

# Adv. Algebra 2 – Concept Quiz

Name: \*key

## Form A

Date: \_\_\_\_\_ Period: \_\_\_\_\_

### 7. Solving Equations with Square and Cube Roots

a) Solve the equation below.

$$\sqrt{3x-5} + 8 = 2$$

$$-8 -8$$

$$\sqrt{3x-5} = -6$$

N.S.

b) Complete the equation in the first column. If the number of solutions is not possible, write NP.

Equation	Number of Real Solutions
a) $x^2 = \text{positive}$	2
b) $x^3 = \text{Any } \neq$	1
c) $x^2 = 0$	1
d) $x^2 = \text{neg}$	0
e) $\sqrt{x} = \text{non-zero}$	1
f) $\sqrt[3]{x} = \text{NP}$	2
g) $\sqrt{x} = \text{non-negative}$	0
h) $\sqrt{x} = \text{NP}$	2

### 8. Arithmetic with Complex Numbers

a)  $(5-i) - (13-4i)$

$$-8 + 3i$$

b)  $(5-3i)(9-2i)$

$$45 - 10i - 27i + 6i^2$$

$$45 - 37i + 6(-1)$$

$$39 - 37i$$

c)  $\frac{5-2i}{8+3i} \cdot \frac{8-3i}{8-3i} = \frac{40-15i-16i+6i^2}{64-24i+24i-9i^2}$

$$= \frac{40-31i-6}{64+9} = \frac{34-31i}{73}$$

d)  $i^{71}$

$$(i^4)^{17} \cdot i^3 \quad 4 \cdot 17 = 68$$

$$1 \cdot i^3 = -i$$

### 9. Solving Quadratic Equations

Solve the quadratic equations below using at least 3 different methods.

a)  $2x^2 + 12x + 60 = 0$

$$\frac{2}{2} \frac{12}{2} \frac{60}{2} \frac{0}{2}$$

$$x^2 + 6x + 30 = 0$$

$$x^2 + 6x + 9 = -30 + 9$$

$$(x+3)^2 = -21$$

$$x+3 = \pm\sqrt{-21}$$

$$x = -3 \pm i\sqrt{21}$$

b)  $x^2 + x - 56 = 0$

$$(x+8)(x-7) = 0$$

$$x = -8, 7$$

c)  $10x^2 - 8x + 3 = 0$

$$x = \frac{+8 \pm \sqrt{(-8)^2 - 4(10)(3)}}{2(10)}$$

$$x = \frac{8 \pm \sqrt{64 - 120}}{20}$$

$$x = \frac{8 \pm \sqrt{56}}{20} = \frac{8 \pm 2i\sqrt{14}}{20} = \frac{4 \pm i\sqrt{14}}{10}$$

d)  $x^2 - 14x = -75$

$$x^2 - 14x + 49 = -75 + 49$$

$$(x-7)^2 = -26$$

$$x-7 = \pm\sqrt{-26}$$

$$x = 7 \pm i\sqrt{26}$$

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## Form B

### 7. Solving Equations with Square and Cube Roots

a) Solve the equation below.

$$\sqrt{5x-2} + 10 = 7$$

$$\begin{array}{r} -10 \quad -10 \\ \hline \sqrt{5x-2} = -3 \end{array}$$

N.S.

b) Complete the equation in the first column. If the number of solutions is not possible, write NP.

Equation	Number of Real Solutions
a) $x^2 = n > 0$	2
b) $x^3 = \text{any } \#$	1
c) $x^2 = 0$	1
d) $x^2 = n < 0$	0
e) $\sqrt{x} = n > 0$	1
f) $\sqrt[3]{x} = \text{NP}$	2
g) $\sqrt{x} = n < 0$	0
h) $\sqrt{x} = \text{NP}$	2

### 8. Arithmetic with Complex Numbers

a)  $(4 - 2i) - (15 - i)$

$-11 - i$

b)  $(4 - 2i)(6 - 8i)$

$$\begin{array}{l} 24 - 32i - 12i + 16i^2 \\ 24 - 44i - 16 \end{array}$$

$8 - 44i$

c)  $\frac{7-3i}{2+5i} \cdot \frac{2-5i}{2-5i} = \frac{14-35i-6i+15i^2}{4-10i+10i-25i^2}$

$$= \frac{14 - 41i - 15}{4 + 25} = \frac{-1 - 41i}{29}$$

$\frac{-1 - 41i}{29}$

d)  $i^{83}$

$$(i^4)^{20} \cdot i^3$$

$$(1) \cdot i^3 = -i$$

$-i$

### 9. Solving Quadratic Equations

Solve the quadratic equations below using at least 3 different methods.

a)  $3x^2 - 2x + 5 = 0$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(5)}}{2(3)}$$

$$x = \frac{2 \pm \sqrt{4 - 60}}{6}$$

$$x = \frac{2 \pm \sqrt{-56}}{6} = \frac{2 \pm 2i\sqrt{14}}{6} = \frac{1 \pm i\sqrt{14}}{3}$$

$\frac{1 \pm i\sqrt{14}}{3}$

b)  $x^2 + 12x + 66 = 0$

$$x^2 + 12x + 36 = -66 + 36$$

$$(x+6)^2 = -30$$

$$x+6 = \pm\sqrt{-30}$$

$x = -6 \pm i\sqrt{30}$

c)  $\frac{6x^2}{6} + \frac{42}{6} = \frac{12x}{6}$

$$x^2 + 7 = 2x$$

$$x^2 - 2x + 7 = 0$$

$$(x-1)^2 = -6$$

$$x-1 = \pm\sqrt{-6}$$

$x = 1 \pm i\sqrt{6}$

d)  $\frac{6x^2}{6} + \frac{12x}{6} - \frac{90}{6} = \frac{0}{6}$

$$x^2 + 2x - 15 = 0$$

$$(x+5)(x-3) = 0$$

$x = -5, 3$