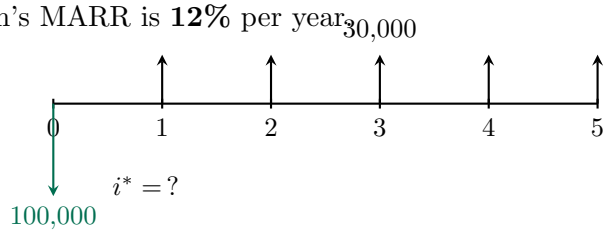
In-Class Activity 17

Name: _____ **ID:** _____ **Section:** _____

(25 points) *CopperISE307* is evaluating a **5-year tailings-reprocessing project** that recovers residual copper from old mine waste. It costs **100,000 SAR** today and returns a net **30,000 SAR per year** in years 1–5. The firm's MARR is **12%** per year.



Useful factors:

$(P/A, 12\%, 5)$	$(P/A, 15\%, 5)$	$(P/A, 20\%, 5)$	$(P/F, 12\%, 5)$
3.6048	3.3522	2.9906	0.5674

(a) (10 pts) Find the project's **internal rate of return** i^* by trial-and-error.

1. Calculate $PW(15\%)$

2. Calculate $PW(20\%)$

3. Linearly interpolate to find $i^* \approx i_{15\%} + \frac{PW(15\%)}{PW(15\%) - PW(20\%)} \times (i_{20\%} - i_{15\%})$

4. State the accept/reject decision by comparing i^* with the MARR.

(b) (15 pts) Before approval, regulators require Najd Copper to fund a **reclamation obligation of 90,000 SAR** paid at closure (end of year 5), so the **year-5 net flow becomes** $30{,}000 - 90{,}000 = -60{,}000$ SAR.

1. Calculate how many sign changes there are in the revised series.

2. Classify the revised series as **simple** or **nonsimple** (count the sign changes; state how many values of i^* are possible) and explain why the plain "IRR vs. MARR" rule should **not** be trusted here.

3. Draw the updated cash flow diagram from part (a) with the reclamation obligation added in year 5.

4. Calculate the present worth of the revised series at the MARR.

5. Make the correct accept/reject decision using **present worth at the MARR**.