

$$63. \frac{\left(\frac{1 - (x+h)}{2 + (x+h)} - \frac{1-x}{2+x} \right) (2+x)(2+x+h)}{(h)(2+x)(2+x+h)}$$

$$\frac{(1 - (x+h))(2+x) - (1-x)(2+x+h)}{h(2+x)(2+x+h)} \quad x \neq -2, -2-h$$

$$\frac{\cancel{2} - \cancel{2x} - \cancel{2h} + \cancel{x} - \cancel{x^2} - \cancel{xh} - \cancel{2} - \cancel{x} - \cancel{h} + \cancel{2x} + \cancel{x^2} + \cancel{xh}}{h(2+x)(2+x+h)}$$

$$= \frac{-3}{(2+x)(2+x+h)}$$

$$69. \frac{2(1+x)^{1/2} - x(1+x)^{-1/2}}{x+1}$$

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

$$= \frac{2+x}{(1+x)\sqrt{1+x}}$$

$$53. \frac{\left(1 + \frac{1}{c-1}\right)(c-1)}{\left(1 - \frac{1}{c-1}\right)(c-1)} \quad c \neq 1$$

$$= \frac{c-1+1}{c-1-1} = \frac{c}{c-2}$$

$$59. \frac{1}{1+a^n} + \frac{1}{1+a^{-n}}$$

$$\frac{1}{1+a^n} + \frac{(1)a^n}{\left(1 + \frac{1}{a^n}\right)a^n} \quad \begin{array}{l} a \neq 0 \\ a^n \neq -1 \end{array}$$

$$= \frac{1}{1+a^n} + \frac{a^n}{1+a^n} = \frac{a^n+1}{1+a^n} = 1$$

$$71. \frac{3(1+x)^{1/3} - x(1+x)^{-2/3}}{(1+x)^{2/3}} \rightarrow \frac{x}{(1+x)^{2/3}}$$

$$\textcircled{1} \frac{(1+x)^{-2/3} (3(1+x) - x)}{(1+x)^{2/3}} = \frac{3+2x}{(1+x)\sqrt[3]{1+x}}$$

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

$$61. \frac{\left(\frac{1}{a+h} - \frac{1}{a}\right)a(a+h)}{h(a)(a+h)}$$

$$a \neq 0, -h$$

$$h \neq 0$$

$$= \frac{\cancel{a} - \cancel{a}h}{h \cdot a \cdot (a+h)} = \frac{-1}{a(a+h)}$$

$$51. \frac{\left(\frac{x}{y} - \frac{y}{x}\right)x^2y^2}{\left(\frac{1}{x^2} - \frac{1}{y^2}\right)x^2y^2}$$

$$x \neq 0 \quad x \neq \pm y \\ y \neq 0$$

$$\frac{x^3y - xy^3}{y^2 - x^2} = \frac{xy(x^2 - y^2)}{\cancel{y^2 - x^2}} = -xy$$

$$65. \sqrt{1 + \left(\frac{x}{\sqrt{1-x^2}}\right)^2}$$

$$1-x^2 > 0$$

$$\begin{aligned} \sqrt{1 + \frac{x^2}{1-x^2}} &= \sqrt{\frac{1-x^2}{1-x^2} + \frac{x^2}{1-x^2}} \\ &= \sqrt{\frac{1}{1-x^2}} = \frac{1}{\sqrt{1-x^2}} \end{aligned}$$

Evaluate

$$2 + \frac{1}{2 + \frac{1}{2 + \frac{1}{2 + \dots}}} = x$$

$$x = 1 + \sqrt{2}$$

$$x = 1 \pm \sqrt{2}$$

$$2 + \frac{1}{x} = x \quad 2x + 1 = x^2 \quad (x-1)^2 = 2$$

$$1 = x^2 - 2x$$

2. Under which of the following condition

is $\frac{a-b}{ab}$ positive?

- a. $0 < a < b$
- b. $a < b < 0$
- c. $b < a < 0$
- d. $b < 0 < a$
- e. None of the above

$$\frac{a-b}{ab} = \frac{1}{b} - \frac{1}{a} > 0$$

$$\frac{1}{b} > \frac{1}{a}$$