Math Problem Solutions

Problem 1 Solution:

The equation is: $E(t) = -2t^2 + 12t + 4$.

Set $E(t) = 40$. Rearrange: $-2t^2 + 12t - 36 = 0$.

Divide by -2: $t^2 - 6t + 18 = 0$.

Using the quadratic formula, the discriminant is negative.

Conclusion: The power will not reach 40 MW.

Problem 2 Solution:

Logic equation: $Q = (A \text{ OR } B) \text{ AND } (\text{NOT } A \text{ OR } B)$.

Case 1: $A=0, B=1 \Rightarrow Q=1$.

Case 2: $A=1, B=0 \Rightarrow Q=0$.

Case 3: $A=1, B=1 \Rightarrow Q=1$.

Final answers: $1, 0, 1$.

Problem 3 Solution:

Hexagon area = 12 cm^2. 20% obstructed.

Unobstructed area = $12 \times 0.8 = 9.6 \text{ cm}^2$.

Total for 10 hexagons = $9.6 \times 10 = 96 \text{ cm}^2$.

Problem 4 Solution:

Sequence: $L_n = 3n + 5$.

$L_1 = 8, L_7 = 26, L_{15} = 50$.

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Problem 5 Solution:

Gravitational force: $F = \frac{G \cdot m_1 \cdot m_2}{r^2}$.

$G=6.674 \times 10^{-11}, m_1=500 \text{ kg}, m_2=800 \text{ kg}, r=10 \text{ m}$.

$F = \frac{(6.674 \times 10^{-11})(500)(800)}{10^2}$.

$F \approx 2.67 \times 10^{-7} \text{ N}$.