

Algebra 2 · Real and Complex Numbers · Test Answer Key

Common Core N-RN.A.1, N-RN.A.2, N-CN.A.1, N-CN.A.2 · mathovore.fr

Worked solutions with a scoring guide for the 20-point test. Award the points listed in each scoring note and allow partial credit for correct steps with a later arithmetic slip. Graphs are shown where a figure helps check the reading of the plane.

Algebra 2 Common Core: N-RN.A.1 · N-RN.A.2 · N-CN.A.1 · N-CN.A.2

Question 1: Classify marked numbers (2 points)

- a) -4 is rational. $\sqrt{10} \approx 3.16$ is not a perfect square root, so it is irrational.
b) -4 is an integer (not natural, because it is negative). $\sqrt{10}$ is irrational.

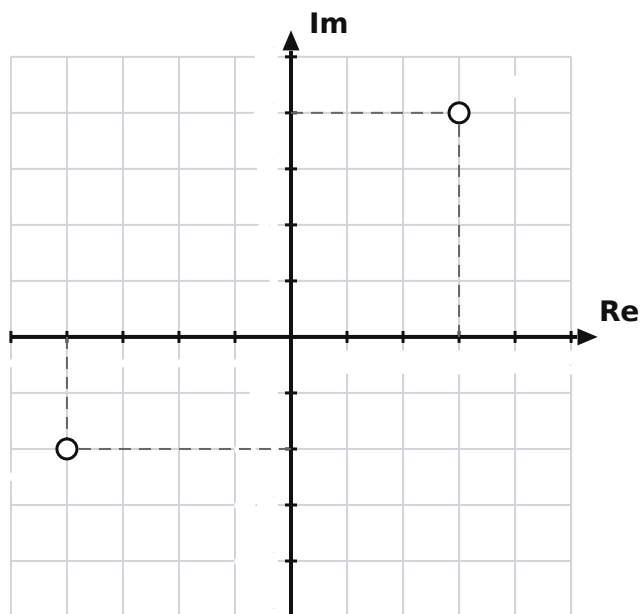
a) -4 rational, $\sqrt{10}$ irrational b) integer; irrational

Scoring: 1 point for part a (both correct), 1 point for part b (both correct).

Question 2: Points in the complex plane (2 points)

Read across first, then up or down.

a) $3+4i$ b) $-4-2i$



The numbers read from the plane.

Scoring: 1 point for each correct number. Reversed parts earn no point.

Question 3: Imaginary unit (2 points)

a) $\sqrt{-72} = i\sqrt{36 \cdot 2} = 6i\sqrt{2}$.

b) $3x^2 = -48$, so $x^2 = -16$ and $x = \pm 4i$.

a) $6i\sqrt{2}$ b) $x = \pm 4i$

Scoring: 1 point for each part.

Question 4: Add and subtract (2 points)

a) $5 - 8 = -3$, $-3i + 7i = 4i$. b) $6 - 9 = -3$, $2i + 5i = 7i$.

a) $-3 + 4i$ b) $-3 + 7i$

Scoring: 1 point for each correct result.

Question 5: Multiply (3 points)

a) $8 + 12i - 2i - 3i^2 = 8 + 10i + 3$. b) $9 + 15i + 15i + 25i^2 = 9 + 30i - 25$. c) $49 - 4i^2 = 49 + 4$.

a) $11 + 10i$ b) $-16 + 30i$ c) 53

Scoring: 1 point for each correct product.

Question 6: Powers of i (2 points)

a) $38 = 4(9) + 2$, so $i^{38} = i^2 = -1$. b) $83 = 4(20) + 3$, so $i^{83} = i^3 = -i$.

a) -1 b) $-i$

Scoring: 1 point for each correct power.

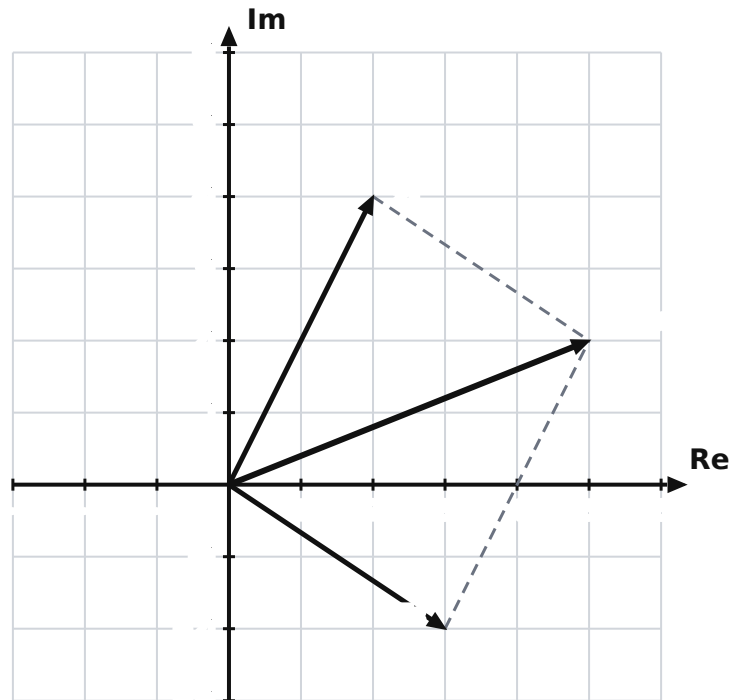
Question 7: Arrows in the plane (3 points)

a) $z_1 = 2+4i$ and $z_2 = 3-2i$.

b) $(2+4i)+(3-2i)=5+2i$.

c) $(2+4i)-(3-2i)=-1+6i$.

a) $2+4i$, $3-2i$ b) $5+2i$ c) $-1+6i$



The sum is the diagonal of the parallelogram.

Scoring: 1 point for each part.

Question 8: Check a solution (2 points)

$(2+i)^2 = 4+4i+i^2 = 3+4i$ and $-4(2+i) = -8-4i$.

Sum: $(3+4i)+(-8-4i)+5=0$.

The left side is 0, so $2+i$ is a solution.

Scoring: 1 point for expanding the square correctly; 1 point for combining to get 0.

Question 9: Find the error (2 points)

Liam replaced i^2 with 1 instead of -1 . Correctly, $4-9i^2=4-9(-1)=4+9=13$.

The correct product is 13.

Scoring: 1 point for identifying the wrong value of i^2 ; 1 point for 13.

Total
20 points