BECA/Huson/Algebra 2: Complex Numbers & Rational Exponents
11 March 2024

Name: SOLUTIONS

3.19 Quiz: Solving quadratics, complex numbers, radicals and exponents

Do Not Use a Calculator

A2.REI.4 Solve quadratic equations

1. Solve by factoring.

$$x^2 + 8x + 15 = 0$$

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

$x = -3, -5$

check

$(-3)^2 + 8(-3) + 15 \stackrel{?}{=} 0$

$9 + (-24) + 15 = 0$ ✓

$(-5)^2 + 8(-5) + 15 = 0$?

$25 - 40 + 15 = 0$ ✓

2. Solve by completing the square.

$$x^2 + 8x + 13 = 0$$

$x^2 + 8x + 16 = 3$

$(x+4)^2 = 3$

$x + 4 = \pm\sqrt{3}$

$x = -4 \pm \sqrt{3}$

$\frac{8}{2} = 4$

$(\frac{8}{2})^2 = 4^2 = 16$

3. Solve by using the quadratic formula.

$$2x^2 + 3x - 6 = 0$$

$$x = \frac{-(3) \pm \sqrt{3^2 - 4(2)(-6)}}{2(2)}$$

$$= \frac{-3 \pm \sqrt{9 + 48}}{4}$$

$$= \frac{-3 \pm \sqrt{57}}{4}$$

4. Select all of the solutions to $(x+2)^2 = -9$. $x+2 = \pm\sqrt{-9} = \pm 3i$ (HSN.CN.2 Complex numbers)

$x = -2 \pm 3i$

(a) $x = -2+3i$

(b) $x = -2-3i$

(c) $x = -2-\sqrt{3}$

(d) $x = 2-3 = -1$

(e) $x = 2+3 = 5$

(f) $x = -2+\sqrt{3}$

5. Write each expression in the form $a+bi$ with a, b real numbers.

Given $u = 7+2i$ and $v = 3-5i$.

(a) $u+v =$ $10-3i$

(b) $u-v =$ $(7+2i)-(3-5i) = 4+7i$

(c) $uv =$ $(7+2i)(3-5i) = 21-35i+6i-10i^2$

$= 31-29i$

6. Simplify each radical expression.

(a) $\sqrt{25} =$ 5

(b) $\sqrt{-20} =$ $\sqrt{-1}\sqrt{4}\sqrt{5}$

$= 2i\sqrt{5}$

(c) $\sqrt{27} =$ $\sqrt{9}\sqrt{3} = 3\sqrt{3}$

(d) $\frac{\sqrt{-16}}{\sqrt{4}} = \frac{4i}{2} = 2i$

7. Simplify each expression. (HSN.RN.A Rational exponents)

(a) $4^{\frac{3}{2}} = \left(\sqrt{4}\right)^3 = 2^3 = 8$

(b) $\left(\sqrt{\frac{4}{9}}\right)^{-1} = \left(\frac{\sqrt{4}}{\sqrt{9}}\right)^{-1} = \left(\frac{2}{3}\right)^{-1} = \frac{3}{2}$

$= 3/2$