Number Lesson #8:
Practice Test

Use the space beside the question for your rough work.

1. Which of the following numbers is not a prime factor of 14 014?

   A. 7
   B. 11
   C. 13
   D. 17

2. How many numbers in the list 7, 11, 17, 21, are prime factors of 3 234?

   A. 1
   B. 2
   C. 3
   D. 4

Numerical Response

1. The sum of all of the prime factors of 160 797 is _____.

   (Record your answer in the numerical response box from left to right)

3. The lowest common multiple of 33 and 110 can be written as a product of prime factors in the form $a \times b \times c \times d$ where a, b, c, and d are prime numbers with $a < b < c < d$. The value of c is

   A. 3
   B. 5
   C. 11
   D. 1 100

Numerical Response

2. The greatest common factor of 6 699 and 8 265 is _____.

(Record your answer in the numerical response box from left to right)

4. The lowest common multiple of 14 and 105 is equal to the greatest common factor of the numbers P and Q. Which of the following statements must be false?

A. P is a multiple of 7.

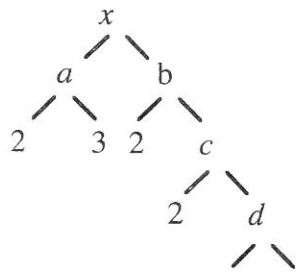
B. Q is a multiple of 21.

C. P could be less than 200.

D. Q could be greater than 2 000.

Use the following information to answer the next two questions.

The partial prime factorization of a number x is shown in the tree diagram.



5. If x is a perfect square, then the minimum value of d is

A. 2 **B.** 3 **C.** 6 **D.** 9

Numerical Response

3. If x is a perfect cube, then the minimum value of x is _____.

(Record your answer in the numerical response box from left to right)

6. The number represented by $\otimes$ is irrational. The decimal representation of $\otimes$ is

A. terminating and repeating
B. terminating and non-repeating
C. non-terminating and repeating
D. non-terminating and non-repeating

7. Which of the following are rational numbers?

I $1.01001000100001.....$ II $\sqrt[3]{\frac{8}{27}}$ III $\sqrt{0.04}$ IV $0.\overline{29}$

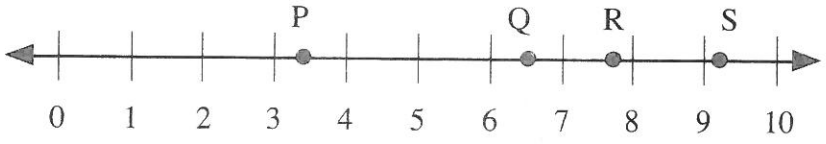
A. III and IV only
B. II, III and IV only
C. I, II, III and IV
D. some other combination of I, II, III and IV

8. The rational number $1.\overline{54}$ can be written as an improper fraction in simplest form $\frac{c}{d}$. The value of c is

A. 17
B. 11
C. 6
D. 4

9. M and N are fixed irrational numbers satisfying $30 < M < 40$ and $3 < N < 4$. The value of $\sqrt{M} + \sqrt{N}$ is best represented on the number line by

A. P
B. Q
C. R
D. S



10. Consider the following numbers. $\sqrt[3]{67}$, $\sqrt[4]{98}$, $\sqrt{19}$, $\sqrt[5]{201}$. The largest of these numbers is

A. $\sqrt{19}$
B. $\sqrt[4]{98}$
C. $\sqrt[3]{67}$
D. $\sqrt[5]{201}$

11. The length of a soccer field is $12\sqrt[4]{4\,000}$ metres. In the number $12\sqrt[4]{4\,000}$, the index and the radicand are respectively

A. 4 and 4 000
B. 12 and 4 000
C. 4 and 12
D. 4 000 and 4

Numerical Response

4. When $7\sqrt[3]{6}$ is written as an entire radical, the value of the radicand is ____.

(Record your answer in the numerical response box from left to right)

12. Three statements are given below.

***Statement* 1** : $35 = 7\sqrt{5}$

***Statement* 2** : $\sqrt{28} = 2\sqrt{7}$

***Statement* 3** : $4\sqrt{3} = 48$

Which of the statements above is/are true?

A. 1 only **B.** 2 only **C.** 1 and 2 only **D.** 2 and 3 only

13. Three students were asked to write the radical $\sqrt{4\,050}$ in another form.
The answers given were:

Student I $405\sqrt{10}$ Student II $15\sqrt{18}$ Student III $45\sqrt{2}$.

A correct answer was given by

A. only Student III

B. only Students II and III

C. all three students

D. some other combination of students not given above

14. The area of a circle of radius, r, is given by the formula $A = \pi r^2$.
A circle of radius 6 cm has an area of 36π cm^2.
If a circle has an area of 120π cm^2, then the exact length of its radius in cm is

A. 60

B. $12\sqrt{10}$

C. $2\sqrt{30}$

D. $2\sqrt{15}$

Numerical Response

5. The volume of a cube of edge length x cm is given by the formula $V = x^3$.
A die has a volume of $720\ \text{mm}^3$.

A student determined that the exact length of each edge of the die could be written in the form $a\sqrt[3]{b}$ where a and b are whole numbers.

The value of $a + b$ is _____.
(Record your answer in the numerical response box from left to right)

15. Consider the following three equations.

$4\sqrt[3]{3} = \sqrt[3]{x}$ $\qquad 5\sqrt{x} = y\sqrt{3}$ $\qquad 16\sqrt{y} = z\sqrt{10}$

Which of the statements below is correct?

A. $x < y < z$ $\qquad$ **B.** $z < x < y$

C. $y < z < x$ $\qquad$ **D.** $z < y < x$

Written Response - 5 marks

Use the following information to answer the next question.

1. A group of students have invented a simple card game based on the real number system. There are 50 cards in the deck and each card has a number written on it.

Points are awarded as follows.

Natural Number → 4 points $\qquad$ Whole number → 5 points $\qquad$ Integer → 6 points
Rational Number → 3 points $\qquad$ Irrational Number → 10 points
Non-real Number → 1 point

- A student selects a card. The number on the card is 7.
  Explain why this card is valued at 18 points.

- A second student selects a card which has the number -5 on it.
  How many points are awarded for this card?

- In the game each student is dealt three cards and the student with the most points wins.

  Which of the following three students wins the game?

  Student A with the following cards: $\frac{3}{4}$, $\sqrt{15}$, and 0.

  Student B with the following cards: -3, $\sqrt{\frac{4}{9}}$, and π.

  Student C with the following cards: $-\sqrt{36}$, $\sqrt{-36}$, and 36.

:

Answer Key

1. D **2.** B **3.** B **4.** C **5.** C **6.** D **7.** B **8.** A

9. C **10.** A **11.** A **12.** B **13.** B **14.** C **15.** D

1.

7	3		

2.

8	7		

3.

2	1	6	

4.

2	0	5	3

5.

9	2		

1. • The number 7 is a natural number, a whole number, an integer, and a rational number.
The point value is $4 + 5 + 6 + 3 = 18$.

- The number -5 is an integer, and a rational number.
  The point value is $6 + 3 = 9$.

- Student A: 3/4 → 3 points, $\sqrt{15}$ → 10 points, 0 → 14 points, for a total of 27 points.
- Student B: -3 → 9 points, $\sqrt{\frac{4}{9}}$ → 3 points, π → 10 points, for a total of 22 points.
- Student C: $-\sqrt{36}$ → 9 points, $\sqrt{-36}$ → 1 point, 36 → 18 points, for a total of 28 points.

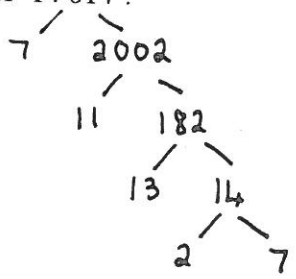
Student C wins the game.

Number Lesson #8:
Practice Test

Use the space beside the question for your rough work.

1. Which of the following numbers is not a prime factor of 14 014 ?

A. 7
B. 11
C. 13
(D.) 17

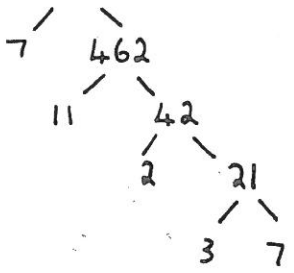


2. How many numbers in the list 7, 11, 17, 21 are prime factors of 3 234?

A. 1
(B.) 2
C. 3
D. 4

21 is not prime

7 and 11 are prime factors

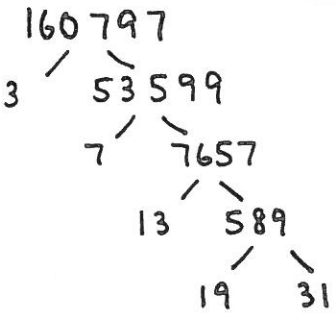


Numerical Response

1. The sum of all of the prime factors of 160 797 is _____.

(Record your answer in the numerical response box from left to right)

7	3		



$160797 = 3 \times 7 \times 13 \times 19 \times 31$

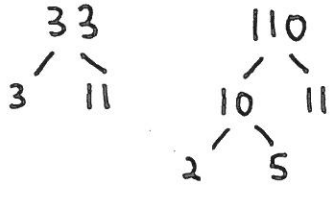
Sum of prime factors

$= 3 + 7 + 13 + 19 + 31$

$= 73$

3. The lowest common multiple of 33 and 110 can be written as a product of prime factors in the form $a \times b \times c \times d$ where $a, b, c,$ and d are prime numbers with $a < b < c < d$.
The value of c is

A. 3
(B.) 5
C. 11
D. 1 100



$33 = 3 \times 11$

$110 = 2 \times 5 \times 11$

$LCM = 3 \times 11 \times 2 \times 5$

$= 2 \times 3 \times 5 \times 11$

$a \quad b \quad c \quad d$

$c = 5$

Numerical Response

2. The greatest common factor of 6 699 and 8 265 is _____.

(Record your answer in the numerical response box from left to right)

8	7		

6699
(3) 2233
11 203
7 (29)

8265
5 1653
(3) 551
19 (29)

GCF : 3 × 29 : 87

4. The lowest common multiple of 14 and 105 is equal to the greatest common factor of the numbers P and Q. Which of the following statements must be false?

A. P is a multiple of 7. ✓

B. Q is a multiple of 21. ✓

(C.) P could be less than 200. ×

D. Q could be greater than 2 000. ✓

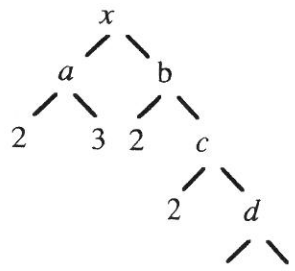
14: 2 7
105: 5 21; 3 7

LCM : 2 × 7 × 3 × 5 : 210

210 is a factor of both P and Q

Use the following information to answer the next two questions.

The partial prime factorization of a number x is shown in the tree diagram.



5. If x is a perfect square, then the minimum value of d is

A. 2 B. 3 (C.) 6 D. 9

d
2 3

min. x = 2 × 3 × 2 × 2 × 2 × 3 = $2^4 \times 3^2$

d : 2 × 3 : 6

Numerical Response

3. If x is a perfect cube, then the minimum value of x is _____.

(Record your answer in the numerical response box from left to right)

d
3 3

2	1	6	

min. x = 2 × 3 × 2 × 2 × 3 × 3 = $2^3 \times 3^3$

= 216

6. The number represented by ⊗ is irrational. The decimal representation of ⊗ is

A. terminating and repeating
B. terminating and non-repeating
C. non-terminating and repeating
(D.) non-terminating and non-repeating

7. Which of the following are rational numbers?

I $1.01001000100001.....$ ✗ II $\sqrt[3]{\frac{8}{27}} = \frac{2}{3}$ ✓ III $\sqrt{0.04} = 0.2 = \frac{1}{5}$ ✓ IV $0.\overline{29}$ $\frac{29}{99}$ ✓

A. III and IV only. (B.) II, III and IV only. C. I, II, III and IV.

D. some other combination of I, II, III and IV.

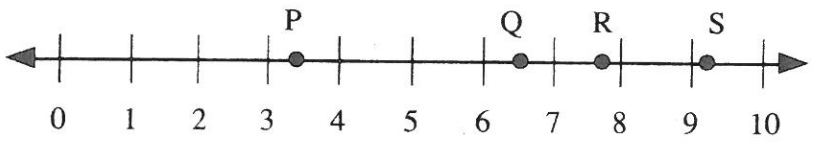
8. The rational number $1.\overline{54}$ can be written as an improper fraction in simplest form $\frac{c}{d}$.
The value of c is

(A.) 17 B. 11 $\frac{17}{11}$ $c = 17$

C. 6 D. 4

9. M and N are fixed irrational numbers satisfying $30 < M < 40$ and $3 < N < 4$.
The value of $\sqrt{M} + \sqrt{N}$ is best represented on the number line by

A. P
B. Q
(C.) R
D. S



$\sqrt{M}$ is approx. 6
$\sqrt{N}$ is approx. 2
$\sqrt{M} + \sqrt{N}$ is approx. $6 + 2 = 8$
R

10. Consider the following numbers. $\sqrt[3]{67}$, $\sqrt[4]{98}$, $\sqrt{19}$, $\sqrt[5]{201}$.
The largest of these numbers is 4.06.. 3.14.. 4.36.. 2.89..

(A.) $\sqrt{19}$ B. $\sqrt[4]{98}$ C. $\sqrt[3]{67}$ D. $\sqrt[5]{201}$

11. The length of a soccer field is $12\sqrt[4]{4\,000}$ metres. In the number $12\sqrt[4]{4\,000}$, the index and the radicand are respectively.

(A.) 4 and 4 000 B. 12 and 4 000 C. 4 and 12 D. 4 000 and 4

Numerical Response

4. When $7\sqrt[3]{6}$ is written as an entire radical, the value of the radicand is ____.

(Record your answer in the numerical response box from left to right)

2	0	5	8

$\sqrt[3]{343}\sqrt[3]{6} = \sqrt[3]{2058}$

12. Three statements are given below.

***Statement* 1** : $35 = 7\sqrt{5}$ × $35 = 7 \times 5$

***Statement* 2** : $\sqrt{28} = 2\sqrt{7}$ ✓ $\sqrt{28} = \sqrt{4}\sqrt{7} = 2\sqrt{7}$

***Statement* 3** : $4\sqrt{3} = 48$ × $4\sqrt{3} = \sqrt{16}\sqrt{3} = \sqrt{48}$

Which of the statements above is/are true?

A. 1 only (B.) 2 only C. 1 and 2 only D. 2 and 3 only

13. Three students were asked to write the radical $\sqrt{4\,050}$ in another form.
The answers given were

Student I $405\sqrt{10}$ Student II $15\sqrt{18}$ Student III $45\sqrt{2}$.

A correct answer was given by

$405\sqrt{10} = \sqrt{164025}\sqrt{10} = \sqrt{1640250}$

$15\sqrt{18} = \sqrt{225}\sqrt{18} = \sqrt{4050}$

$45\sqrt{2} = \sqrt{2025}\sqrt{2} = \sqrt{4050}$

A. only Student III

(B.) only Students II and III

C. all three students

D. some other combination of students not given above.

14. The area of a circle of radius, r, is given by the formula $A = \pi r^2$.
A circle of radius 6 cm has an area of 36π cm^2.
If a circle has an area of 120π cm^2, then the exact length of its radius in cm is

$A = \pi r^2 = 120\pi$

$r^2 = 120$

$r = \sqrt{120} = \sqrt{4}\sqrt{30} = 2\sqrt{30}$

A. 60

B. $12\sqrt{10}$

(C.) $2\sqrt{30}$

D. $2\sqrt{15}$

Numerical Response

5. The volume of a cube of edge length x cm is given by the formula $V = x^3$.
A die has a volume of 720 mm^3.

A student determined that the exact length of each edge of the die could be written in the form $a\sqrt[3]{b}$ where a and b are whole numbers.

The value of $a + b$ is _____.

(Record your answer in the numerical response box from left to right)

9	2		

$x^3 = 720$

$x = \sqrt[3]{720} = \sqrt[3]{8}\sqrt[3]{90}$

$= 2\sqrt[3]{90}$

$a = 2$

$b = 90$

$a + b = 92$

15. Consider the following three equations.

$4\sqrt[3]{3} = \sqrt[3]{x}$ $\quad 5\sqrt{x} = y\sqrt{3}$ $\quad 16\sqrt{y} = z\sqrt{10}$

Which of the statements below is correct?

A. $x < y < z$ B. $z < x < y$

C. $y < z < x$ D. $z < y < x$

$\sqrt[3]{x} = 4\sqrt[3]{3} = \sqrt[3]{64}\sqrt[3]{3} = \sqrt[3]{192}$

$x = 192$

$y\sqrt{3} = 5\sqrt{192}$

$y = \frac{5\sqrt{192}}{\sqrt{3}} = 5\sqrt{64}$

$= 5(8) = 40$

$z\sqrt{10} = 16\sqrt{40}$

$z = \frac{16\sqrt{40}}{\sqrt{10}}$

$= 16\sqrt{4} = 16(2) = 32$

$x = 192$

$y = 40$

$z = 32$

$z < y < x$

Written Response - 5 marks

Use the following information to answer the next question.

1. A group of students have invented a simple card game based on the real number system. There are 50 cards in the deck and each card has a number written on it.

Points are awarded as follows.

Natural Number → 4 points
Rational Number → 3 points
Non-real Number → 1 point
Whole number → 5 points
Irrational Number → 10 points
Integer → 6 points

- A student selects a card. The number on the card is 7.
  Explain why this card is valued at 18 points.

7 is a natural number, a whole number, an integer, and a rational number.

Points = 4 + 5 + 6 + 3 = 18

- A second student selects a card which has the number -5 on it. How many points are awarded for this card?

-5 is an integer and a rational number.

points = 6 + 3 = 9

- In the game each student is dealt three cards and the student with the most points wins.

Which of the following three students wins the game?

Student *A* with the following cards $\frac{3}{4}$, $\sqrt{15}$ and 0. $3 + 10 + 14 = 27$

Student *B* with the following cards -3, $\sqrt{\frac{4}{9}}$ and π. $9 + 3 + 10 = 22$

Student *C* with the following cards $-\sqrt{36}$, $\sqrt{-36}$ and 36. $9 + 1 + 18 = 28$ C wins

Number :	$\frac{3}{4}$	$\sqrt{15}$	0	-3	$\sqrt{\frac{4}{9}}$	π	$-\sqrt{36}$	$\sqrt{-36}$	36
Sets :	$\mathbb{Q}$	$\bar{\mathbb{Q}}$	$\mathbb{W}, \mathbb{I}, \mathbb{Q}$	$\mathbb{I}, \mathbb{Q}$	$\mathbb{Q}$	$\bar{\mathbb{Q}}$	$\mathbb{I}, \mathbb{Q}$	non-real	$\mathbb{N}, \mathbb{W}, \mathbb{I}, \mathbb{Q}$
Points :	3	10	5+6+3 = 14	6+3 = 9	3	10	6+3 = 9	1	4+5+6+3 = 18

Answer Key

1. D **2.** B **3.** B **4.** C **5.** C **6.** D **7.** B **8.** A

9. C **10.** A **11.** A **12.** B **13.** B **14.** C **15.** D

1.

7	3		

2.

8	7		

3.

2	1	6	

4.

2	0	5	3

5.

9	2		

1. • The number 7 is a natural number, a whole number, an integer, and a rational number.
The point value is 4 + 5 + 6 + 3 = 18.

• The number -5 is an integer, and a rational number.
The point value is 6 + 3 = 9.

• Student A: 3/4 → 3 points, $\sqrt{15}$ → 10 points, 0 → 14 points, for a total of 27 points.

• Student B: -3 → 9 points, $\sqrt{\frac{4}{9}}$ → 3 points, π → 10 points, for a total of 22 points.

• Student C: $-\sqrt{36}$ → 9 points, $\sqrt{-36}$ → 1 point, 36 → 18 points, for a total of 28 points.

Student C wins the game.