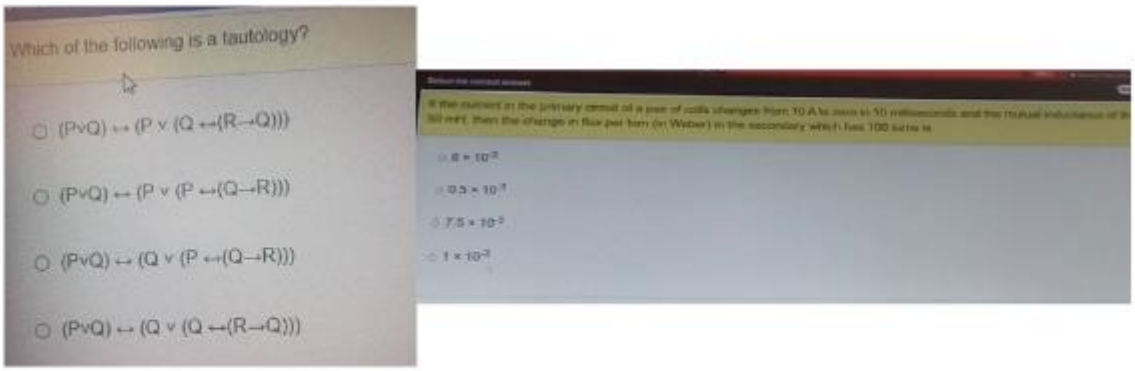
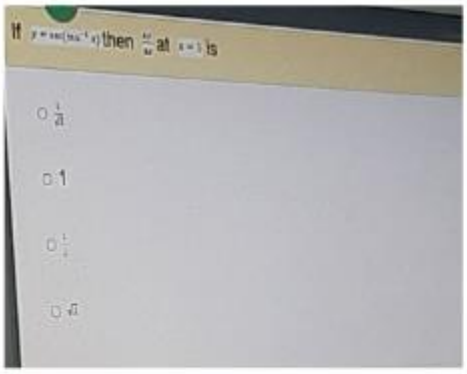
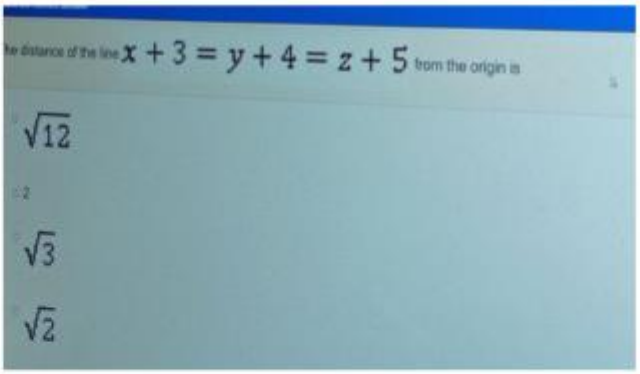

Which of the following is a tautology?
(P∨Q) ↔ (P ∨ (Q ↔(R→Q)))
(P∨Q) ↔ (P ∨ (P ↔(Q→R)))
(P∨Q) ↔ (Q ∨ (P ↔(Q→R)))
(P∨Q) ↔ (Q ∨ (Q ↔(R→Q)))





The equation $x^{3(\log_5 x)^2-\frac{1}{3}(\log_5 x)-2}=\sqrt{3}$ has exactly two

- real roots
- irrational roots
- complex roots
- rational roots