}$$

$$\frac{3 \pm \sqrt{9 + 12}}{-6}$$

$$\frac{3 \pm \sqrt{21}}{-6}$$

$$\frac{3 \pm 3\sqrt{12}}{-6}$$

$$\frac{-1(\sqrt{21} - 3)}{-1(6)}$$

$$\frac{3 \pm \sqrt{21}}{-6} //$$

$$\frac{\sqrt{21} - 3}{6} //$$

$$\textcircled{12} \quad y = x^2 + x + 4$$

$$a=1, b=1$$

$$x = -\frac{1}{2 \times 1}$$

$$\therefore y = 4, (0, 4)$$

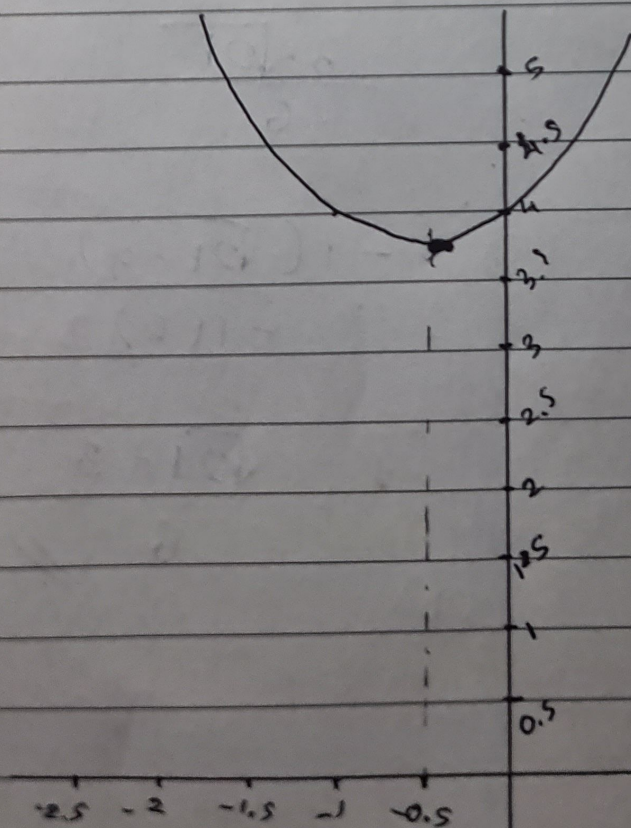
$$(-1, 4)$$

$$x = -\frac{1}{2}$$

$$\therefore y = x^2 + x + 4, x = -\frac{1}{2}$$

$$y = \frac{15}{4}$$

$$\left(-\frac{1}{2}, \frac{15}{4}\right) \approx (-0.5, 3.75)$$



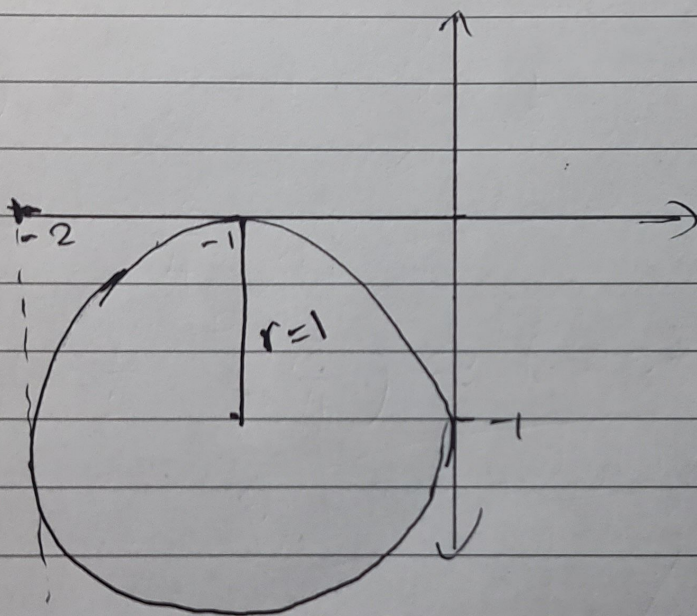
$$(13) x^2 + y^2 + 2x + 2y + 1 = 0$$

$$x^2 + y^2 + 2x + 2y = -1$$

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

$$(x+1)^2 + (y+1)^2 = 1$$

$$x = -1, y = -1, r = 1$$



$$(14) f(x) = x^2 - 2x$$

$$f(2) = 2^2 - 2 \cdot 2$$

$$= 4 - 4$$

$$= 0$$

$$f^{-1}(-1) = x^2 - 2x$$

$$= 1, 1$$

$$(15) \frac{\sqrt{7} + \sqrt{2}}{\sqrt{7} - \sqrt{2}}$$

$$= \frac{\sqrt{7} + \sqrt{2}}{\sqrt{7} - \sqrt{2}} \times \frac{\sqrt{7} + \sqrt{2}}{\sqrt{7} + \sqrt{2}}$$

$$= \frac{(\sqrt{7} + \sqrt{2})^2}{7 - 2}$$

$$= \frac{7 + 2\sqrt{14} + 2}{5}$$

$$= \frac{9 + 2\sqrt{14}}{5} //$$