Grade 6 Math Circles
November 14/15/16
Encryption Solutions

Exercise Solutions

We will provide solutions to select exercises from the handout.

1. *I will tell you what the next session is about*

3. *The next session of the math circles workshop is on the concept of*

4. *A pig and a cow went together to a farm and a market*

5. (a) *csnirauperfhe*

   (b) *mlenacerasotrsgtkphiiawrcso*

6. (a) *hello everyone*

   (b) *purple is my favourite colour*

7. *matrices*

Problem Set Solutions

1. (a) *qc jezsyvmxi xcti sj tmi mw*

   (b) *ftdqq bauzf azq ragd azq ruhq zuzq*

2. (a) *mviyfiyaorttpopesfueei*

   (b) *tnrnhitupeirooonvnepnfeieeef*

3. *the big purple dog was bigger than the orange dog*

4. (a) The shift is 7.

   (b) *blue cheese is my second favourite cheese*

5. (a) *yfywmzwttzntjvjtktxbxwky*

   (b) *we hope that you are enjoying math circles*

6. Using prime numbers $p = 7$ and $q = 11$, we get $n = 77$ and $L = 30$. For e, we may choose 7 since 7 can't be divided by any of the same prime numbers as 30 (note that this isn't the only

option). Then $m^e = 6^7 = 279936$ and the remainder when we divide by $n = 77$ is 41. Hence 41 is the encoded message.

7. (a) *ellohay hat'sway ouryay amenay?*

8. (a) *ipylyfgivrmrgygr*
   icrvxsfvodjr

   (b) *encryption*