

Quiz: Instrumentation Amplifier (IA) topologies: one-amp

TI Precision Labs – Instrumentation Amplifiers

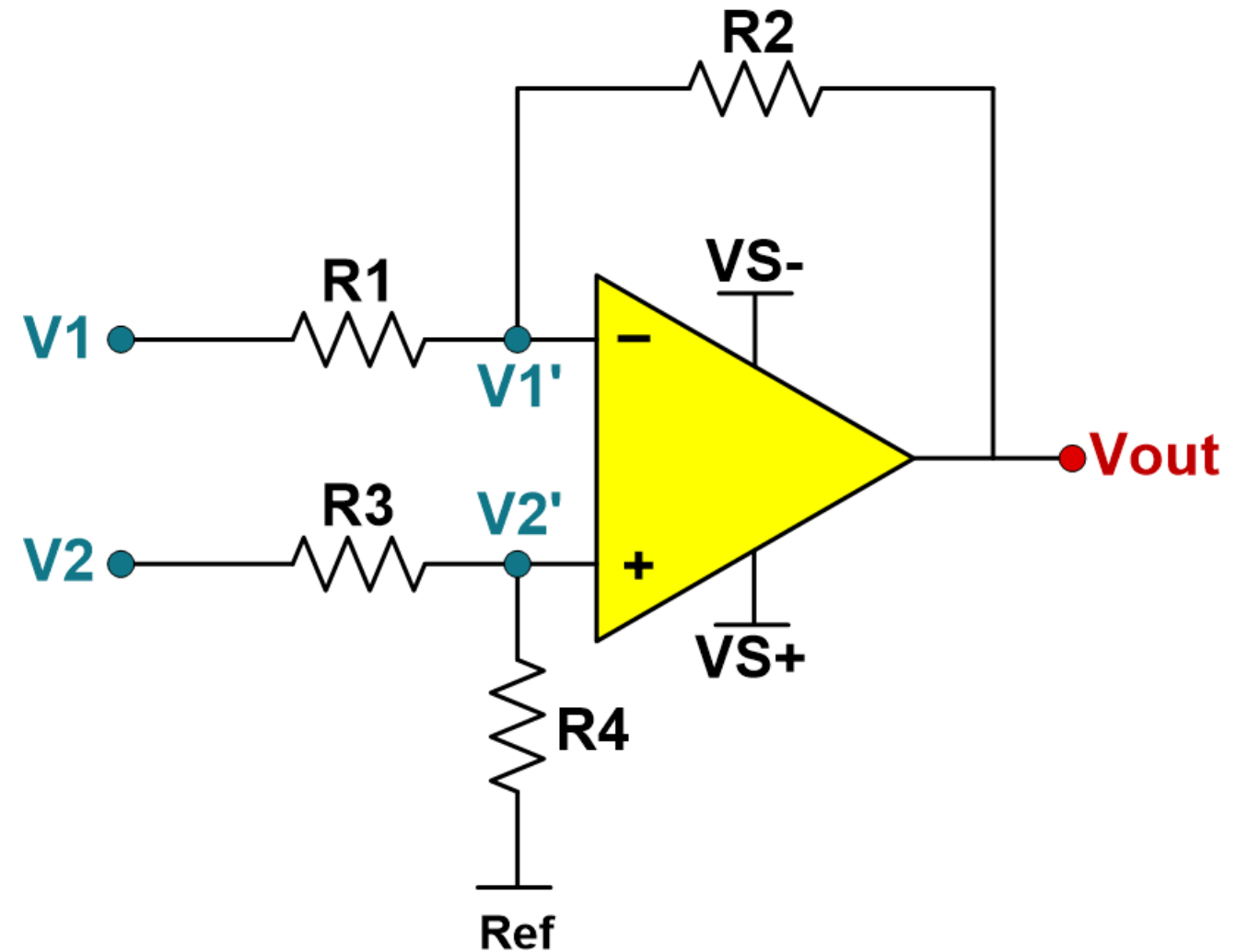
Presented by Tamara Alani

Prepared by Tamara Alani

Quiz: (IA) topologies: one-amp || Question

1. What is the output equation of a one-amp IA assuming all resistances are equal to each other?

- a) $V_{out} = V2 \times V1$
- b) $V_{out} = V2 - V1 + Ref$
- c) $V_{out} = Ref \times (V2 - V1)$
- d) $V_{out} = V1 \times V2 \times Ref$



Quiz: (IA) topologies: one-amp || Answer

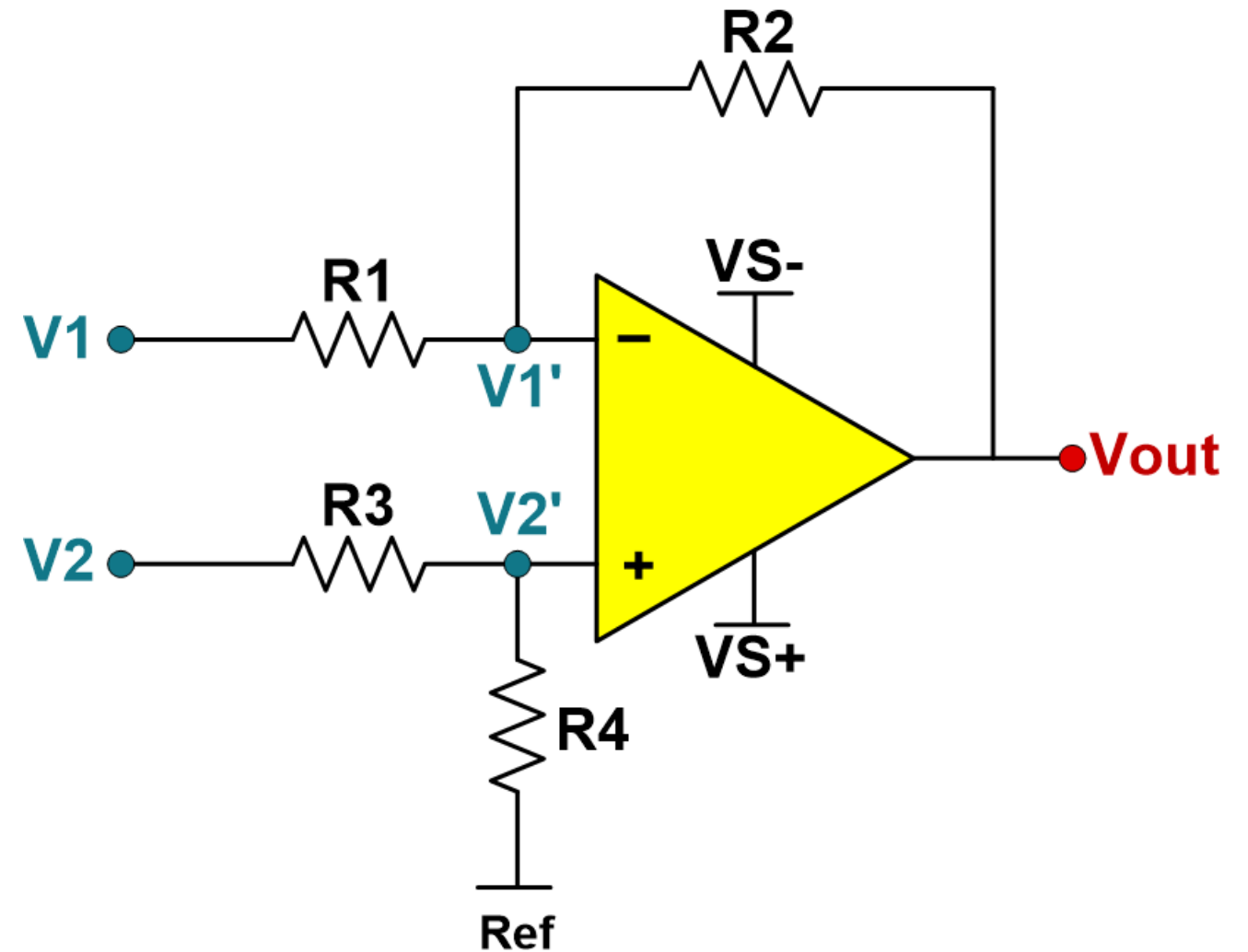
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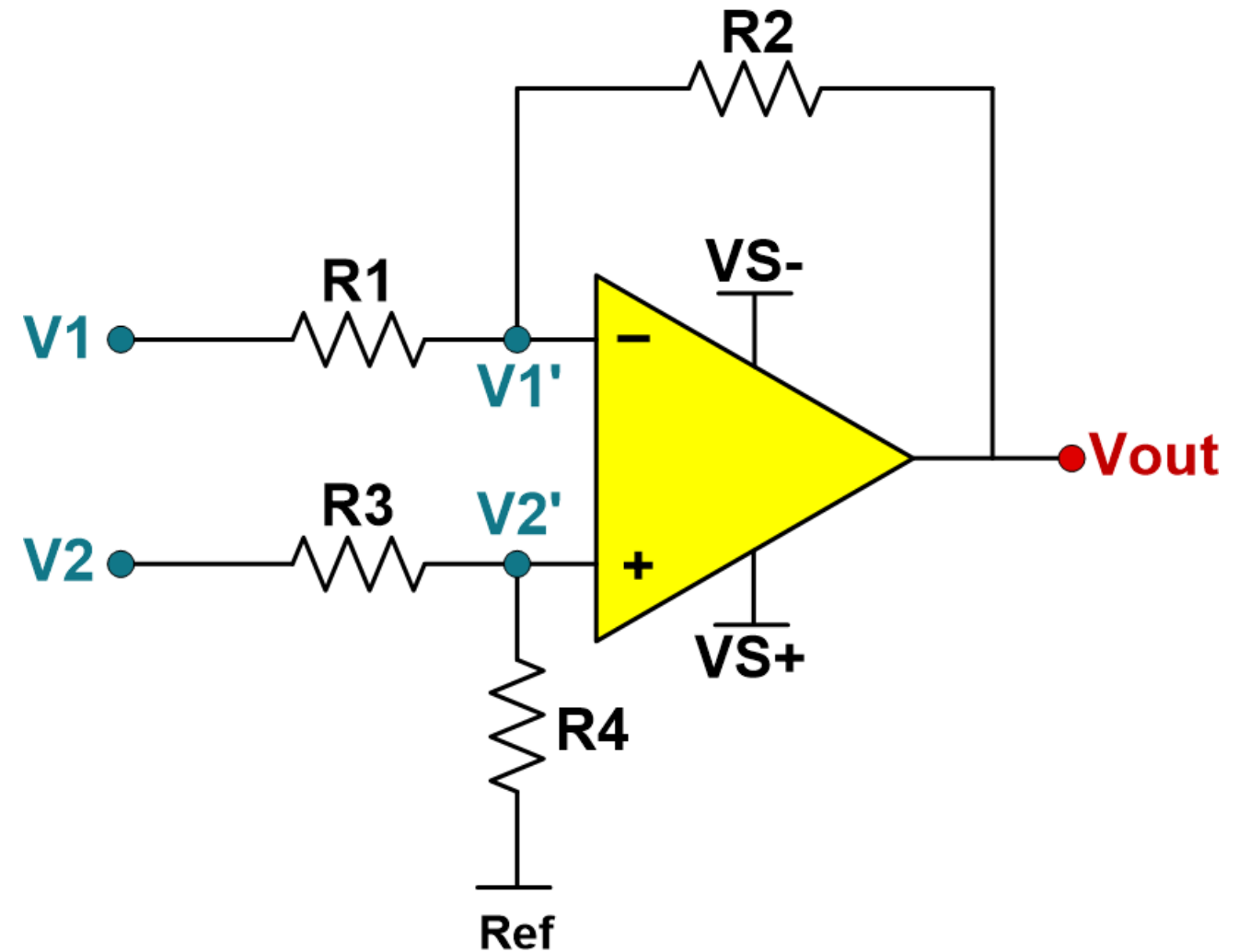
d) $V_{out} = V1 \times V2 \times Ref$



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2. If we match $R1$ to $R3$ and $R2$ to $R4$, what is the differential gain (A_d) of the following circuit?

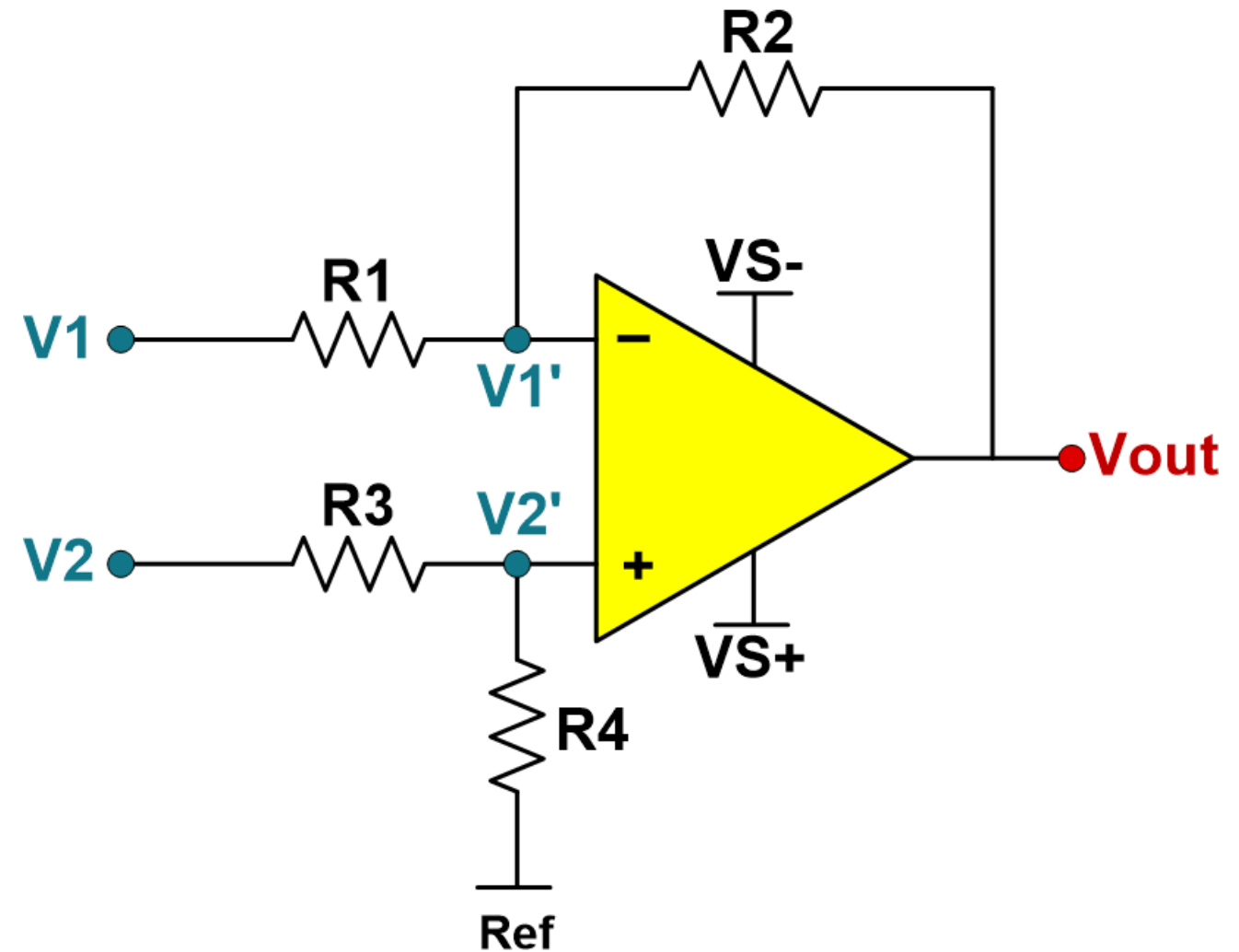
- a) $A_d = R2 / R1$
- b) $A_d = R1 \times R2$
- c) $A_d = R1 / R2$
- d) $A_d = R3 / R4$



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3. Which of the following statements is true of signal gain and noise gain?
- a) Signal gain determines the bandwidth of the circuit, and noise gain is the non-inverting gain of the amplifier
 - b) Signal gain is dependent on the amplifier's configuration and determines the input-output relationship.
 - c) The noise gain of a circuit determines many features of the amplifier, including bandwidth and stability, and is defined as the non-inverting gain.
 - d) For a difference amplifier, noise gain is defined as A_d and signal gain is defined as $A_d + 1$
 - e) B & C

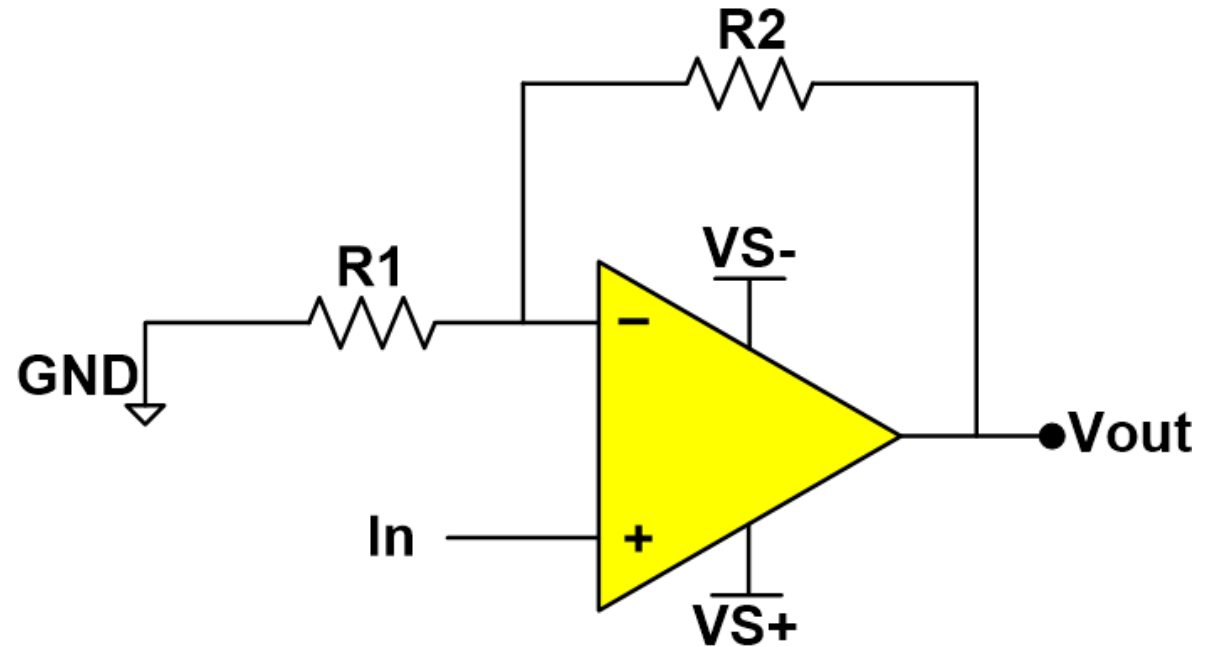
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4. What is the signal gain and noise gain of the following circuit?

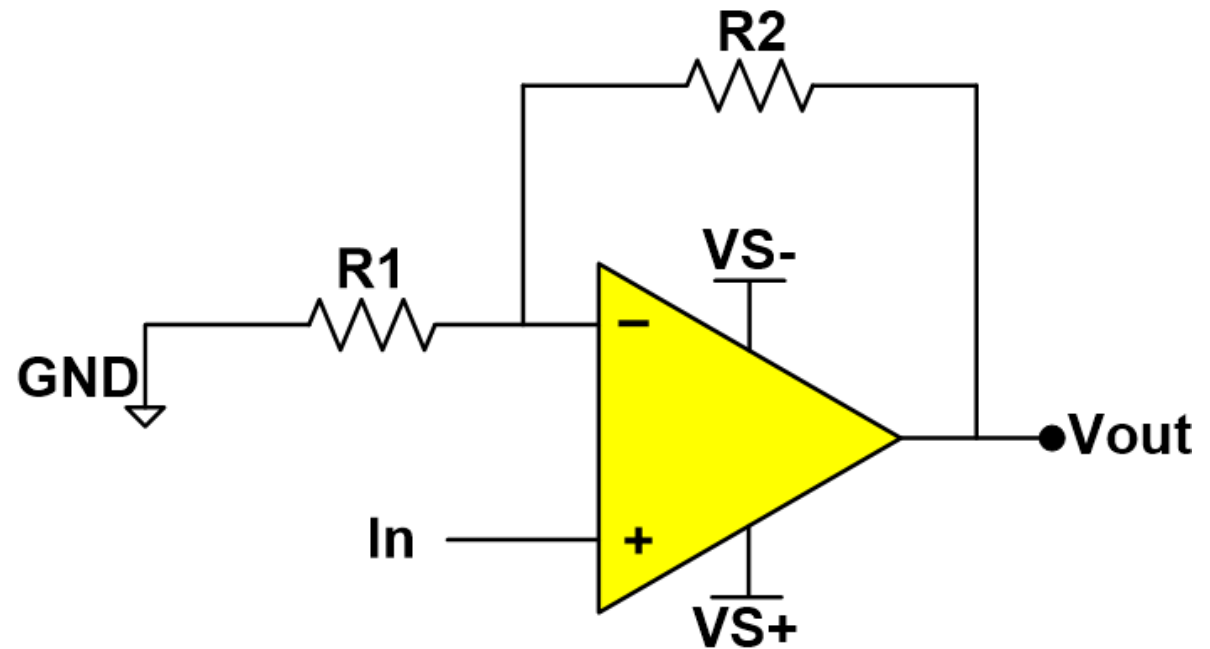
- a) Signal gain = $-R2 / R1$
Noise gain = $1 - (R2 / R1)$
- b) Signal gain = $1 + (R2 / R1)$
Noise gain = $R2 / R1$
- c) Signal gain = $1 + (R2 / R1)$
Noise gain = $1 + (R2 / R1)$
- d) None of the above



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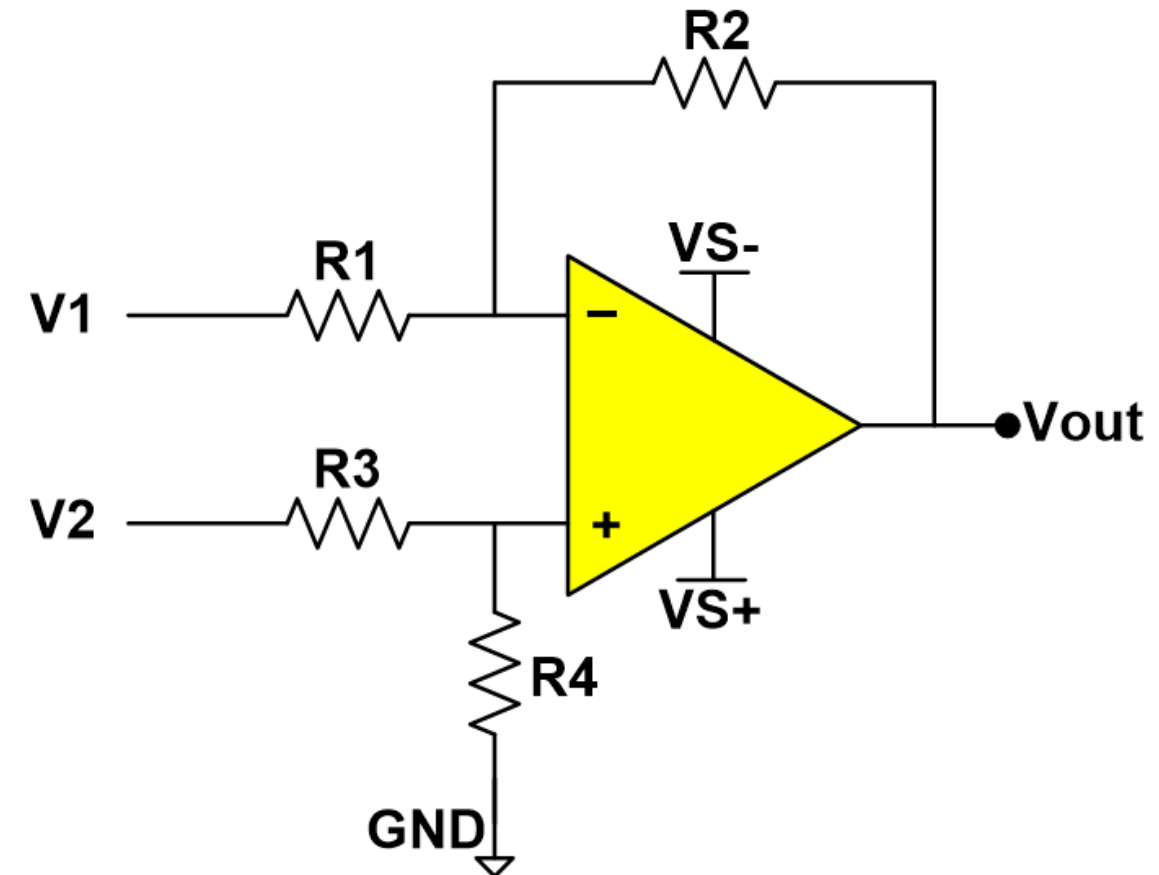
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5. What is the signal gain and noise gain of the following circuit?

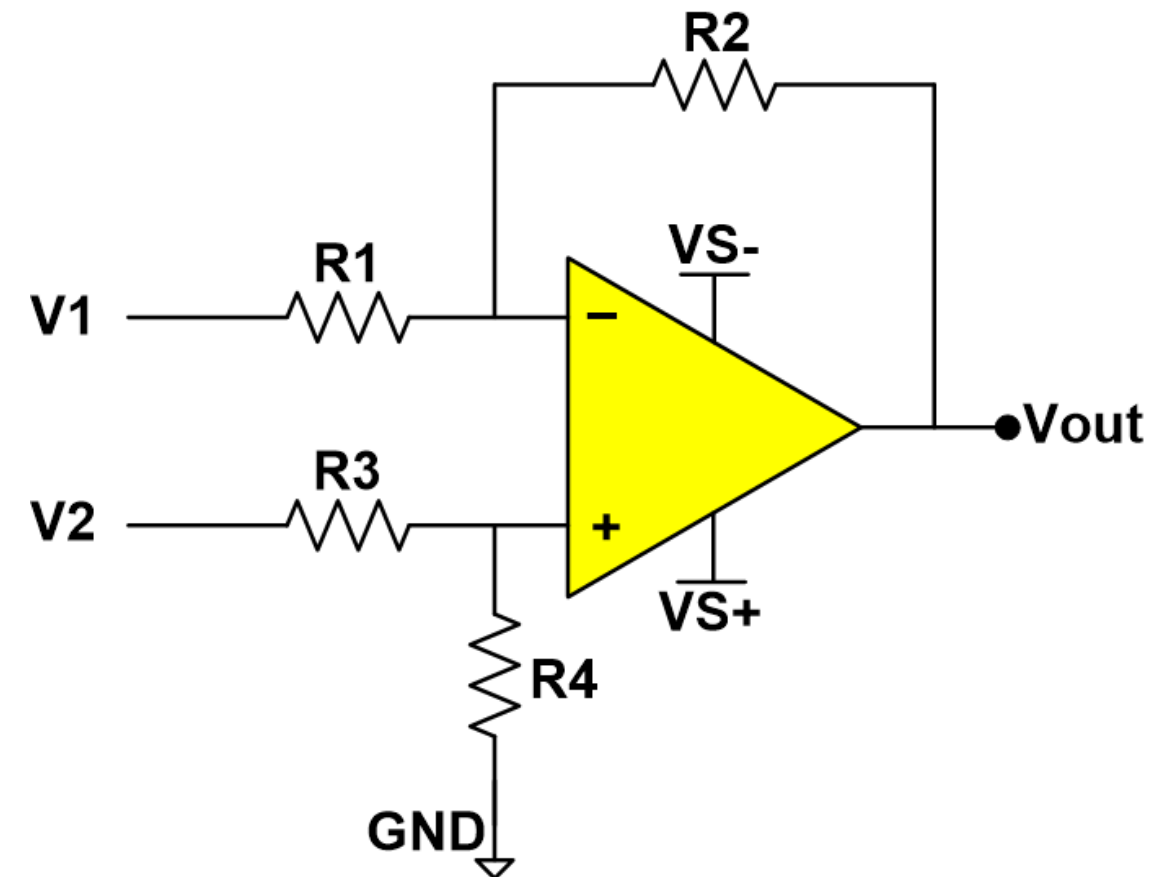
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Noise gain = $1 + (R2 / R1)$**
- d) None of the above



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6. Which of the following is true of resistor CMRR performance?

- a) CMRR performance due to resistor mismatch is improved in low gain or attenuated circuits
- b) CMRR performance due to resistor mismatch is independent of gain
- c) CMRR performance due to resistor mismatch is improved for higher gain circuits
- d) None of the above

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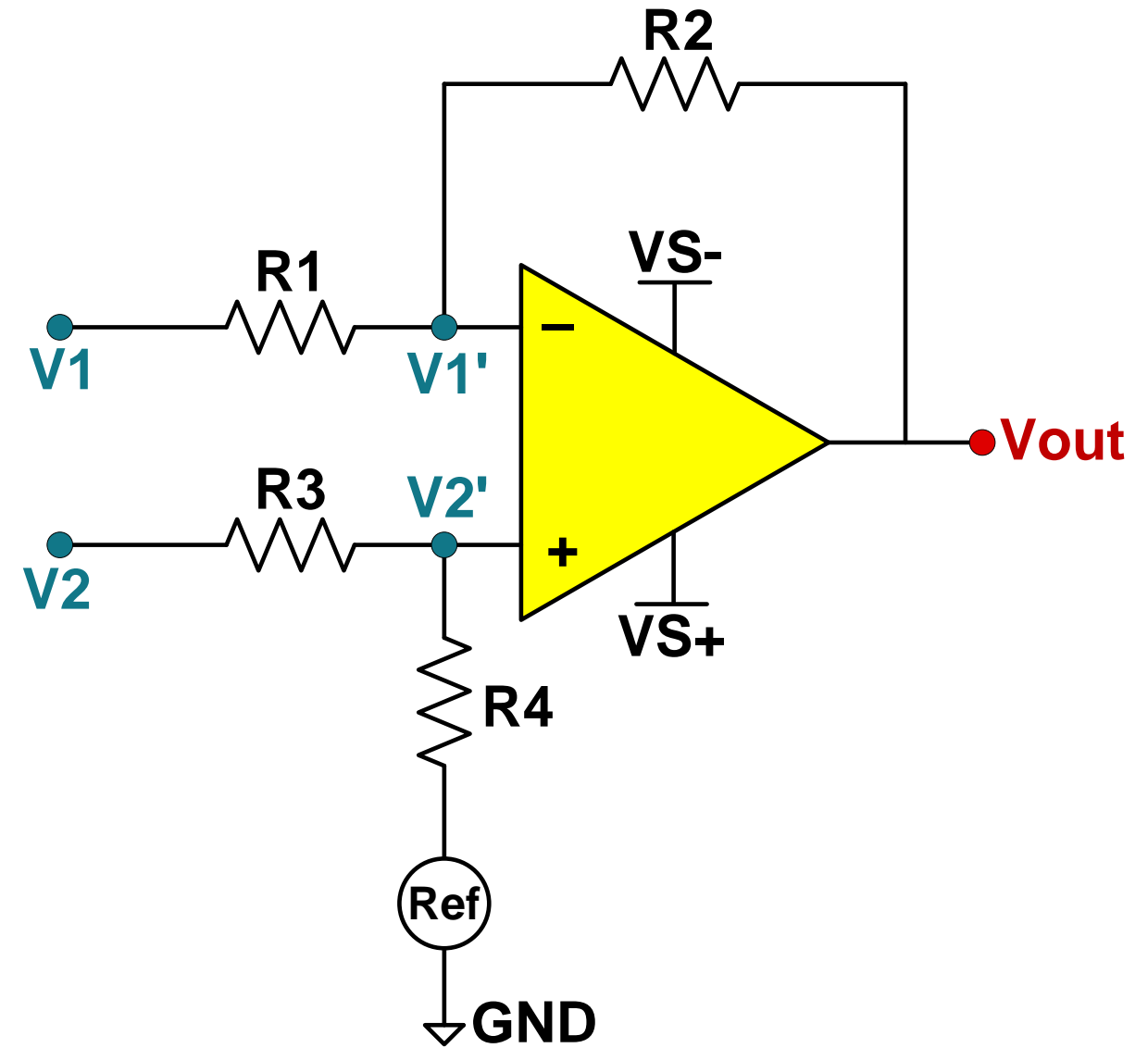
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7. Which of the following is true of one-amp IAs?

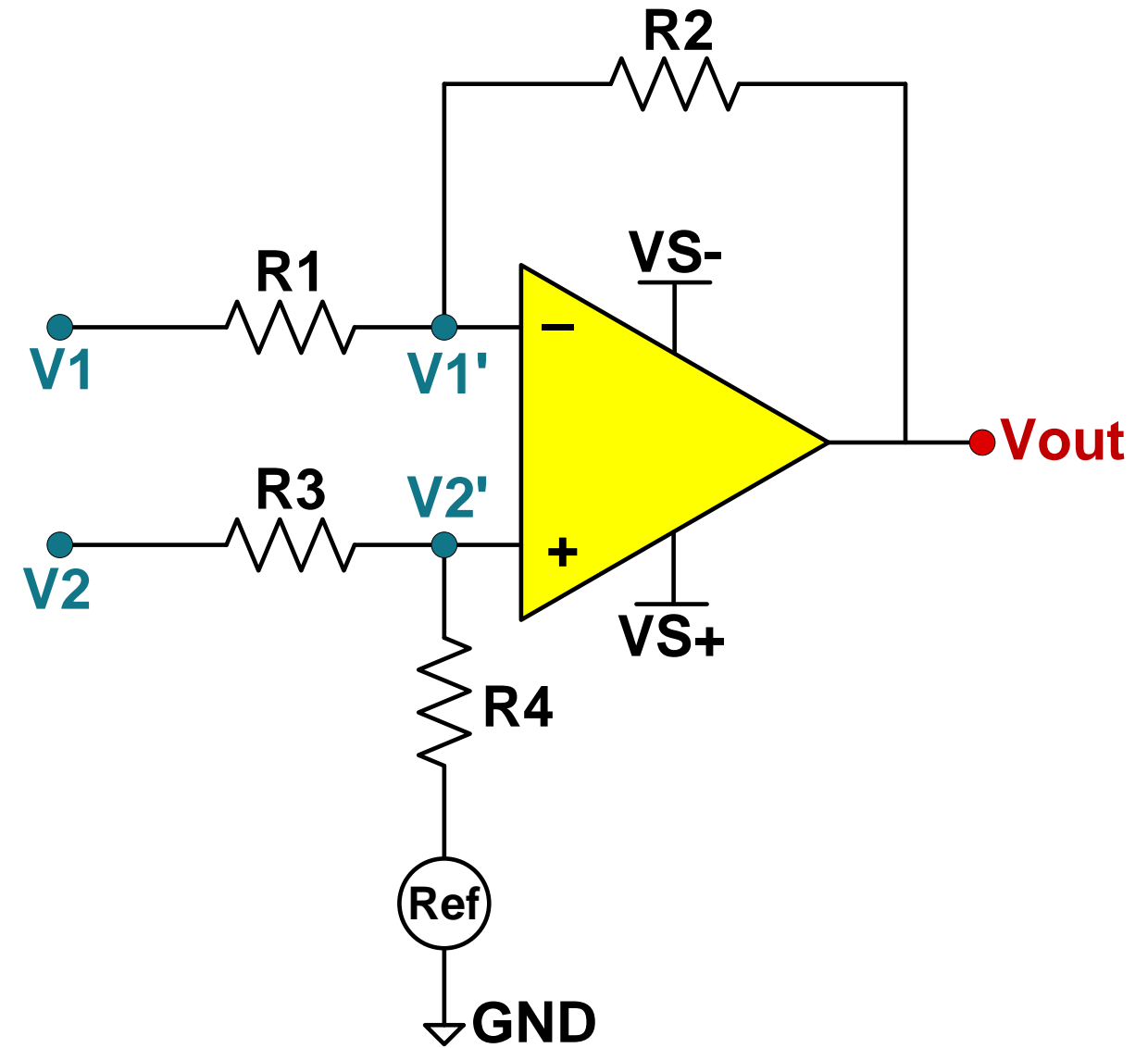
- a) Resistor matching is not crucial, as long as the value of the resistors are high
- b) One-amp IAs exhibit low input impedance. If paired with a non-zero output impedance source, accuracy will be degraded.
- c) The precision of a one-amp IA relies heavily on resistor matching
- d) B & C



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7. Which of the following is true of one-amp IAs?

- a) Resistor matching is not crucial, as long as the value of the resistors are high
- b) One-amp IAs exhibit low input impedance. If paired with a non-zero output impedance source, accuracy will be degraded.
- c) The precision of a one-amp IA relies heavily on resistor matching
- d) **B & C**



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