

VIDEO SUMMARIES: ALGEBRA (L2)

FRACTIONS

What you need to know:

| + | - | × | ÷ |
|--|--|--|---|
| <p>Upside Down Picnic Table</p> $\frac{\frac{a}{b} \times \frac{c}{d}}{\frac{a \times d + b \times c}{b \times d}} = \frac{ad + bc}{bd}$ | $\frac{\frac{a}{b} \times \frac{c}{d}}{\frac{a \times d - b \times c}{b \times d}} = \frac{ad - bc}{bd}$ | $\frac{\frac{a}{b} \times \frac{c}{d}}{\frac{a \times c}{b \times d}} = \frac{ac}{bd}$ | $\frac{\frac{a}{b} \div \frac{c}{d}}{\frac{a}{b} \times \frac{d}{c}} = \frac{a \times d}{b \times c} = \frac{ad}{bc}$ |

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FACTORISING

What you need to know:

$$x^2 - 25$$

If both numbers are squares then square root to find solution.

$$(x + 5)(x - 5)$$

On the calculator:

1. **[MENU]** EQUA
2. **[F2]** POLY
[F1] (2) for quadratic
3. Type each no. (inc first) followed by EXE key
4. **[F1]** (SOLV)
5. Make answers negative and put in brackets

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REARRANGING

What you need to know:

1. Draw any hidden brackets
2. Identify what is the subject
3. Work backwards up BEDMAS
4. Repeat if necessary

B
E
D
M
A
S

A thick red arrow pointing upwards, positioned to the right of the letters B, E, D, M, A, S, indicating the order of operations from bottom to top.

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INDICES

Powers

Exponents

What you need to know:

| $\sqrt{\quad}$ or 2 | \times | \div | $+$ or $-$ |
|---|---|--|---|
| Multiply Powers $(3x^4)^3$ $3^3 x^{4^3}$ $27x^{12}$ | Add Powers $3x^2 \times 5x^6$ $15x^{2+6}$ $15x^8$ | Subtract Powers $\frac{x^7}{x^5} = x^{7-5}$ x^2 | Only add or subtract coefficients of like terms $4ab + 2a^2b$ $- a^2b + 2ab$ $6ab$ |

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EXPANDING THREE BRACKETS

What you need to know:

- Expand two sets of brackets with FOIL method

$$(x + 2)(x - 5)(x - 3)$$

$$(x^2 + 2x - 5x - 10)(x - 3)$$

$$(x^2 - 3x - 10)(x - 3)$$
- Break up third set

$$x(x^2 - 3x - 10) - 3(x^2 - 3x - 10)$$
- Expand the brackets

$$x^3 - 3x^2 - 10x - 3x^2 + 6x + 30$$
- Simplify

$$x^3 - 6x^2 - 4x + 30$$

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LOG RULES

What you need to know:

1. $\log A + \log B = \log(AB)$
2. $\log A - \log B = \log\left(\frac{A}{B}\right)$
3. $\log A^B = B\log A$
4. if $\log_A x = B$ then $x = A^B$
5. \ln (natural log) - inverse of e

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WORD LOG EQUATIONS

$$\log A^B = B\log A$$

What you need to know:

1. Substitute
2. Simplify
3. Log on both sides
4. Use log rule
5. Divide both sides by log
6. Put in calculator

$$T = I(1 + 0.035)^t$$

$$6000 = 5000(1 + 0.035)^t$$

$$\frac{6000}{5000} = (1 + 0.035)^t$$

$$\log 1.2 = \log(1 + 0.035)^t$$

$$\log 1.2 = t \log(1 + 0.035)$$

$$\frac{\log 1.2}{\log(1 + 0.035)} = t$$

$$t = 5.300$$

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