February 3rd, 2016

**Homework 2:** Choose one of the two problems listed below. Write up your solution with as much detail as possible. Please include any math and all explanations.

**Number Guessing Cards**

Here are two versions of the Number Guessing Cards. One person chooses a number that appears on at least one card, then indicates on which cards the chosen number appears. The other person then must as quickly as possible determine which number was chosen.

Small Set

CARD 1

1

3

5

7

CARD 2

2

3

6

7

CARD 3

4

5

6

7

Large Set

CARD 1

1

3

5

7

9

11

13

15

17

19

21

23

25

27

29

31

CARD 2

2

3

6

7

10

11

14

15

18

19

22

23

26

27

30

31

CARD 3

4

5

6

7

12

13

14

15

20

21

22

23

28

29

30

31

CARD 4

8

9

10

11

12

13

14

15

24

25

26

27

28

29

30

31

CARD 5

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

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**Turn over for the other problem**

**Tiling with L’s**

For n a positive integer consider an array of 2^n × 2^n squares, with the upper right-hand square removed. Prove that this array can be tiled by “L’s” consisting of three squares. In the figure below we show the array n = 2, and one “L”.

