A Level Transition Lessons from GCSE:

Indices

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| --- |
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01: Indices

Law 1: Multiplication

26 x 24 =

=

=

**General Law 1:**

pm x pn =

Law 2: Division

26 ÷ 24 =

t5 ÷ t2 =

=

**General Law 2:**

pm ÷ pn =

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **3)** | **4)** | **5)** |
| 6) | **7)** | **8)** | **9) 12** | **10)** |

**11)**

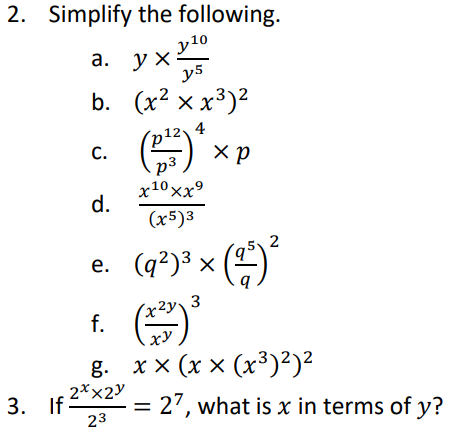
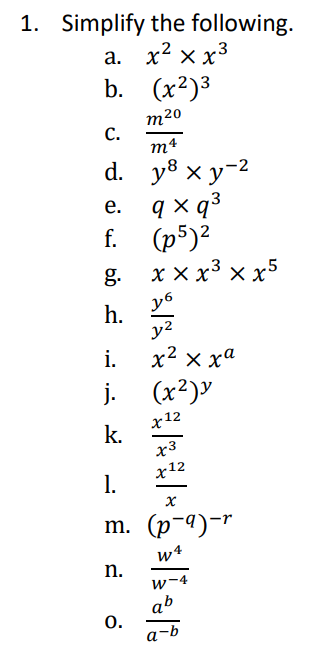
Law 3: Brackets

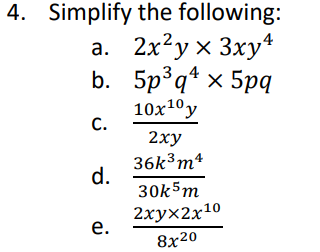
(26)2

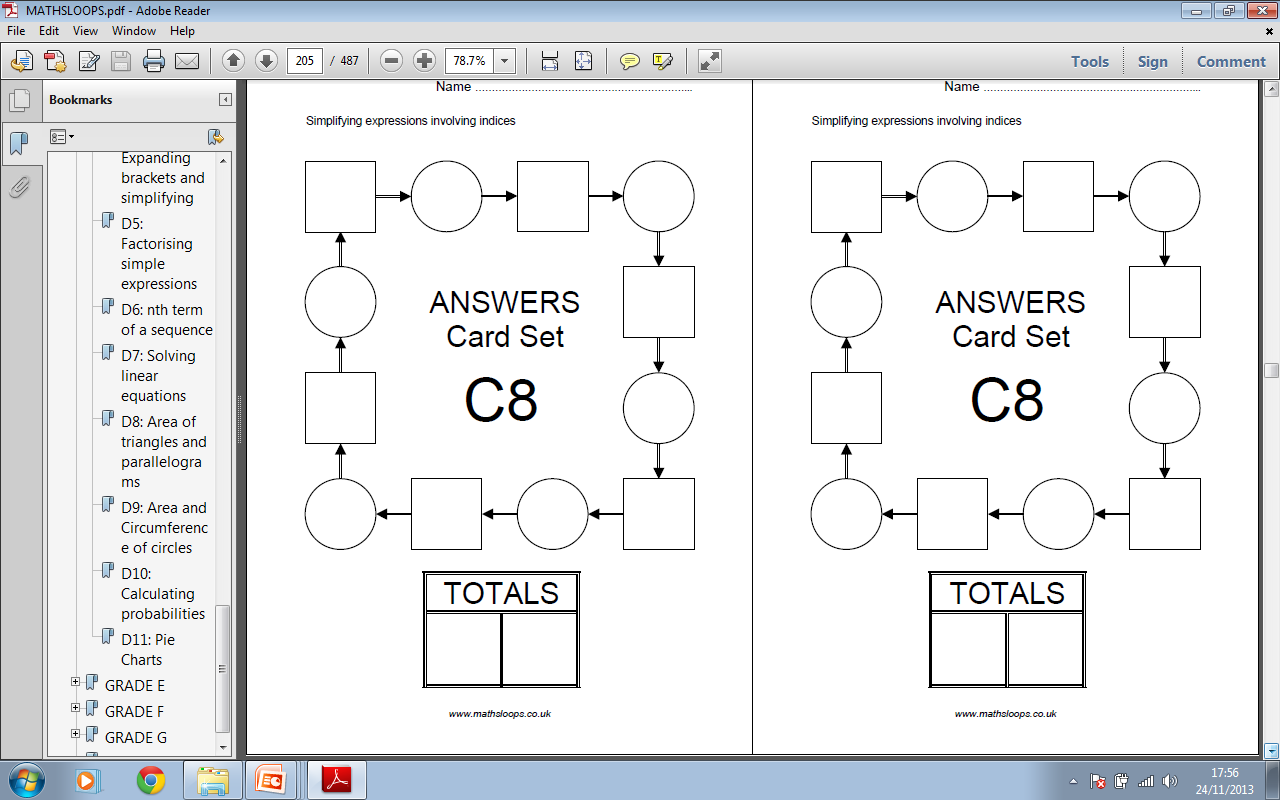
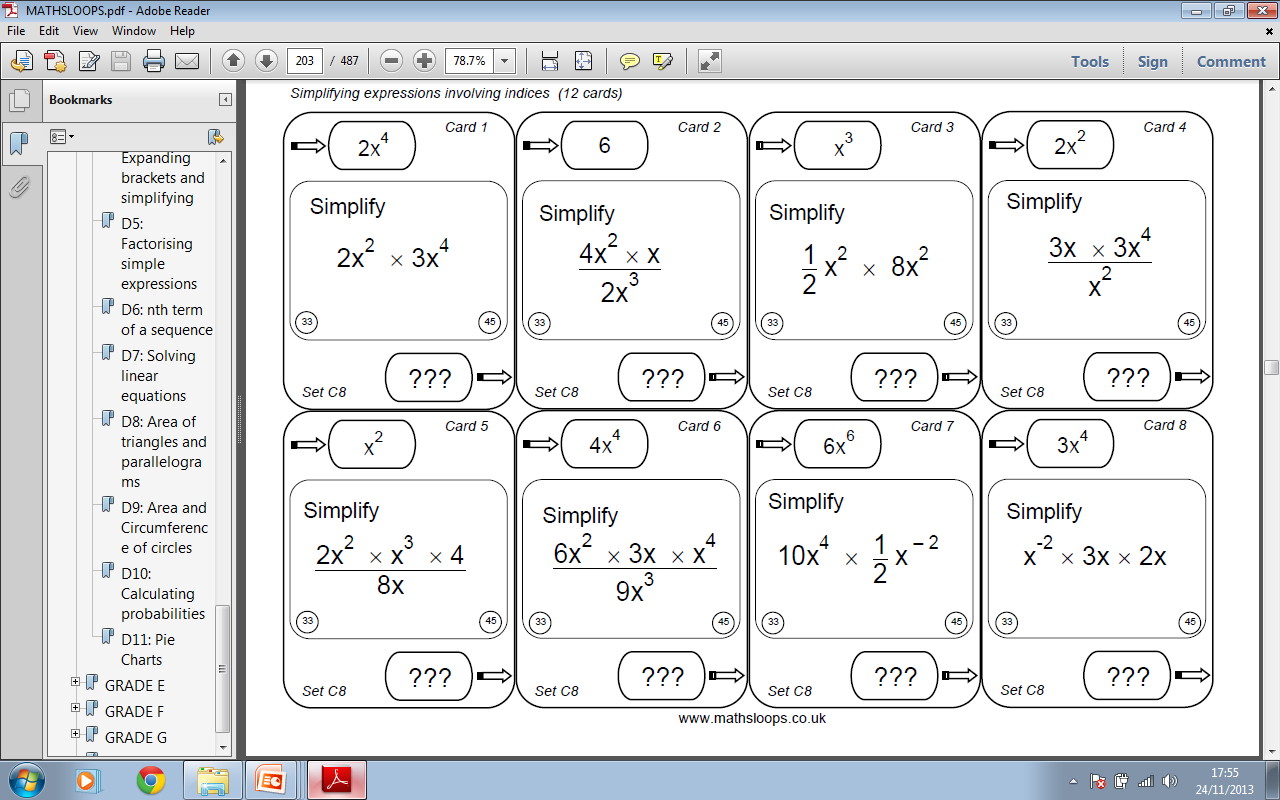
**General Law 3:**

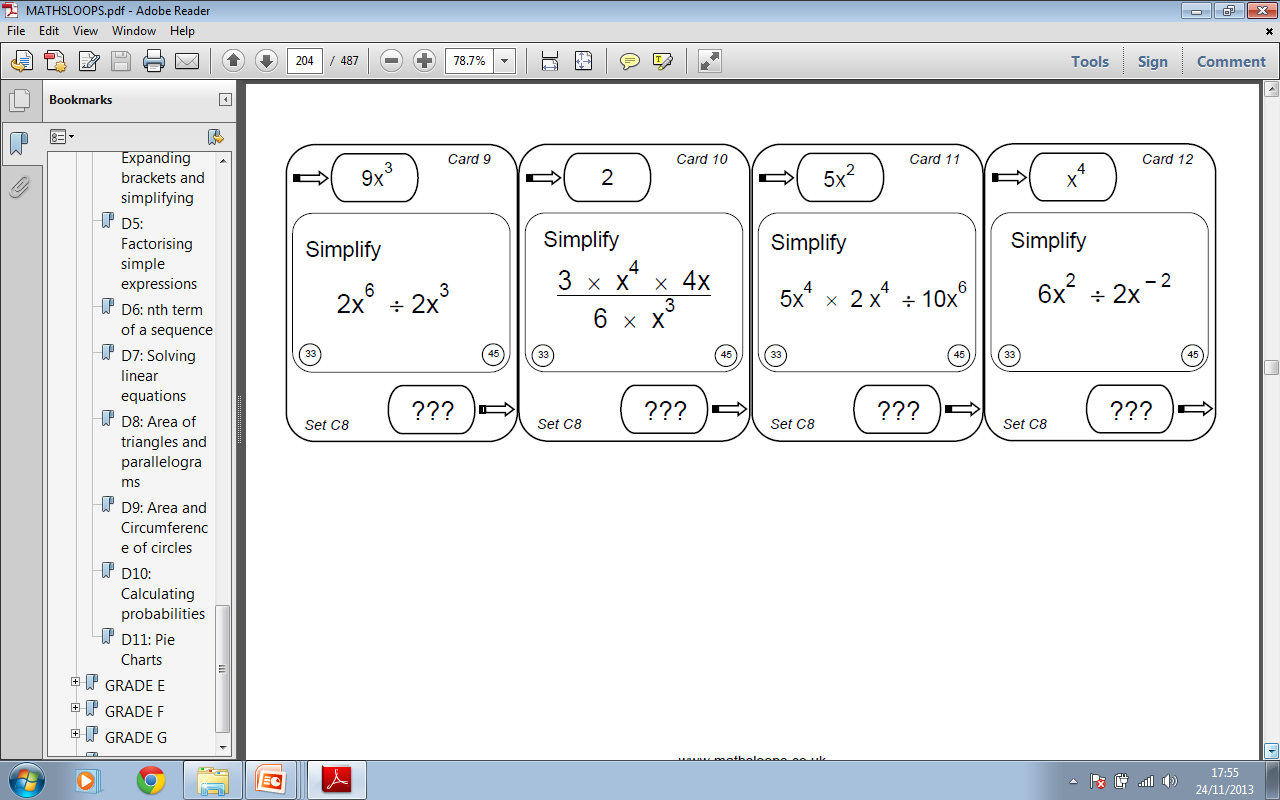
(pm)n =

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1) | 2) | 3) | 4) | 5) |
| 6) 9d6 x 8d3 | 7) 12e10 x ½ e4 | 8) 24f8 ÷ 6f4 | 9) 60g12 ÷ 5g3 | 10) |









02: Negative & Fractional Indices

Index Law 4

**General Rule**

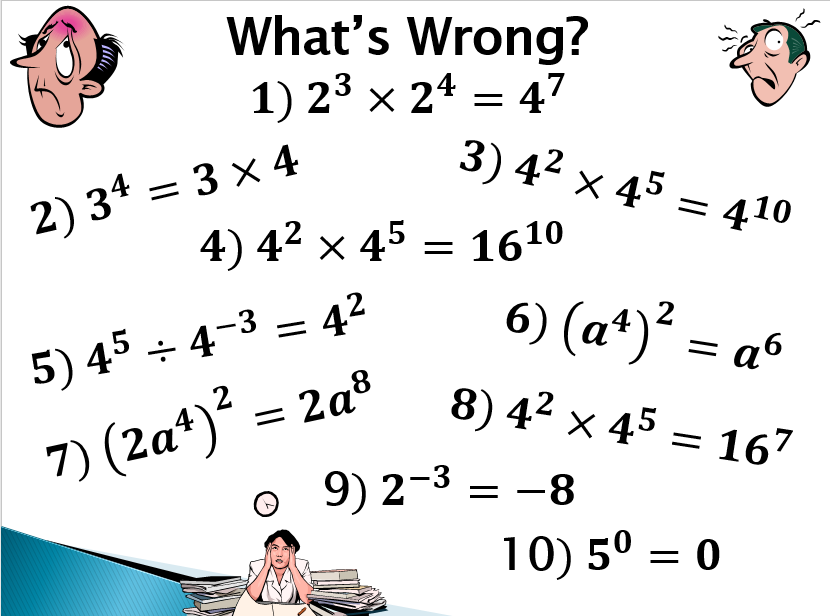
p0 =

Index Law 5

**General Rule**

=

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2) | 3) | 4) |



Fractions & Powers

1. 2) 3)

4) 5) 6)

Further Examples

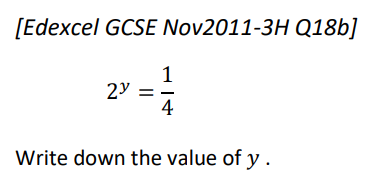
Write the following in index form…

a) b) c)

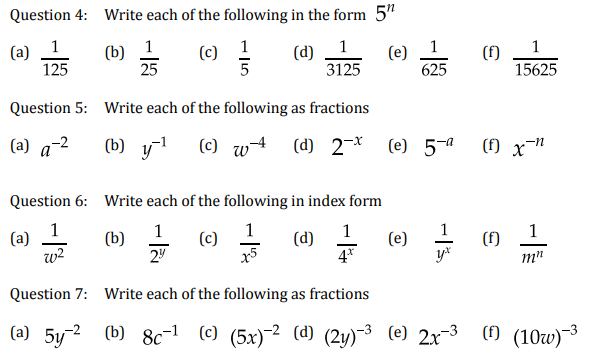
Write the following as a fraction:

a) b) c)

Exam Question



Quick Questions:



Index Law 6

**General Rule**

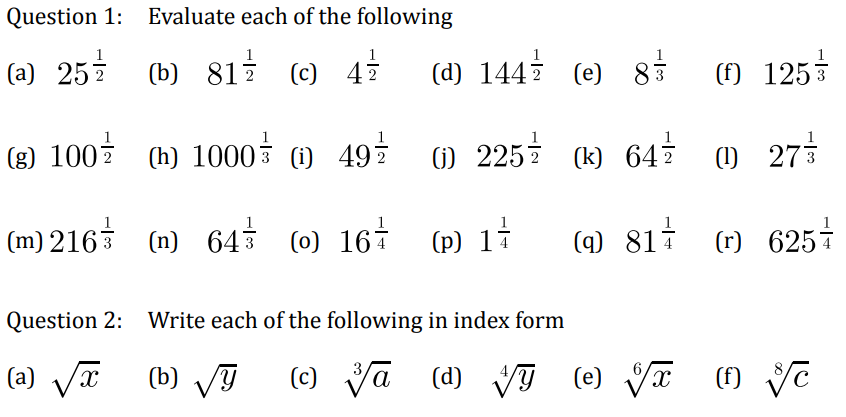
***=***

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | 3) |  |

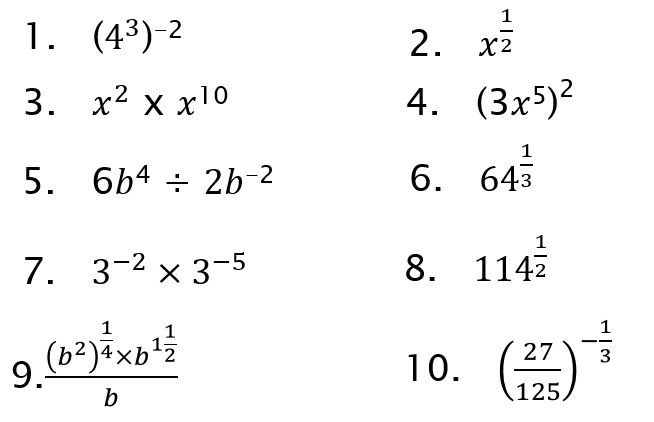
|  |  |  |  |
| --- | --- | --- | --- |
| 5) | 6) Write as an index | 7) | 8) |

Write the following as a power of 4:

a) b) c) d) e)



03: More Fractional Indices



Index Law 7

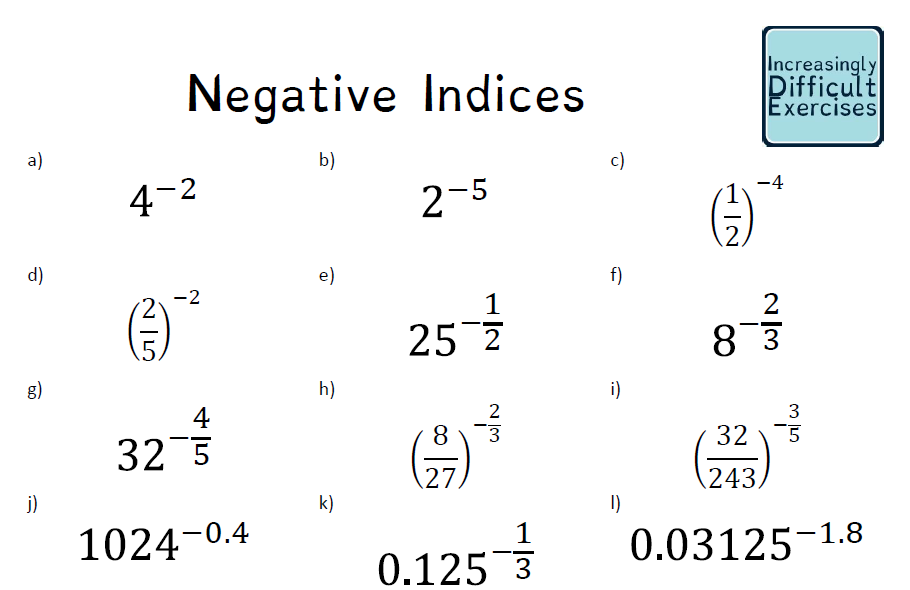
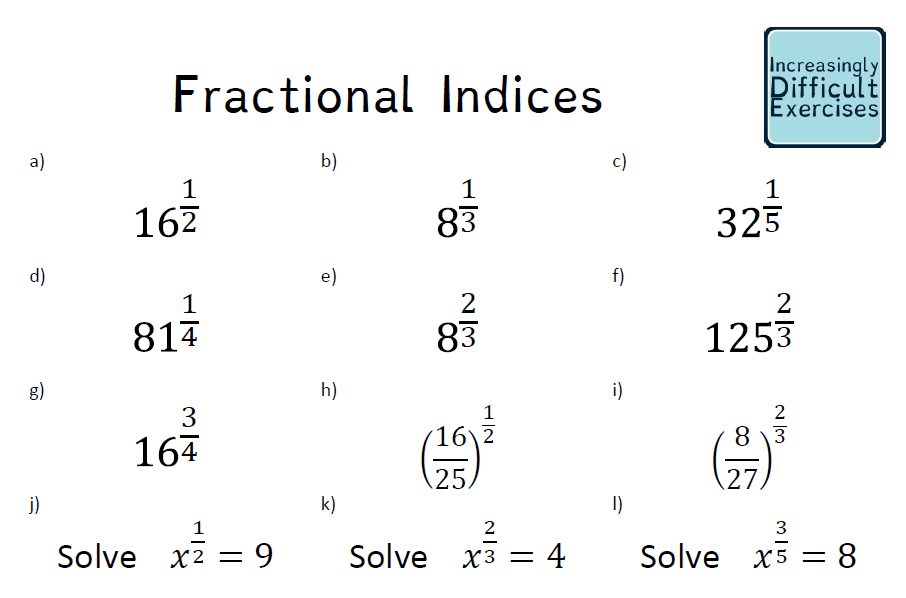
**General Rule**

***=***

|  |  |  |  |
| --- | --- | --- | --- |
| 1) | 2) | 3) | 4) |
| 5) | 6) | 7) | 8) |

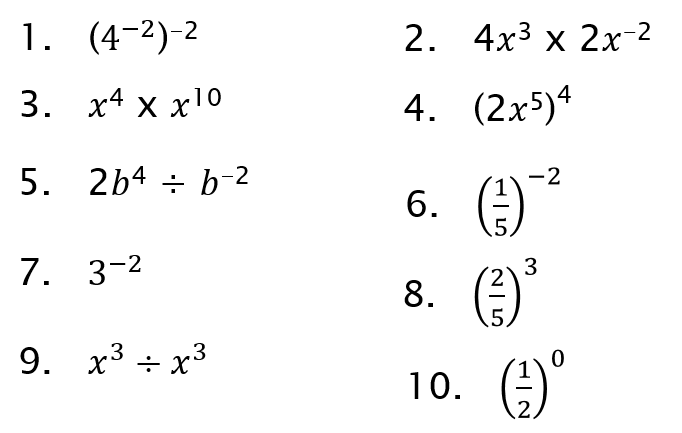
Evaluate

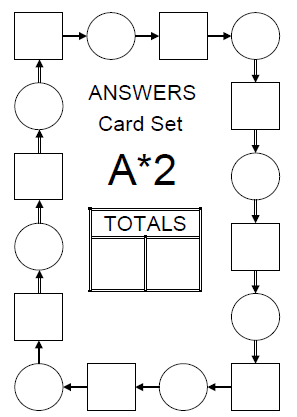
|  |  |  |
| --- | --- | --- |
|  |  |  |

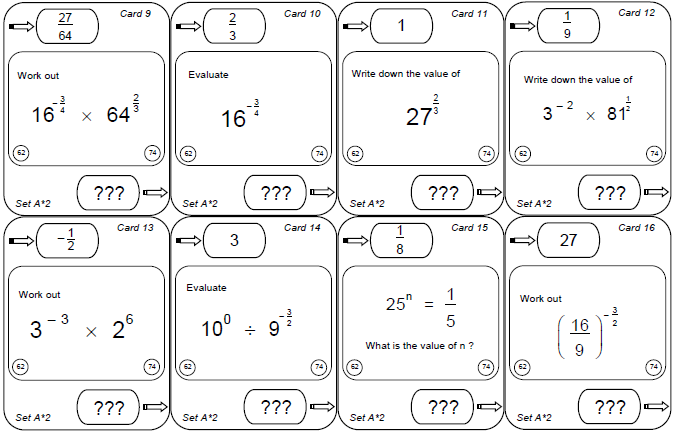


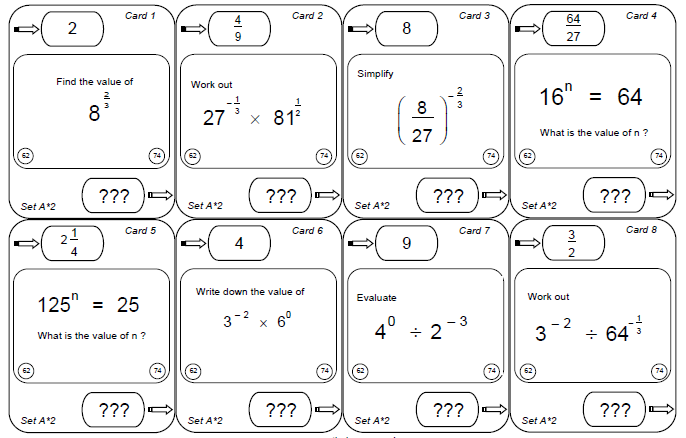
|  |  |
| --- | --- |
| **USING INDEX LAWS**  **1.** Simplify *t*2 × *t*3  **2.** 4*m*2 × 3*m*5  **3.** Simplify  (a) 42 × 4 5  (b) *p*6 ÷ *p*3  (c) (*q*4)2  **4.** Simplify  (a) 5*w*6 *× 2w*2  (b) 20*x*3÷ 4*x*5  (c) (3*y*3)2  **5.** Simplify  (i) *x*5 × *x*–2  (ii) *y*5 ÷ *y*–2  **6.** (a) Write down the value of  (b) Work out  Give your answer as a decimal.  (c) Work out . Give your answer as a power of 5.  **7.** (a) Find the value of  (b) Find the value of 8*x*0  **8.** (a) Write down the value of  (b) Write down the value of (4*xy*)0  **9.**  Write down the value of 64 | **10.** (a) Find the value of  (b) Simplify 2–2 ×  **11.** (a) Write down the value of 110  (b) Find the value of 8  (c) Simplify 6–2 × 1440.5  **12.** Evaluate  (a)  (b)  **13.** Simplify fully  (a) 8 × 80 × 8–1  (b) 5–2 × (5)3  (c) Write down the value of  **14.** (a) (i) Evaluate 13*z*0  (ii) Evaluate (13*z*)0  **15.** (a) Work out the exact value of ()4  (c) Find the value of (0.25)–1  (d) Find the value of . Leave your answer as a fraction.  **16.** (a) Calculate the value of 64, giving your answer as a fraction in its simplest form.  **17.** (a) Work out 49× 5–1  **18.** Express  as a fraction.  **19.** (a) Evaluate  (b) Write as a fraction. |

04: Solving Equations





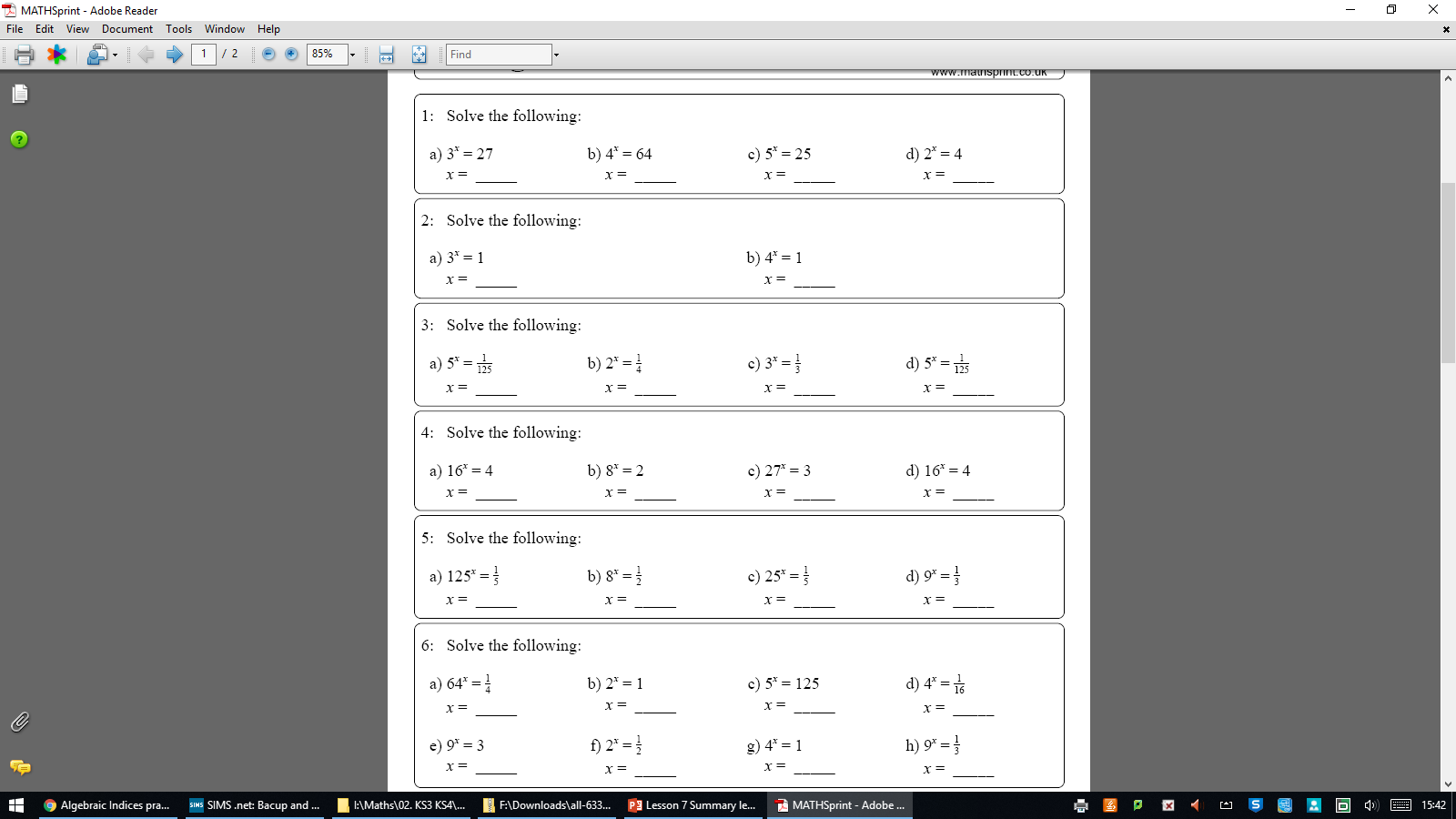




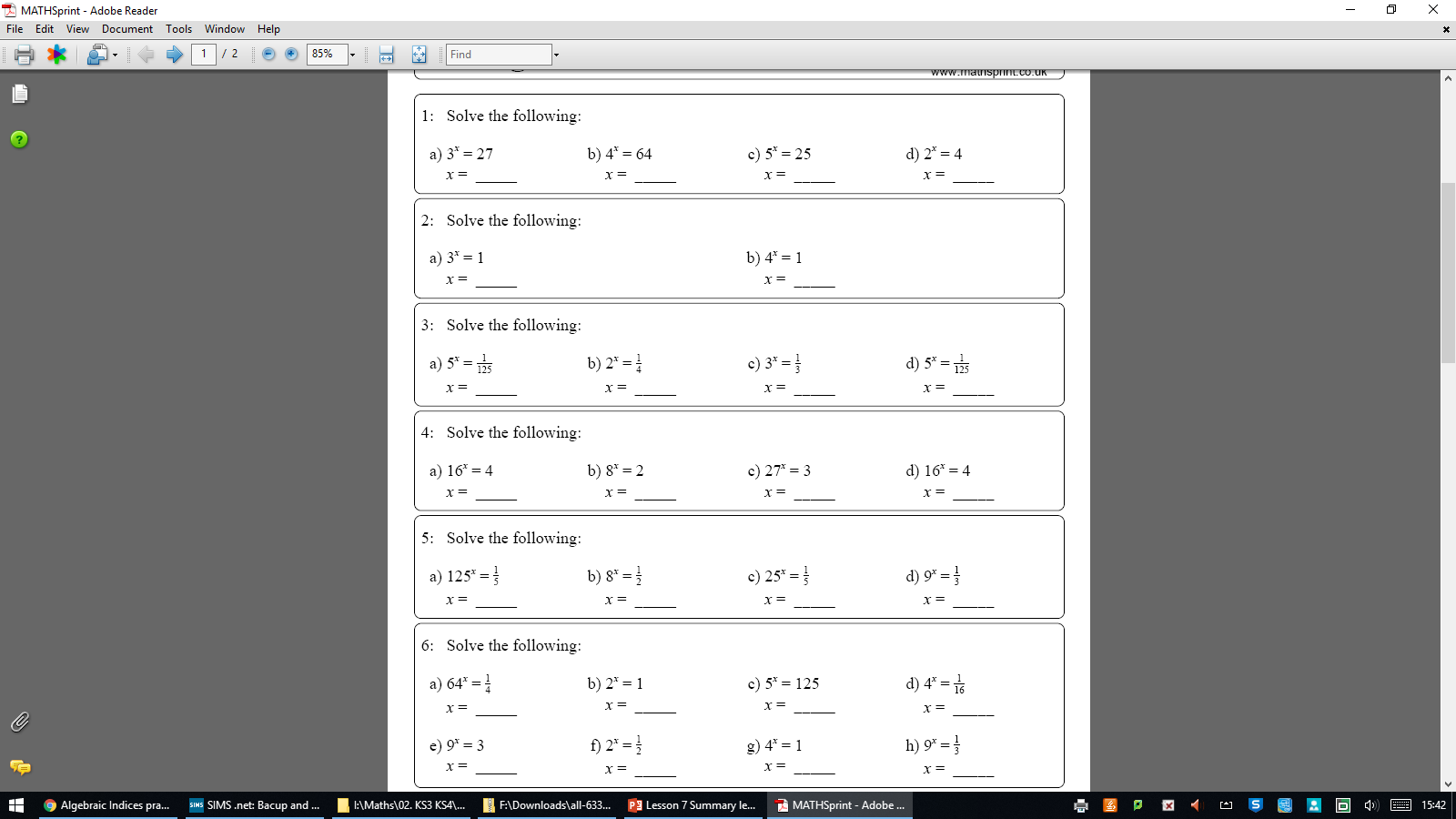
|  |  |  |
| --- | --- | --- |
| 1) 3x = 81 | 2) 14x = 1 | 3) = |
| 4) 5 = 0 | 5) | 6) |

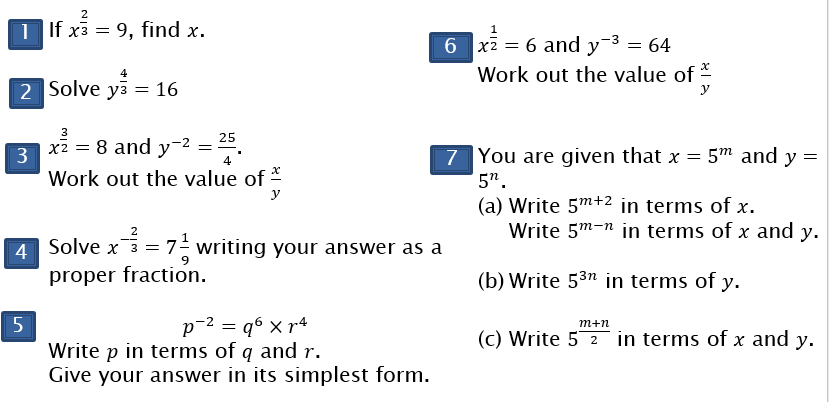
Further Examples

|  |  |
| --- | --- |
| Solve | |
| Method 1 | Method 2 |



|  |  |
| --- | --- |
| 2) Solve | 3) Solve |





06: Changing the Base & Solving

1) If and b, express the following as powers of 2.

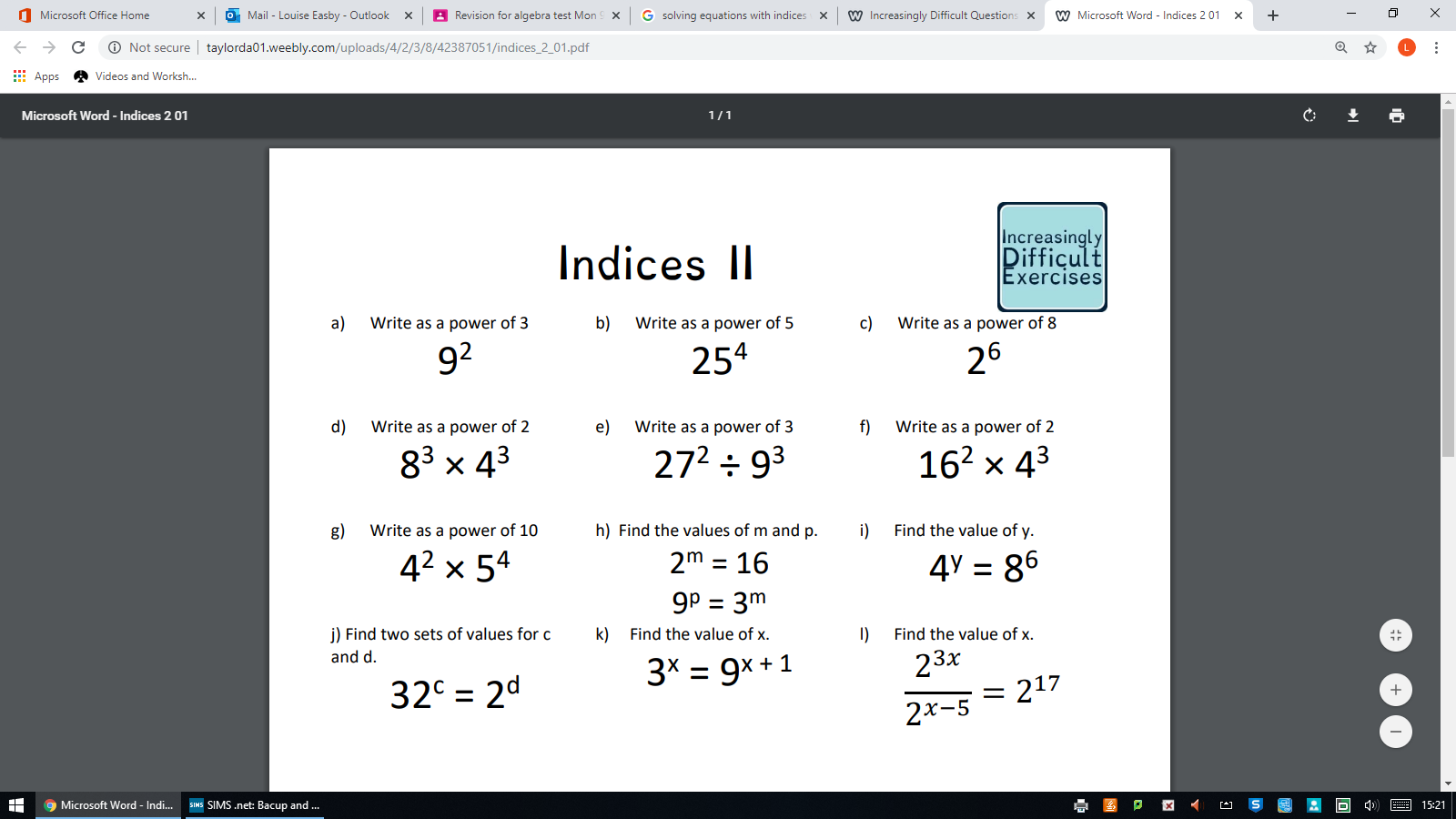
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  | 4) | 5) |

2) Write the following numbers as the base 5 raised to a power

|  |  |  |  |
| --- | --- | --- | --- |
| i) 625 | ii) 1 | iii) | iv) |

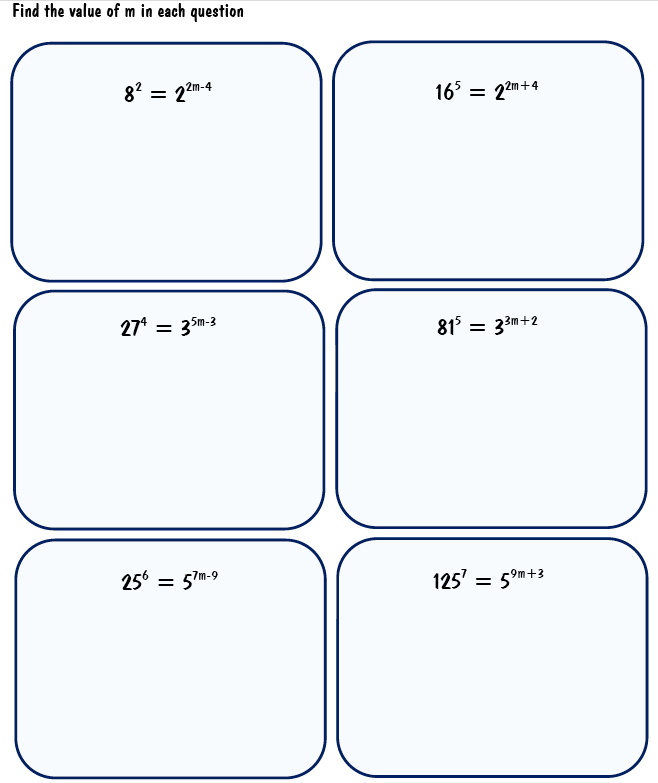
3) Write the following numbers as the base 2 raised to a power

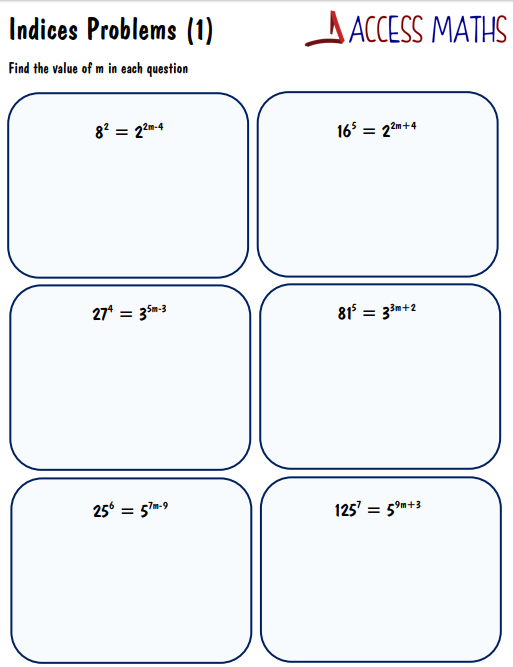
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| i) 8 | ii) 1 | iii) | iv) | v) | vi) |



Solving:

|  |  |
| --- | --- |
| 1. Solve | 1. Solve |





Further Examples…

|  |  |
| --- | --- |
| 1. Solve |  |

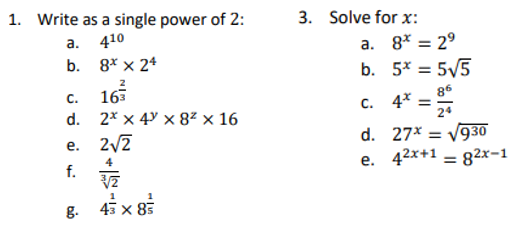
|  |  |
| --- | --- |
|  |  |

Exam Questions

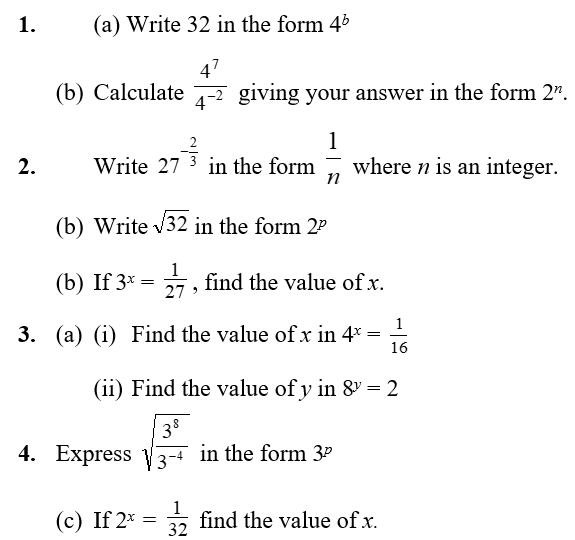
|  |  |  |
| --- | --- | --- |
| Screen Clipping | Screen Clipping | Find the value of for which  x |

Questions: In your books…

Extension…



07: Problem Solving

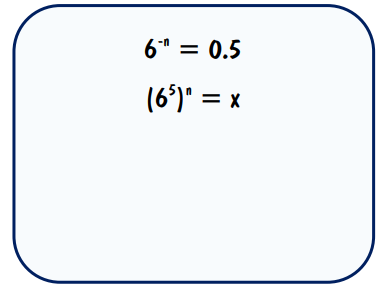
Starter

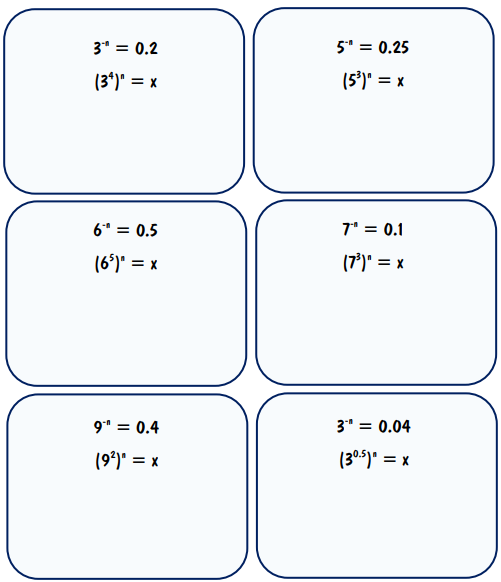
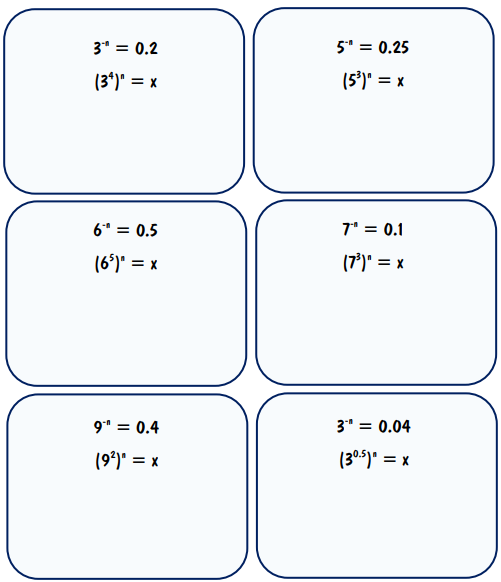
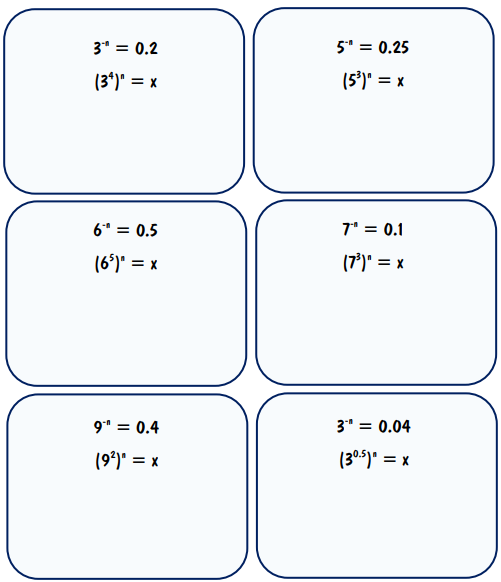
Examples:

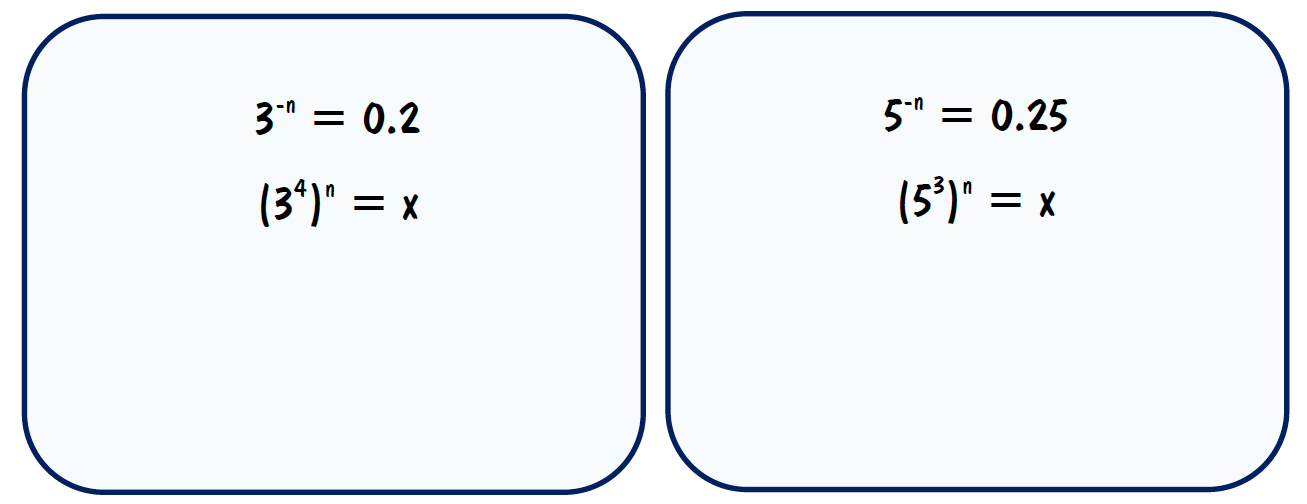
|  |  |  |  |
| --- | --- | --- | --- |
| 1) What is half of ? | 2) What is a ninth of ? | 3) What is a quarter of ? | 4) What is the square root of ? |
| 5)  What is ? | 6)  Circle the correct answer… | | 7) |

Forming Expressions:

|  |  |
| --- | --- |
| can be written in the form  Express in terms of | If and b, express the following in terms of & .  a) b) |

Harder Examples:  
Find .





1. If , then write down an expression for in terms of and .
2. If , then write down an expression for in terms of and .
3. If , then write down an expression for in terms of and .
4. If , then write down an expression for in terms of and .
5. If , then write down an expression for in terms of and .
6. If , then write down an expression for in terms of and .
7. If , then write down an expression for in terms of and .
8. If , then write down an expression for in terms of and .
9. If , then write down an expression for in terms of .
10. If , then write down an expression for in terms of and .
11. If , then write down an expression for in terms of .
12. If , then write down an expression for in terms of and .
13. If , then write down an expression for in terms of and .
14. If , then write down an expression for in terms of .
15. If , then write down an expression for in terms of .
16. If , then write down an expression for in terms of and .
17. If , then write down an expression for in terms of and .
18. If then write down an expression for in terms of and .
19. If , then write down an expression for in terms of .
20. If , then write down an expression for in terms of .