Consolidation of Grade 6 EQAO Questions

Number Sense and Numeration

SE2 Families of Schools

GRADE SIX EQAO QUESTIONS: Number Sense and Numeration

Year	NV1	NV2	NV3
Spring 2006	MC17 MC19	MC4 MC5 MC25 OR29	MC20 OR8
Spring 2007	MC18 MC19 OR29	MC5 MC34	MC6 MC35 OR8
Spring 2008	MC1 MC2 OR10	MC31 MC32	MC22 MC23 OR27
Spring 2009	MC1 MC33 OR29	MC2 MC31 MC32 OR28	MC22
Spring 2010	MC1 MC32 OR8	MC5 MC23	MC31 MC34 OR28

OVERALL EXPECTATIONS

NV1
- Read, represent, compare, and order whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers

NV2
- Solve problems involving the multiplication and division of whole numbers, and the addition and subtraction of decimal numbers to thousandths, using a variety of strategies

NV3
- Demonstrate an understanding of relationships involving percent, ratio, and unit rate

Continuum of Expectations: Number Sense & Numeration

Quantity Relationships	
Grade 5	**Grade 6**
Overall Expectation	
• Read, represent, compare, and order whole numbers to 100 000, decimal numbers to hundredths, proper and improper fractions, and mixed numbers	• Read, represent, compare, and order whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers
Specific Expectations	
• Represent, compare, and order whole numbers and decimal numbers from 0.01to 100 000, using a variety of tools	• Represent, compare, and order whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools
• Demonstrate an understanding of place value in whole numbers and decimal numbers from 0.01 to 100 000, using a variety of tools and strategies	• Demonstrate an understanding of place value in whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools and strategies
• Solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 100 000	• Solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 1 000 000
• Read and print in words whole numbers to ten thousand, using meaningful contexts	• Read and print in words whole numbers to one hundred thousand, using meaningful contexts
• Represent, compare, and order fractional amounts with like denominators, including proper and improper fractions and mixed numbers, using a variety of tools	• Represent, compare, and order fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools
• Demonstrate and explain the concept of equivalent fractions, using concrete materials	
• Round decimal numbers to the nearest tenth, in problems arising from real-life situations	
• Demonstrate and explain equivalent representations of a decimal number, using concrete materials and drawings	
• Read and write money amounts to $1000	
	• Estimate quantities using benchmarks of 10%, 25%, 50%, 75%, and 100%
	• Identify composite numbers and prime numbers, and explain the relationship between them (i.e., any composite number can be factored into prime factors)

Counting	
Grade 5	**Grade 6**
Overall Expectation	
• Demonstrate an understanding of magnitude by counting forward and backwards by 0.01	
Specific Expectations	
• Count forward by hundredths from any decimal number expressed to two decimal places, using concrete materials and number lines	

Operational Sense

Grade 5	Grade 6
Overall Expectation	
• Solve problems involving the multiplication and division of multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to hundredths, using a variety of strategies	• Solve problems involving the multiplication and division of whole numbers, and the addition and subtraction of decimal numbers to thousandths, using a variety of strategies
Specific Expectations	
• Solve problems involving the addition, subtraction, and multiplication of whole numbers, using a variety of mental strategies	• Use a variety of mental strategies to solve addition, subtraction, multiplication, and division problems involving whole numbers
	• Solve problems involving the multiplication and division of whole numbers (four digit by two-digit), using a variety of tools and strategies
• Multiply two-digit whole numbers by two-digit whole numbers, using estimation, student-generated algorithms, and standard algorithms	• Multiply whole numbers by 0.1, 0.01, and 0.001 using mental strategies
• Divide three-digit whole numbers by one-digit whole numbers, using concrete materials, estimation, student-generated algorithms, and standard algorithms	
• Use estimation when solving problems involving the addition, subtraction, multiplication, and division of whole numbers, to help judge the reasonableness of a solution	• Use estimation when solving problems involving the addition and subtraction of whole numbers and decimals, to help judge the reasonableness of a solution
• Add and subtract decimal numbers to hundredths, including money amounts, using concrete materials, estimation, and algorithms	• Add and subtract decimal numbers to thousandths, using concrete materials, estimation, algorithms, and calculators
• Multiply decimal numbers by 10, 100, 1000, and 10 000, and divide decimal numbers by 10 and 100, using mental strategies	• Multiply and divide decimal numbers by 10, 100, 1000, and 10 000 using mental strategies
	• Multiply and divide decimal numbers to tenths by whole numbers, using concrete materials, estimation, algorithms, and calculators
	• Explain the need for a standard order for performing operations, by investigating the impact that changing the order has when performing a series of operations

Proportional Relationships

Grade 5	Grade 6
Overall Expectation	
• Demonstrate an understanding of proportional reasoning by investigating whole-number rates	• Demonstrate an understanding of relationships involving percent, ratio, and unit rate
Specific Expectations	
• Describe multiplicative relationships between quantities by using simple fractions and decimals	
• Determine and explain, through investigation using concrete materials, drawings, and calculators, the relationship between fractions (i.e., with denominators of 2, 4, 5, 10, 20, 25, 50, and 100) and their equivalent decimal forms	• Determine and explain, through investigation using concrete materials, drawings, and calculators, the relationships among fractions (i.e., with denominators of 2, 4, 5, 10, 20, 25, 50, and 100), decimal numbers, and percents
• Demonstrate an understanding of simple multiplicative relationships involving whole-number rates, through investigation using concrete materials and drawings	• Represent relationships using unit rates
	• Represent ratios found in real-life contexts, using concrete materials, drawings, and standard fractional notation

Overall Expectation #1:
- Read, represent, compare, and order whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers

Spring 2006

17 Which of the following is a factor of 70 but is not a prime number?

    a   10 *

    b   7

    c   4

    d   2

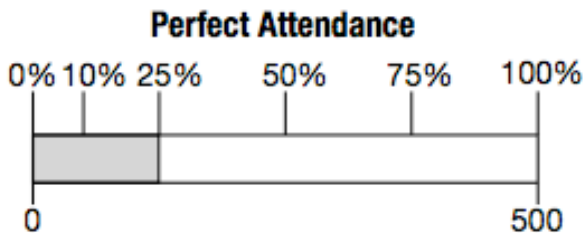**19** Which set is in order from least to greatest?

    a   1.153, 1.062, 0.13, 0.054

    b   0.13, 0.054, 1.162, 1.153

    c   0.054, 0.13, 1.153, 1.062

    d   0.054, 0.13, 1.062, 1.153 *

18 What number is modelled in the place-value chart below?

F 3529.035

G 3529.35

H 3511.035

J 35 011.35

19 A school has 500 students. The shaded portion below shows the students with perfect attendance.

Perfect Attendance

Which of the following is closest to the number of students with perfect attendance?

A 100

B 200

C 300

D 400

29 Write the following fractions in order from least to greatest.

$$\frac{3}{2}, \frac{2}{3}, \frac{1}{4}, \frac{4}{5}$$

Explain your thinking.

1 Which is the correct way to write the number 90 090 in words?

    a   nine hundred ninety

    b   nine thousand ninety

    c   ninety thousand ninety

    d   nine hundred thousand ninety

2 Joseph finishes a swim race in 73.365 seconds. Joseph knows the following about his friend's time for the same race.

- The digit in the hundredths column is 3 more than Joseph's.

- The digit in the ones column is 2 less than Joseph's.

In what time does Joseph's friend swim the race?

    a   53.368

    b   53.395

    c   71.368

    d   71.395

10 Each of 130 students sign up for one of five activities. The table below shows some of the results.

Activity Sign-Up

Activity	Number of Students
Soccer	38
Chess	13
Band	33
Drama	
Photography	14

Susan estimates that 25% of the students signed up for drama. Jessica estimates that 50% of the students signed up for drama.

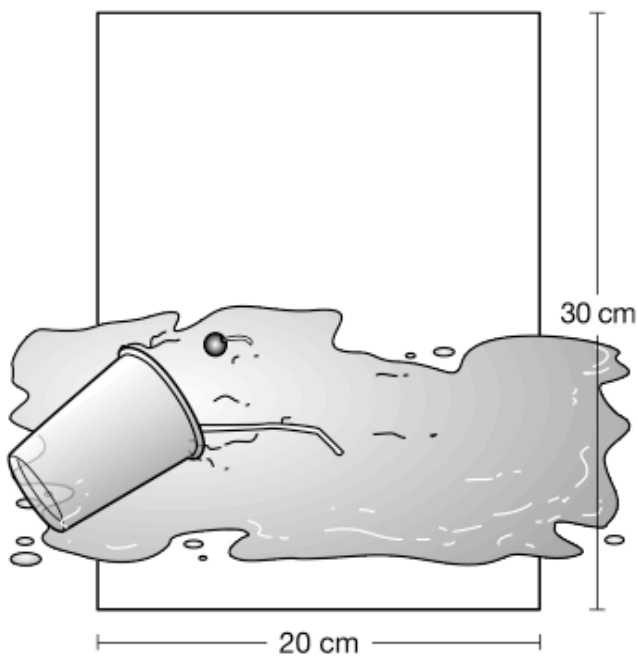Using the benchmarks of 10%, 25%, 50%, 75% or 100%, justify which estimate is more appropriate.

1 Which of the following lists shows these numbers in order from least to greatest?

1.250, 12.50, 0.125, 125.0

a 0.125, 12.50, 1.250, 125.0

b 125.0, 12.50, 1.250, 0.125

c 12.50, 125.0, 0.125, 1.250

d 0.125, 1.250, 12.50, 125.0

33 Samantha spills a milkshake on a rectangular piece of paper as shown below.

30 cm

20 cm

Which of the following **best** approximates the area of the entire spill?

a 100 cm^2

b 300 cm^2

c 400 cm^2

d 600 cm^2

29 Consider the fractions $\frac{3}{2}$ and $1\frac{3}{4}$.

- Which of these fractions is larger?

Justify your answer.

The larger fraction is _____.

- Find a fraction between $\frac{3}{2}$ and $1\frac{3}{4}$.

Justify your answer.

A fraction between $\frac{3}{2}$ and $1\frac{3}{4}$ is _____.

1 Zach lives in a city with a population of ninety-two thousand forty-seven. Which number below represents the population of this city?

  a   9247

  b   92 470

  c   92 047

  d   920 047

32 Mr. Price's class collects a total of 1943 pennies over a period of 4 weeks. Samantha brings 125 pennies each week.

Approximately what percent of the total number of pennies collected does Samantha bring?

  a   10%

  b   25%

  c   50%

  d   75%

8 Consider the fractions shown below.

$$\frac{3}{4}, \frac{18}{25}, \frac{15}{20}, \frac{75}{100}$$

Which fractions represent equal values?

Justify your answer.

Overall Expectation #2:
• Solve problems involving the multiplication and division of whole numbers, and the addition and subtraction of decimal numbers to thousandths, using a variety of strategies

Spring 2006

4 Germaine buys one hamburger, one sandwich and two fruit salads.

Menu

Item	Amount
Hamburger	$3.50
Sandwich	$2.75
Fruit Salad	$1.60
Frozen Yogourt	$3.00

How much change should she receive from $20.00?

   a $9.15

   b $9.45

   c $10.55 *

   d $12.15

5 Which number, when placed in the box, makes the following number sentence true?

$$15 - 6 \times 2 + 18 \div 3 = \square$$

   a 7

   b 9 *

   c 12

   d 24

25 Cary needs to set up 144 chairs in rows. Each row must have an equal number of chairs. Which of the following could be the method Cary uses to set up the chairs?

    a   14 rows of 10 chairs

    b   12 rows of 14 chairs

    c   6 rows of 21 chairs

    d   8 rows of 18 chairs *

29 The rectangular ceiling of a room has an area of 36 m^2. The ceiling needs 3 coats of paint. Each can of paint covers 25 m^2.

About how many cans of paint are needed to paint the ceiling?

Explain your thinking.

_____ cans of paint are needed.

5 Four students in Ms. Haswell's class simplify the expression below.

$$6 + 21 \div 7 - 4 \times 2 + 5$$

The first step of each of the four students is shown in the table below.

Simplifying the Expression

Student	First Step
Zoe	6 + 21
Liam	7 − 4
Dennis	21 ÷ 7
Deborah	2 + 5

Which student performs a first step that is correct?

   A Zoe

   B Liam

   C Dennis

   D Deborah

34 The table below shows the number of pop cans four classes collect. It also shows the number of days each class collects during the recycling program.

Class	Pop Cans Collected	Days Collected
Class 1	7284	40
Class 2	1250	25
Class 3	3742	20
Class 4	2705	50

Which class collects the greatest number of pop cans per day?

   F Class 1

   G Class 2

   H Class 3

   J Class 4

31 Look at the expression below.

$$6 - 2 \times 6 \div 2$$

Which of the following shows the order of operations that can be used to simplify this expression correctly?

    a   subtraction, division, multiplication

    b   subtraction, multiplication, division

    c   division, subtraction, multiplication

    d   multiplication, division, subtraction

32 A swim team completes the 4-person relay in 210.625 seconds. The times for the first three swimmers are shown below.

Swimmers' Times

Swimmer	Time (in seconds)
1	53.452
2	59.371
3	47.582
4	?

What is the time for swimmer 4?

    a   50.220 seconds

    b   50.200 seconds

    c   50.022 seconds

    d   50.020 seconds

2 Chandra, Brittany, Ben and Daniel buy different sandwiches and salads for lunch. Their choices are shown below.

Prices for Lunch

	Salad	Sandwich
Chandra	$4.48	$3.99
Brittany	$4.48	$4.99
Ben	$3.49	$4.99
Daniel	$3.49	$3.99

Which person should receive about $2.50 change from $10.00?

a   Chandra

b   Brittany

c   Ben

d   Daniel

31 It takes Nadeem 22 minutes to walk 1 kilometre. At this rate, approximately how long will it take Nadeem to walk 5 kilometres?

a   1 hour

b   2 hours

c   100 hours

d   110 hours

32 Which expression is equivalent to 128 ÷ 2?

a $(120 \div 2) + (8 \div 2)$

b $(120 \div 2) \div (8 \div 2)$

c $(120 + 2) + (8 + 2)$

d $(120 + 2) \div (8 + 2)$

28 Carmen wants to install a fence. Each section of fence is 2.4 metres long and costs $6.00 per metre. Carmen will need 16 sections of fence. How much change should he receive from $250?

Show your work.

5 A number divided by 58 is close to 30.

Which of the following could be this number?

    a   18.43

    b   184.3

    c   1843

    d   18 430

23 Which operation is a correct first step to simplify the expression below?

$$44 + 10 \div 5 - 3 \times 2 + 1$$

    a $2 + 1$

    b $5 - 3$

    c $10 \div 5$

    d $44 + 10$

GRADE SIX EQAO QUESTIONS: Number Sense and Numeration

Overall Expectation #3:
• Demonstrate an understanding of relationships involving percent, ratio, and unit rate.

Spring 2006

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20 The results of a survey show that 30% of the people surveyed read a newspaper regularly. Which of the following numbers is equivalent to 30%?

a   0.03

b   3.0

c $\frac{1}{3}$

d $\frac{3}{10}$ ★

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8 Pie is served at a picnic. Each pie is made up of 6 equal pieces. Bradley records the number of pieces each person eats in the table below.

Name	Gurleen	Max	Ta-Shanya	Stewart	Brianne	Adrian
Number of Pieces Eaten	3	2	2	3	3	1

How many pies are eaten in total? Express your answer as a fraction.

Show your work.

They eat _____ pies.

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6 The weather report shows that there is an 80% chance of rain tomorrow. Which fraction represents this chance?

    F $\dfrac{1}{2}$

    G $\dfrac{3}{4}$

    H $\dfrac{4}{5}$

    J $\dfrac{5}{6}$

35 Some students were asked in a survey, "What is your favourite sport?" The graph below shows the results of the survey.

Favourite Sport

Favourite Sport	Number of Students
Hockey	☺ ☺ ◖
Basketball	☺ ☺ ☺
Volleyball	☺ ☺ ☺ ◖
Soccer	☺ ☺
Other Sports	☺ ◖

Key
☺ represents 4 students

What percent of the students chose hockey as their favourite sport?

    A 2.5%

    B 10%

    C 20%

    D 25%

8 A school needs to buy 2400 pencils. The prices for pencils at 3 stores are shown below.

- Store A sells 60 pencils for $1.80.

- Store B sells 30 pencils for $0.99.

- Store C sells 15 pencils for $0.55.

The school will purchase the pencils with the lowest price. Which store has the lowest price for 2400 pencils?

Explain your answer.

Store _____ has the lowest price for pencils.

22 A package of 3 pairs of socks costs $3.90. What is the cost of one pair of socks?

    a $1.30

    b $1.90

    c $6.90

    d $11.70

23 A teacher plants 6 tulips and 9 roses in a planter. Which of the following represents the ratio of roses to tulips?

    a $\dfrac{3}{2}$

    b $\dfrac{2}{3}$

    c $\dfrac{15}{9}$

    d $\dfrac{9}{15}$

27 Josie, Christina, Audrey and Manny go shopping. Josie spends $\frac{4}{5}$ of her money, Christina spends 75% of her money, Audrey spends 0.68 of her money and Manny spends $\frac{17}{20}$ of his money.

Who has the largest percentage of their money left?

Justify your answer.

22 Natasha is 12 years old. Her teacher is 36 years old. Which ratio represents Natasha's age in 4 years to her teacher's age in 4 years?

    a   1:3

    b   2:5

    c   3:10

    d   4:9

31 Amir's class has 24 students. There are 15 boys in the class. Which of the following represents the ratio of girls to boys?

    a 24:9

    b 9:24

    c 5:3

    d 3:5

34 Chris, Paul and Carla share the cost of renting a video game.

• Chris pays 0.4 of the cost.

• Paul pays 36% of the cost.

• Carla pays the remainder of the cost.

What fraction of the cost does Carla pay?

    a $\dfrac{6}{25}$

    b $\dfrac{9}{25}$

    c $\dfrac{19}{25}$

    d $\dfrac{24}{25}$

28 The rates for Internet use offered by three companies are shown below.

• Company A: $6.00 for every 90 minutes of use

• Company B: $2.75 for every 45 minutes of use

• Company C: $3.00 for every 60 minutes of use

Which company offers the lowest rate per minute?

Show your work.

Company _____ offers the lowest rate per minute.