

# Challenge Problems Solutions

①

| Byrd | Jensen | Lane | North | Zimmer |
|------|--------|------|-------|--------|
| X    | X      | X    | 1     | X      |
| X    | X      | 2    | X     | X      |
| X    | 3      | X    | X     | X      |
| X    | X      | X    | X     | 4      |
| 5    | X      | X    | X     | X      |

Names: Polly Byrd 5<sup>th</sup>     Joe Jensen 3<sup>rd</sup>     Michael North 1<sup>st</sup>     Low Zimmer 4<sup>th</sup>     Kerry Lane 2<sup>nd</sup>

- facts:
- Mr. Zimmer is 63 winner is young → Zimmer not 1<sup>st</sup>
  - Polly might have gotten fourth except for bridee knee → Polly is 5<sup>th</sup> none of the others.
  - Zimmer not third
  - Kerry is Kerry Lane
  - Jensen won a higher place last year: Jensen not 1<sup>st</sup>
  - Michael passed Kerry (who came in second) → Michael is 1<sup>st</sup> & is Michael North.
  - Kerry ahead of Byrd → Byrd not 1<sup>st</sup>. → Kerry Lane 2<sup>nd</sup>
  - North is first
  - Byrd didn't come in 3<sup>rd</sup> & isn't named Joe.
  - only Jensen can be third → no one else left who could be → Jensen is Joe Jensen & he finished 3<sup>rd</sup>.
  - Zimmer is Mr. Zimmer & therefore is named Low & is 4<sup>th</sup>
  - Byrd is 5<sup>th</sup> & is Polly Byrd.

② Let  $x$  = value of the middle pearl

... ..  $x-100, x-100, x, x-150, x-300, \dots$   
 total  $16x - 13600$        $\downarrow$  must total to 65000      total  $16x - 20400$

$$33x - 13600 - 20400 = 65000$$

$$x = \underline{\underline{3000}}$$

③  $a^n = 1$  for what conditions would this be true?

① if  $a = 1$  for a base  
 $\therefore$

$$x^2 - 5x + 5 = 1$$

$\downarrow$

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

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

$$x = \underline{4}, \underline{1}$$

② if  $a = -1$   
 & the exponent is even  
 $\therefore$

$$x^2 - 5x + 5 = -1$$

$$x^2 - 5x + 6 = 0$$

$$(x-2)(x-3) = 0$$

$$x = \underline{\cancel{2}}, \underline{3}$$

$\downarrow$   
 extraneous solution

$\downarrow$   
 creates an odd exponent when substituted into

$$-x^2 - 12x - 33$$

which is our exponent power term.

③ if  $n = 0$

$$-x^2 - 12x - 33 = 0$$

$$x = \frac{12 \pm \sqrt{144 - 132}}{-2}$$

$$x = \frac{12 \pm 2\sqrt{3}}{-2}$$

$$x = \underline{\underline{-6 \pm \sqrt{3}}}$$