

THINK OF A NUMBER: -Algebra

1)

- i) *Think of a number.*
- ii) *Double it.*
- iii) *Add 12.*
- iv) *Half the answer.*
- v) *Subtract the number first thought of.*

- a) Pick any number and work through the instructions above. What answer do you get?
Try it again with a different starting value. What answer do you get?
- b) Now start with the value of x which represents ANY number at all and work through the instructions.

{You should end up with the same answer as in part a), which confirms that it does not matter which number you start with!}

2)

- i) *Think of a number.*
- ii) *Add 2.*
- iii) *Double it.*
- iv) *Subtract 6.*
- v) *Half the answer.*
- vi) *Add 1.*

- a) Pick any number and work through the instructions above. What answer do you get?
Try it again with a different starting value. What answer do you get?
- b) Now start with the value of x which represents ANY number at all and work through the instructions.

{This should confirm that you always end up with the same value you started with!}

3)

- i) *Think of a number.*
- ii) *Double it.*
- iii) *Add 12.*
- iv) *Subtract 8.*
- v) *Half the answer.*
- vi) *Subtract the number first thought of.*

- a) Pick any number and work through the instructions above. What answer do you get?
Try it again with a different starting value. What answer do you get?
- b) Now start with the value of x which represents ANY number at all and work through the instructions.

{You should end up with the same answer as in part a), which confirms that it does not matter which number you start with!}

4)

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| <p>i) <i>Think of a number.</i>
ii) <i>Add 10.</i>
iii) <i>Double it.</i>
iv) <i>Subtract 10.</i>
v) <i>Half the answer.</i>
vi) <i>Subtract 5.</i></p> |
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- a) Pick any number and work through the instructions above. What answer do you get? Try it again with a different starting value. What answer do you get?
- b) Now start with the value of x which represents ANY number at all and work through the instructions.

{This should confirm that you always end up with the same value you started with!}

5)

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| <p>i) <i>Think of a number.</i>
ii) <i>Add 4.</i>
iii) <i>Multiply by 3.</i>
iv) <i>Subtract the number first thought of.</i>
v) <i>Half the answer.</i>
vi) <i>Subtract 6.</i></p> |
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- a) Pick any number and work through the instructions above. What answer do you get? Try it again with a different starting value. What answer do you get?
- b) Now start with the value of x which represents ANY number at all and work through the instructions.

{This should confirm that you always end up with the same value you started with!}

6)

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| <p>i) <i>Think of a number.</i>
ii) <i>Double it.</i>
iii) <i>Add 8.</i>
iv) <i>Half the answer.</i>
v) <i>Subtract the number first thought of.</i>
vi) <i>Subtract 4.</i></p> |
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- a) Pick any number and work through the instructions above. What answer do you get? Try it again with a different starting value. What answer do you get?
- b) Now start with the value of x which represents ANY number at all and work through the instructions.

{You should end up with the same answer as in part a), which confirms that it does not matter which number you start with!}

EXTENSION.

- 1) The following instructions should result with the same number you start with.

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| i) <i>Think of a number.</i> |
| ii) <i>Add 5.</i> |
| iii) <i>Double it.</i> |
| iv) <i>Subtract 6.</i> |
| v) <i>Half the answer.</i> |
| vi) |

Complete the final instruction to ensure we always end up with the same number we started with.

- 2) The following instructions should always result with an answer of 4.

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|------------------------------|
| i) <i>Think of a number.</i> |
| ii) <i>Double it.</i> |
| iii) <i>Add 12.</i> |
| iv) <i>Half the answer.</i> |
| v) |
| vi) |

Complete the final two instructions to ensure we always end up with an answer of 4.

- 3) The following instructions should always result with an answer of 4.

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| i) <i>Think of a number.</i> |
| ii) <i>Subtract 3.</i> |
| iii) <i>Double it.</i> |
| iv) <i>Add 6.</i> |
| v) |
| vi) |
| vii) |

Complete the final instructions to ensure we always end up with an answer of 4.

- 4) i) Construct a set of at least 5 instructions which always results in an answer of 10.
- ii) Construct a set of at least 5 instructions which always results in a zero answer.
- iii) Construct a set of at least 5 instructions which always results in the same number you started with.
- iv) Construct a set of at least 5 instructions which always results in an answer of $\frac{1}{2}$.

ANSWERS to the extension.

1) vi) *Subtract 2.*

2) v) *Subtract the number first thought of,* vi) *Subtract 2* (or visa-versa!)

3) E.g. v) *Half the answer,* vi) *Subtract the number first thought of,* vii) *Add 4.*