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Round I PART I

$$A = m\angle\theta = 40$$

$$m\angle\theta = \frac{1}{2}(220 - 140) = \frac{1}{2}(80) = \underline{40}$$

Part 3

$$\frac{4^{n+1} \cdot 4^{2n+2}}{4^{3n+3}} = \frac{4^{3n+3}}{4^{3n+3}} = 1 \quad \underline{C=1}$$

PART 2

$$B = 8 \quad \begin{bmatrix} -11 & -3 \\ 8 & 6 \end{bmatrix}$$

$$\begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix} + \begin{bmatrix} -3 & 6 \\ 6 & 0 \end{bmatrix} - \begin{bmatrix} 10 & 8 \\ 2 & -4 \end{bmatrix}$$

$$\text{Final: } \frac{A}{B} + C = \frac{40}{8} + 1 = \underline{6}$$

Round 2

Part 1

$$3x - 1 + 2x - 3 + 4x + 6 = 128$$

$$9x + 2 = 128$$

$$9x = 126$$

$$x = 14$$

$$\text{Smallest } A = 2x - 3 = \underline{25} = A$$

$$\text{Final: } \frac{A+B}{C} = \frac{25+39}{-4} = \underline{-16}$$

Part 2

$$B = 5(-3)^2 - 6 = 45 - 6$$

$$\underline{B = 39}$$

$$\underline{C = -4}$$

Part 3

$$\begin{array}{r} 3x^5 - 4x^4 \\ x+2 \overline{) 3x^6 + 2x^5 - 8x^4 + 2x^2 + 4x} \\ \underline{3x^6 + 6x^5} \\ -4x^5 - 8x^4 \\ \underline{-4x^5 - 8x^4} \\ 2x^2 + 4x \end{array}$$

Round 3

Part 1

$$\text{side opposite } 30^\circ = \frac{1}{\sqrt{3}} (\text{longer leg}) = \frac{1}{\sqrt{3}} (5\sqrt{3}) = 5$$

$$h = 2(\text{shorter leg}) = 2(5) = 10$$

$$\underline{A = 10}$$

Part 3

$$3x - 2 = 5x - 28$$

$$26 = 2x$$

$$x = 13$$

$$\underline{C = 13}$$

Part 2 $x \neq 0$ or 2

$$(x-2)2 + 1x = 1x(x-2)$$

$$2x - 4 + x = x^2 - 2x$$

$$0 = x^2 - 5x + 4$$

$$0 = (x-4)(x-1)$$

$$x = 1 \text{ or } x = 4$$

$$\underline{B = 4 + 1 = 5}$$

$$\text{Final: } C^{\frac{A}{B}} = 13^{\frac{10}{5}} = 13^2 = \underline{169}$$

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Round 4
 Part 1 $m = \frac{1-9}{-1-3} = \frac{-8}{-4} = 2$ $y-1 = 2(x+1)$ $0 = 2x+3$
 $y = 2x+3$ $x\text{-intercept} = -\frac{3}{2} = A$

Part 2 $-6 + 10i - 9i + 15i^2 = -6 - 15 + i = -21 + i$ $B = -21$

Part 3 $\widehat{PE} = \widehat{RA} = \frac{1}{2}(360 - 146 - 70) = 72$

$\widehat{AR} = 40\pi \Rightarrow 288^\circ$ $\frac{288}{40\pi} = \frac{360}{C} \Rightarrow 50\pi$ $C = 25$

$2\pi r = 50\pi$ $r = 25$

Final: $C - \frac{B}{A} = 25 - \left(\frac{-21}{-\frac{3}{2}}\right) = 25 - 14 = \boxed{11}$

Round 5

Part 1 $3^2 + (9-x)^2 = x^2$
 $9 + 81 - 18x + x^2 = x^2$
 $90 = 18x$
 $5 = x$
 base = $2(9-x) = 8$
 Perimeter = $5 + 5 + 8 = 18$
 $A = 18$

Part 2 $-3 \leq 2x - 5 \leq 11$
 $2 \leq 2x \leq 16$
 $1 \leq x \leq 8$
 $B = 8$

Part 3 $l:w = 3:2$ area = 54
 $3n(2n) = 54$ $l = 3(3) = 9$
 $6n^2 = 54$ $w = 3(2) = 6$
 $n^2 = 9$
 $n = 3$ $C = 9$

Final:
 $B^{\frac{1}{C}} =$
 $8^{\frac{18}{9}} = 8^2 = \boxed{64}$

Round 6

Part 1 vertex $A = \frac{5}{2}(2x) - 23 = 5x - 23 \Rightarrow 5x + 23 + 2x = 180$ $A = 29$
 $7x = 203$
 $x = 29$

Part 2 $(\sqrt{x} - 5)(\sqrt{x} - 2) = 0$ ok!
 $\sqrt{x} = 5$ $\sqrt{x} = 2$ $\sqrt{25} - 7\sqrt{25} + 10 = 0$ $B = 25 + 4 = 29$
 $x = 25$ $x = 4$ $\sqrt{4} - 7\sqrt{4} + 10 = 0$

Part C $g = 7 + 4w$ $e = 3w - 2$ $w = \text{water}$
 $7 + 4w + 3w - 2 + w = 149$
 $8w + 5 = 149$
 $w = 18$

Final:
 $B(C - A) =$
 $29(79 - 29) = \boxed{1450}$

$g = 7 + 4(18) = 79$
 $C = 79$

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Round 7 A = 22 Part 2 $2 - \frac{2}{3} + 4 + \frac{2}{3} = 6 = B$
 Part 1

Part 3 $4x + 3(2x - 1) = 27 \Rightarrow 10x = 30 \Rightarrow x = 3; y = 6 - 1 = 5$
C = 3(5) = 15 Final: $C^2 - B^3 - A = 225 - 216 - 22 = \boxed{-13}$

Round 8

Part 1 $|x - 2| \leq 15$ $\frac{-15 + 15}{-13} \leq \frac{x - 2}{1} \leq \frac{15 + 15}{17}$ $-13 \leq x \leq 17$ A = -13

Part 2 $180 - 110 = 70$ $\frac{1}{2}(70) = 35 = B$

Part 3 $15m^2 - 78m - 72 - 6m^2 + 22m + 84$
 $= 9m^2 - 56m + 12$ C = 9 - 56 + 12 = -35 = C

Final $(B + C)^A = 0^{-13} = \boxed{0}$

Round 9 $\frac{1 - k}{-3 - 4} = \frac{1}{2} \Rightarrow 2 - 2k = -7 \Rightarrow -2k = -9 \Rightarrow k = \frac{9}{2} = A$

Part 2 $\frac{(x+9)(x-6)}{(x+9)(x-9)} \cdot \frac{(x-9)(x-1)}{(x-6)(x-4)} = \frac{x-1}{x-4}$ $B = \frac{x-1 - (x-4)}{-1+4} = \frac{3}{3} = B$

Part 3 $3\sqrt[3]{27} \sqrt[3]{2} + 9\sqrt[3]{8} \sqrt[3]{2} - 2\sqrt[3]{64} \sqrt[3]{2}$
 $9\sqrt[3]{2} + 18\sqrt[3]{2} - 8\sqrt[3]{2} = 19\sqrt[3]{2}$ C = 19

Final $6A - 4B + C = 6(\frac{9}{2}) - 4(3) + 19 = 27 - 12 + 19 = \boxed{34}$

Round 10

Part 1 $\frac{12}{60} = \frac{80}{x}$ $12x = 4800$ x = 400 = A

Part 2 $\frac{t+q}{2} = 85$ $\frac{3t+q}{4} = 83$ $3t + 170 - t = 83(4)$
 $q = 170 - t$ $2t = 162$
t = 81 = B

Part 3 $24 - 7x = 10$
 $-7x = -14$
x = 2

Final $(\sqrt{A} - \sqrt{B})^C$
 $(\sqrt{400} - \sqrt{81})^2$
 $(20 - 9)^2 = 11^2 = \boxed{121}$