

Q1 Solns

1. $a < 0, b > 0$ $\frac{b-a}{ab} = \frac{\text{pos} - \text{neg}}{\text{pos} \cdot \text{neg}} = \frac{\text{pos} + \text{pos}}{\text{neg}} = \frac{\text{pos}}{\text{neg}} = \boxed{\text{neg}}$

2. a. $|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$

b. if $x < 3$, then $x - 3 < 0$
 so $|x - 3| = -(x - 3) = \boxed{3 - x}$

3.
$$\frac{\sqrt[6]{3x^5y} \sqrt[6]{8x^5y^{-5}}}{\sqrt[6]{6x^2y^{-2}}}$$

$$= \sqrt[6]{\frac{3x^5y \cdot 8x^5y^{-5}}{6x^2y^{-2}}}$$

$$= \sqrt[6]{\frac{3 \cdot 8 x^{10} y^{-4}}{6 x^2 y^{-2}}}$$

$$= \sqrt[6]{4x^8y^{-2}}$$

$$= \sqrt[6]{\frac{4x^8}{y^2}}$$

$$= \frac{\sqrt[6]{4x^8}}{\sqrt[6]{y^2}}$$

$$= \frac{(2^2x^8)^{1/6}}{y^{2/6}}$$

$$= \frac{2^{2/6} x^{8/6}}{y^{1/3}}$$

$$= \frac{2^{1/3} x^{4/3}}{y^{1/3}}$$

$$= \frac{\sqrt[3]{2x^4}}{\sqrt[3]{y}}$$

$$= \frac{\sqrt[3]{2x^4} \sqrt[3]{y^2}}{\sqrt[3]{y} \cdot \sqrt[3]{y^2}}$$

$$= \boxed{\frac{\sqrt[3]{2x^4y^2}}{y}}$$

4. $27^{1/3} + 27^{2/3} - 4^{-1/2}$

$$= \sqrt[3]{27} + \sqrt[3]{27^2} - \frac{1}{\sqrt{4}}$$

$$= 3 + 9 - \frac{1}{2}$$

$$= \frac{24}{2} - \frac{1}{2} = \boxed{\frac{23}{2}}$$

$$5. \frac{6x^2yz^3 - xy^2z}{xyz}$$

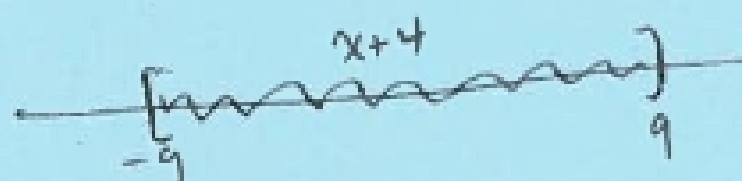
$$= \frac{xyz(6xz^2 - y)}{xyz}$$

$$= \boxed{6xz^2 - y}$$

$$6. \quad \begin{array}{ccc} -2 - |x+4| & \geq & -11 \\ +2 & & +2 \end{array}$$

$$-|x+4| \geq -9$$

$$|x+4| \leq 9$$



$$-9 \leq x+4 \leq 9$$

$$\begin{array}{ccc} -4 & -4 & -4 \end{array}$$

$$-13 \leq x \leq 5$$

or

$$\boxed{[-13, 5]}$$