



π IN THE SKY⁹

Answer Key



Dam Deduction

Compute the velocity of the powered outflow.



Plug in the values for the measured height of the reservoir (H) above the penstocks and acceleration of gravity constant (g), and compute.

$$V = \sqrt{2gH} = \sqrt{2(9.8 \text{ m/s}^2)(100 \text{ m})} = \sqrt{1,960 \text{ m}^2/\text{s}^2} \approx \sqrt{44 \text{ m/s}^2}$$

What is the powered outflow if 1 penstock is open?

1. Compute the area of the penstock opening and multiply by the velocity. $A = \pi r^2 = 3.14 \cdot (3.1 \text{ m})^2 \approx 30 \text{ m}^2$ Powered outflow $\approx (30 \text{ m}^2)(44 \text{ m/s}) \approx (1,320 \text{ m}^3/\text{s})$

Is this a high or low percentage of the total outflow?



1. Compute the ratio of powered outflow to total outflow.

- $(1,320 \text{ m}^3/\text{s}) / (1,350 \text{ m}^3/\text{s}) \approx 98\%$
 - a high percentage of total outflow

What can this tell you about the potential environmental impacts?

The potential for environmental impact is high.