

More "Mental Math"

Division:

① $\frac{372}{18}$ $\begin{cases} \nearrow \approx \frac{400}{20} = 20 \\ \searrow \approx \frac{360}{18} = 20 \end{cases}$ is an Under-Estimate (vs. $20.\bar{6}$)

② $\frac{6537}{32}$ $\begin{cases} \nearrow \approx \frac{6500}{30} = \frac{650}{3} \approx 210 \\ \searrow \approx \frac{6400}{32} = 200 \end{cases}$ is an Under-Estimate (vs. 204.28125)

③ $\frac{87}{158}$ $\begin{cases} \nearrow \approx \frac{80}{160} = \frac{1}{2} = 0.5 \text{ is an Under-Estimate} \\ \searrow \approx \frac{90}{160} = \frac{9}{16} = 0.5625 \text{ is an over-Estimate} \end{cases}$ (vs. ≈ 0.5506)

④ $\frac{139}{408}$ $\begin{cases} \nearrow \approx \frac{100}{400} = \frac{1}{4} = 0.25 \text{ is an Under-Estimate} \\ \searrow \approx \frac{140}{420} = \frac{14}{42} = \frac{14.1}{14.3} = \frac{1}{3} = 0.\bar{3} \approx 0.33 \end{cases}$ is an Under-Estimate (vs. ≈ 0.3407)

4.2 & 4.3 Exponents & Order of operations

PE(MD)AS
P: powers
E: exponents
(M): multiplication
(D): division
A: addition
S: subtraction

Calculating
"from left
to right"

e.g. ① $3 \cdot 4^2 \div 2 + 6 \cdot 3^3$
 $= 3 \cdot 16 \div 2 + 6 \cdot 27$
 $= 48 \div 2 + 162 = 24 + 162 = \boxed{186}$

② $12 \div 2(1+5)$
 $= 12 \div 2 \cdot 6 = 6 \cdot 6 = \boxed{36}$ (Not 1!)
1st!! 2nd!!

③ $10 \cdot 4 - 2(4^2 \div 4) \div 2 \div \frac{1}{2} + 9$
 $= 40 - 2(16 \div 4) \div 2 \div \frac{1}{2} + 9$
 $= 40 - 2 \cdot 4 \div 2 \div \frac{1}{2} + 9 = 40 - 8 \div 2 \div \frac{1}{2} + 9$
 $= 40 - 4 \div \frac{1}{2} + 9 = 40 - 8 + 9$
 $= 32 + 9 = \boxed{41}$