Key

LET'S CHECK IN WITH UNITS 1 & 2!

1. The value(s) of x that satisfy $\sqrt{x^2 - 4x - 5} = 2x - 10$ are

1) $\{5\}$

2) $\{7\}$

3) $\{5, 7\}$ ⟵

4) $\{3, 5, 7\}$

*Check 5, 1ST

$\sqrt{25 - 20 - 5} \overset{?}{=} 10 - 10$ ✓

*Check 3 next

$\sqrt{9 - 12 - 5} \overset{?}{=} 6 - 10$

$\sqrt{-8} \neq -4$

*Check 7 last

$\sqrt{49 - 28 - 5} \overset{?}{=} 14 - 10$ ✓

2. If $A = -3 + 5i$, $B = 4 - 2i$, and $C = 1 + 6i$, where i is the imaginary unit, determine what $BC + A$ equals in simplest $a + bi$ form.

Check on calculator

$BC + A$

$(4 - 2i)(1 + 6i) + (-3 + 5i)$

$\begin{array}{r} 4 + 24i \\ -2i - 12i^2 \\ \hline 4 + 22i + 12 \end{array}$

$16 + 22i + -3 + 5i = \boxed{13 + 27i}$

3. The roots of the equation $3x^2 + 2x = -7$ are

1) $-2, -\frac{1}{3}$

2) $-\frac{7}{3}, 1$

3) $-\frac{1}{3} \pm \frac{2i\sqrt{5}}{3}$ ⟵

4) $-\frac{1}{3} \pm \frac{\sqrt{11}}{3}$

use Quad Form!

$3x^2 + 2x + 7 = 0$

$x = \dfrac{-2 \pm \sqrt{(2)^2 - 4(3)(7)}}{2(3)}$

$x = \dfrac{-2 \pm \sqrt{-80}}{6}$

*you know the answer is 3 (the only choice w/ imaginary #'s)

4. Over the set of integers, factor the expression $x^4 - 4x^2 - 12$.

(Regular Trinomial) $(x^2 - 6)(x^2 + 2)$

5. Where i is the imaginary unit, the expression $(x + 3i)^2 - (2x - 3i)^2$ is equivalent to

1) $-3x^2$

2) $-3x^2 - 18$

3) $-3x^2 + 18xi$ ⟵

4) $-3x^2 - 6xi - 18$

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

$(x^2 + 6xi - 9) - (4x^2 - 12xi - 9)$

$\begin{array}{r} x^2 + 6xi - 9 \\ -4x^2 + 12xi + 9 \\ \hline -3x^2 + 18xi \end{array}$

6. Solve the equation $2x^2 + 3x + 8 = 0$. Express the answer in $a + bi$ form.

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

$$x = \frac{-3 \pm \sqrt{-55}}{4} \qquad \rightarrow \quad x = \frac{-3}{4} \pm \frac{i\sqrt{55}}{4}$$

$$x = \frac{-3 \pm i\sqrt{55}}{4}$$

7. Solve algebraically for all values of x: $\sqrt{6 - 2x} + x = 2(x + 15) - 9$

$$\sqrt{6-2x} + x = 2x + 30 - 9$$
$$\left(\sqrt{6-2x}\right)^2 = (x + 21)^2$$
$$6 - 2x = (x+21)(x+21)$$
$$6 - 2x = x^2 + 42x + 441$$
$$0 = x^2 + 44x + 435$$

$$x = \frac{-44 \pm \sqrt{(44)^2 - 4(1)(435)}}{2(1)}$$

$$x = \frac{-44 \pm \sqrt{1936 - 1740}}{2}$$

$$x = \frac{-44 \pm \sqrt{196}}{2}$$

$$\rightarrow \quad x = \frac{-44 \pm 14}{2}$$

$$x = \frac{-44 + 14}{2} = -15$$

$$x = \frac{-44 - 14}{2} = -29$$

$$\{-15\}$$

CHALLENGE:

Which expression is equivalent to $x^6 y^4 (x^4 - 16) - 9(x^4 - 16)$?

1) $x^{10}y^4 - 16x^6 y^4 - 9x^4 - 144$

2) $(x^6 y^4 - 9)(x + 2)^3 (x - 2)$

3) $(x^3 y^2 + 3)(x^3 y^2 - 3)(x + 2)^2(x - 2)^2$

4) $(x^3 y^2 + 3)(x^3 y^2 - 3)(x^2 + 4)(x^2 - 4)$ ⟵ (circled)

$$(x^4 - 16)(x^6 y^4 - 9)$$
$$(x^2 + 4)(x^2 - 4) \quad (x^3 y^2 + 3)(x^3 y^2 - 3)$$
$$(x^2 + 4)(x + 2)(x - 2) \quad (x^3 y^2 + 3)(x^3 y^2 - 3)$$