

Event A

Problem #3 (“textbook with a twist”; 2 points)

Try to solve each problem within three minutes.

3. Compute the smallest possible integer value for  $b > 2$ , such that  $\sqrt{0.12_b}$  is a rational number in base 10. (MSHSML 2019-20 6A #3)

Event A

Problem #3 (“textbook with a twist”; 2 points)

Try to solve each problem within three minutes.

3. Determine exactly the ordered quadruple  $(w, x, y, z)$  which satisfies this system:

$$2w + x + y + z = 5$$

$$w + 2x + y + z = 10$$

$$w + x + 2y + z = 20$$

$$w + x + y + 2z = 40$$

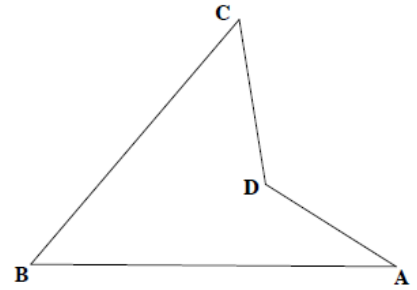
(MSHSML 2018-19 6A #3)

## Event B

Problem #3 ("textbook with a twist"; 2 points)

Try to solve each problem within three minutes.

3. In the figure, concave quadrilateral  $ABCD$  is concave at  $D$ . Interior angles  $A$ ,  $B$ , and  $C$  are congruent and  $m\angle D = 225^\circ$ . If  $BD = 6$ , determine exactly the area of quadrilateral  $ABCD$ . (Figure not drawn to scale.) (MSHSML 2019-20 6B #3)



## Event B

Problem #3 (“textbook with a twist”; 2 points)

Try to solve each problem within three minutes.

3. Right triangle  $ABC$  has legs  $\overline{AB}$  and  $\overline{BC}$  of lengths 20 and 21, respectively.  $M$  is the midpoint of  $\overline{AB}$  and  $N$  is the trisection point of  $\overline{BC}$  closest to  $C$ . If  $\overline{AN}$  and  $\overline{CM}$  intersect at  $O$  and ray  $\overrightarrow{BO}$  intersects  $\overline{AC}$  at  $P$ , determine exactly the area of  $\triangle ABP$ . (MSHSML 2018-19 6B #3)