Achievable

GRE DUMP SHEET

Arithmetic and number properties

Signs, odds and evens

Odd and even	Signs, for × and ÷ alike
odd ± odd = even	same signs: positive
odd ± even = odd	different signs: negative
odd × odd = odd	$a - (-b) = a + b$
even × any integer = even	$-10 < -1$: closer to 0 is greater

- Rebuild a rule from 0 and 1; **0 is even**; 2 is the only even prime
- Negative base: even power +, odd power −: $(-2)^3 = -8$
- Quantity B is 0? Only the sign of A matters

Defined and undefined

- **Undefined:** $\frac{x}{0}$, $\sqrt{\text{negative}}$, 0^0, a vertical line's slope
- "Defined" rules out a zero denominator: a likely trap answer

Divisors, primes and multiples

- **Divisor:** divides evenly (3 of 12); **multiple:** × an integer (24 of 12)
- **Prime factors:** try 2, 3, 5, 7... in turn: $462 = 2 \cdot 3 \cdot 7 \cdot 11$
- **Divisible by** 3, 9: digit sum; 4: last two digits; 5: ends in 0 or 5
- **Remainder** = decimal part × divisor: $142 \div 12 \approx 11.833$, r 10
- A remainder is less than the divisor: ÷ 4 leaves 0, 1, 2 or 3
- **Primes:** 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47
- **Cubes:** 8, 27, 64, 125, 216, 343, 512, 729; squares to $12^2 = 144$

GCF and LCM

- **GCF:** shared primes, **lowest** powers: x^2y^3z, $x^3y^2z^5 \rightarrow x^2y^2z$
- **LCM:** all primes, **highest** powers: $9 = 3^2$, $78 = 2 \cdot 3 \cdot 13 \rightarrow 234$
- **Or list the factors:** 148 and 212 share 1, 2, 4: GCF 4
- **Common denominator:** the LCM: 5, 10, 30, 45 → 90

Fractions and decimals

- **Add** over a common denominator; **×** across; **÷:** flip and ×
- **To a fraction:** digits over 10^n: $0.124 = \frac{124}{1000} = \frac{31}{250}$
- $\frac{4}{9} = 0.\overline{4}$; $\frac{3}{11} = 0.\overline{27}$; $\frac{6}{900} = 0.00\overline{6}$
- **Round only the final answer:** $0.13579 \rightarrow 0.14$

Percents

- **40% more:** $\times 1.4$; **40% less:** $\times 0.6$; $0.5\% = 0.005$
- **Change** $= \frac{\text{difference}}{\text{original}} \times 100$; after "than" comes the denominator
- **Changes multiply:** down 10%, up 25%: $\times 0.9 \times 1.25$
- No numbers? Start with **100**

Ratios and mixtures

- 2 dogs for every 3 cats: dogs : cats = **2 : 3**, in the words' order
- $\frac{c}{p} = \frac{2}{3}$ means $3c = 2p$; with 12 plates, $c = 8$
- 2 : 3 is 5 parts: 20 items hold 12 plates; totals are multiples of 5
- **Mixture:** track one ingredient: $0.25a + 0.1r = 0.2(a + r)$
- **Weighted average:** Σ share × value, between the extremes

Simple and compound interest

- **Simple** $P\left(1 + \frac{rt}{100}\right)$; **compound** $P\left(1 + \frac{r}{100}\right)^t$
- r and t **per period:** 1% per 4 months for 3 years: $t = 9$
- Interest = total − principal; check simple or compound, and how often it compounds
- $1,000, 5%, 10 years: $1,500 simple, $1,628.89 compound

Sequences

- **Cycle** 3, 6, 2, 1: the 40th term is 1; any 4 in a row sum to 12
- **A rule:** tabulate term number and value, forward or back
- **Arithmetic** $a_n = a_1 + (n-1)d$; **geometric** $a_n = a_1 r^{n-1}$

Exponents and radicals

Rule	Example	Rule	Example
Multiply, same base: **add**	$3^4 \cdot 3^5 = 3^9$	Negative: flip to the denominator	$3^{-4} = \frac{1}{3^4}$, not negative
Divide, same base: **subtract**	$\frac{3^6}{3^3} = 3^3$	Zero power: 1, if the base isn't 0	$3^0 = 1$; 0^0 is undefined
Power of a power: **multiply**	$(3^3)^2 = 3^6$, but $3^{(3^2)} = 3^9$	Fraction: the denominator is the root	$\sqrt[3]{12^2} = 12^{2/3}$; $\sqrt{25} = 25^{1/2}$
Same exponent: multiply bases	$3^3 \cdot 4^3 = 12^3$	Roots combine under × and ÷	$\sqrt{2}\sqrt{3} = \sqrt{6}$; $\frac{\sqrt{12}}{\sqrt{6}} = \sqrt{2}$

- **Like radicals:** $3\sqrt{2} + 2\sqrt{2} = 5\sqrt{2}$; $\sqrt{18} = \sqrt{9}\sqrt{2} = 3\sqrt{2}$
- **Between 0 and 1** powers shrink: $x^3 < x^2 < x$