**Mental Math Strategies**

**Grade 7**

Knowledge of the divisibility rules will provide a valuable tool for mental arithmetic and general development of operation sense.

The divisibility rules are as follows. A number is divisible by:

**Outcome N1**

**Develop and apply divisibility rules for 2,3,4,5,6,8,9,and 10.**

 **2** if it is even

 **3** if the sum of the digits is divisible by 3

 **4** if the number formed by the last two digits is divisible by 4

 **5** if the number ends in a 5 or 0

 **6** if the number is divisible by 3 and even

**8** if the number is divisible by 4 and the resulting quotient is even; or, if the number represented by the last 3 digits is divisible by 8

 **9** if the sum of the digits is divisible by 9

 **10** if it ends in 0

**Outcome N3: Percent**

Students should make immediate mental connections between common fractions and their percent equivalents.

$\frac{1}{2}$ **= 50%** $\frac{1}{3}$ **= 33**$\frac{1}{3}$**%** $\frac{1}{4}$ **= 25%** $\frac{1}{5}$ **= 20%** $\frac{1}{10}$ **= 10%**

Students should mentally calculate 5%, 10%, 20%, 30%, etc. of a number by first determining 10% of the number.

Ex. If 10% of 120 is 12, then 5% of 120 is 6 and 20% of 120 is 24.

**Outcome N2: Operations with Decimals**

Addition and subtraction questions should be presented horizontally to encourage mental computation strategies. For example, when adding numbers such as

4.2 + 0.23 students should be encouraged to add the whole numbers, then the tenths, then the hundredths to get 4.43 **(Front end)**

Estimation should be used to develop a sense of the size of the answer for all calculations involving decimals. For example, to estimate the quotient of

324.4 ÷ 0.97, students should recognize that 0.97 is about 1 so the estimated quotient would be 324 ÷ 1 or 324.

Special number strategy: To mentally divide a decimal by 5, double both the dividend and divisor. For example, 324.4 ÷ 5 = 648.8 ÷ 10 = 64.88

**Outcome N6: Add/Subtract Integers**

Use the same strategies as used with whole numbers:

1. **Front end:** -46 + (-38) 🡪 -40 + (-30) = -70, then -6 +(-8) = -14

finally -70 +(-14) = -84

1. **Compensate:** -46 + (-38)🡪 -46 + (-40) = -86, then -86 +2 = -84
2. **Compatible Numbers:** -28 + 63 + 37 + 33 + (-72)

 ( -28 + (-72)) + (63 + 37) + 33

 -100 + 100 +33

 33

**Other**: Continue to review and practice mental math strategies developed in previous years, especially:

1. **Double/Halve:** 86 x 50 = 43 x 100 = 4300
2. **Distribution** : 12 x 28 = (10 x 28) + (2 x 28) = 280 +56 = 200 + 130 + 6 = 336

 2824 ÷ 4 = (2800 ÷ 4) + (24 ÷ 4) = 700 + 6 = 706

1. **Associative** : 5 x 8 x 7 x 20 = (5 x 20) x (8 x 7) = 100 x 56 = 5600
2. **Compensate:** 500 – 297 = 500 – 300 + 3 = 203
3. **Balancing:**  621 – 203 = 618 – 200 = 418
4. **Counting On:** 700 – 247 Count on from 247

 247 + **3** = 250 250 + **50** = 300 300 + **400** = 700

 Total added on = 3 + 50 + 400 = **453**