

Planning, Deduction, and Numeracy Drills

Complex planning drill

Rule

You have positions:

A B C D

Goal:

D C B A

Allowed move: swap adjacent positions.

Minimum swaps?

Answer: 6

Reason:

Reverse order of 4 elements has $4 \times 3 / 2 = 6$ inversions.

Planning method

For any planning game:

1. Write current state.
2. Write target state.
3. Identify fixed pieces.
4. Move blockers first.
5. Count minimum moves if possible.

Deductive reasoning drill 1

Find next:

▲ ○ ▲ ○ ▲ ?

Answer: ○

Rule: alternating.

Deductive reasoning drill 2

Find next:

A, C, F, J, O, ?

Answer: **U**

Positions:

1, 3, 6, 10, 15

Differences:

+2, +3, +4, +5

Next +6 = 21 = U.

Deductive reasoning drill 3

Complete:

2, 6, 12, 20, 30, ?

Answer: **42**

Pattern:

$n^2 + n$

or differences:

4, 6, 8, 10, 12

Numeracy shortcut drills

Multiplication by 25

$n \times 25 = n \times 100 / 4$

Examples:

• $36 \times 25 = 900$

- $48 \times 25 = 1200$
- $72 \times 25 = 1800$

Multiplication by 11

For two-digit number ab :

$$ab \times 11 = a, a+b, b$$

Example:

$$34 \times 11 = 374$$

If middle sum exceeds 9:

$$57 \times 11 = 627$$

because $5+7=12$, carry 1 to 5.

Percentage equivalents

Fraction	Percentage
$\frac{1}{2}$	50%
$\frac{1}{3}$	33.33%
$\frac{1}{4}$	25%
$\frac{1}{5}$	20%
$\frac{1}{6}$	16.67%
$\frac{1}{8}$	12.5%
$\frac{1}{10}$	10%
$\frac{1}{20}$	5%

10-minute game warmup

Before actual assessment:

1. 2 minutes: grid recall
2. 2 minutes: reverse digit recall
3. 2 minutes: simple arithmetic
4. 2 minutes: pattern series
5. 2 minutes: calm instruction reading