

# MPM 1D0 Unit Test 1 Part 1 Test - Wednesday March 7, 2007

Name \_\_\_\_\_

Mark:  $K = \frac{\quad}{54}$      $T = \frac{\quad}{15}$      $C = \frac{\quad}{5}$

**Part A- Knowledge (25 marks)**

1. Match the following number systems to their name by drawing a line. (3 marks)

$\{1, 2, 3, 4, \dots\}$

$\bar{Q}$  - irrational numbers

$\left\{ \frac{a}{b} \mid a, b \in I, b \neq 0 \right\}$

I - integers

$\{0, 1, 2, 3, \dots\}$

N - natural numbers

{all non-repeating decimals}

W - whole numbers

$\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$

R - real numbers

$\{Q + \bar{Q}\}$

Q - rational numbers

2. Identify the following as Q or  $\bar{Q}$ . (3 marks)

a)  $-0.659707\dots$  \_\_\_\_\_

b)  $\pi$  \_\_\_\_\_

c)  $357.\overline{357}$  \_\_\_\_\_

d)  $21.35898998899\dots$  \_\_\_\_\_

e)  $\frac{77}{1121}$  \_\_\_\_\_

d)  $2.222$  \_\_\_\_\_

3. Answer the following: (4 marks)

a)  $\frac{5}{0} = 0$ . T or F

b) All integers are rationals. T or F

c) .993 is a terminating decimal. T or F

d)  $b \neq 0$  means \_\_\_\_\_

e) For  $\overline{.643}$ , 643 is called the \_\_\_\_\_

f)  $-7 \div 8$  can also be written as \_\_\_\_\_

g)  $4^3$  means  $4 \times 3$ . T or F

h)  $-\frac{3}{7} = \frac{-3}{-7}$ . T or F

A

1. Write each as a power.
- a)  $5 \times 5 \times 5 \times 5 \times 5$
  - b)  $(-3) \times (-3) \times (-3) \times (-3)$
  - c)  $2.03 \times 2.03 \times 2.03 \times 2.03 \times 2.03$
  - d)  $\left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right)$

2. Write each power in expanded form.
- a)  $2^4$
  - b)  $(-4)^5$
  - c)  $0.7^3$
  - d)  $\left(-\frac{3}{4}\right)^2$

3. Evaluate.
- a)  $2^3$
  - b)  $(-4)^2$
  - c)  $-4^2$
  - d)  $(-6)^3$
  - e)  $\left(\frac{3}{4}\right)^4$

4. Evaluate.
- a)  $\left(-\frac{2}{3}\right)^3$
  - b)  $2.3^3$
  - c)  $1^5$
  - d)  $(-1)^{99}$
  - e)  $-1^{28}$

5. Evaluate. Remember to use the correct order of operations.
- a)  $2^3 + 2^4$
  - b)  $4^5 - 4^3$
  - c)  $4^2 \times 2^4$
  - d)  $2^6 \div 4^3$

6. Evaluate. Remember to use the correct order of operations.
- a)  $2^4 + 2^2 - 2^3$
  - b)  $2^4 - 2^2 + 2^3$
  - c)  $(5^2 - 3^2) + (5^2 - 3^2)$
  - d)  $\left(\frac{3}{4}\right)^2 \times \left(-\frac{2}{3}\right)^3$
  - e)  $30(2)^3$
  - f)  $-5(-3)^2$

7. Substitute the given values into each expression. Then, evaluate the expression. Round your answers to the nearest tenth where necessary.
- a)  $5a^2$ ;  $a = 3$
  - b)  $\pi r^2$ ;  $r = 2.5$
  - c)  $c^2 - b^2$ ;  $b = 5$ ,  $c = 13$
  - d)  $\frac{1}{3}\pi r^2 h$ ;  $r = 6$ ,  $h = 4$
  - e)  $4\pi r^2$ ;  $r = 1.2$
  - f)  $x^2 - 3x - 10$ ;  $x = -2$

B

8. a) Evaluate each power.  
 $3^1$   $3^2$   $3^3$   $3^4$   $3^5$   $3^6$
- b) Examine the final digit of each of your answers. What pattern do you notice?
- c) Use the pattern that you found in part b) to determine the final digit in the number  $3243^{3243}$ .

3.2 Work With Exponents, pages 53–54

1. a)  $5^6$  b)  $(-3)^4$  c)  $2.03^5$  d)  $\left(-\frac{2}{3}\right)^3$
2. a)  $2 \times 2 \times 2 \times 2$   
 b)  $(-4) \times (-4) \times (-4) \times (-4) \times (-4)$   
 c)  $0.7 \times 0.7 \times 0.7$  d)  $\left(-\frac{3}{4}\right) \times \left(-\frac{3}{4}\right)$
3. a) 8 b) 16 c) -16 d) -216 e)  $\frac{81}{256}$
4. a)  $-\frac{8}{27}$  b) 12.167 c) 1 d) -1 e) -1
5. a) 24 b) 960 c) 256 d) 1
6. a) 12 b) 20 c) 32 d)  $-\frac{1}{6}$  e) 240 f) -45
7. a) 45 b) 19.6 c) 144 d) 150.8 e) 18.1 f) 0
8. a) 3, 9, 27, 81, 243, 729  
 b) The final digits are in the sequence 3, 9, 7, 1, 3, 9, ....

### 3.3 Discover the Exponent Laws

Principles of Mathematics 9, pages 119–129

A

1. Apply the product rule to write each as a single power. Then, evaluate the expression.

a)  $4^3 \times 4^2$

b)  $(-2)^2 \times (-2)^4$

c)  $2.5^3 \times 2.5^3$

d)  $(-1)^{15} \times (-1)^{25}$

e)  $\left(\frac{2}{3}\right)^4 \times \left(\frac{2}{3}\right)^3$

f)  $\left(-\frac{3}{5}\right)^2 \times \left(-\frac{3}{5}\right)^3$

2. Apply the quotient rule to write each as a single power. Then, evaluate the expression.

a)  $8^5 \div 8^3$

b)  $(-5)^4 \div (-5)$

c)  $3.2^5 \div 3.2^2$

d)  $(-1)^{35} \div (-1)^{20}$

e)  $\left(\frac{3}{4}\right)^6 \div \left(\frac{3}{4}\right)^3$

f)  $\left(-\frac{2}{5}\right)^5 \div \left(-\frac{2}{5}\right)^3$

3. Apply the power rule to write each as a single power. Then, evaluate the expression.

a)  $(5^3)^2$

b)  $(-4^3)^2$

c)  $(0.2^2)^3$

d)  $(-1^6)^3$

e)  $\left[\left(\frac{1}{5}\right)^2\right]^2$

f)  $\left[\left(-\frac{5}{6}\right)^3\right]^2$

4. Simplify using the exponent laws. Then, evaluate.

a)  $3^2 \times 3^4 \times 3^1$

b)  $4^5 \div 4^2 \div 4$

c)  $(2^3)^2 \times (2^2)^3$

d)  $(2^6)^3 \div (2^4)^4$

5. Simplify using the exponent laws. Then, evaluate.

a)  $3^5 \times 3^2 \div 3^4$

b)  $4^6 \div 4^3 \times 4^2$

c)  $\frac{0.2^4 \times 0.2^3}{(0.2^2)^2}$

d)  $\frac{(-3)^5 \div (-3)^2}{(-3)^2}$

e)  $(6^2)^5 \times (6^3)^5 \div (6^5)^3$

f)  $[(-5)^2]^3 \div (-5)^4 \times (-5)^2$

Answers

#### 3.3 Discover the Exponent Laws, pages 55–56

1. a)  $4^5 = 1024$  b)  $(-2)^6 = 64$  c)  $2.5^6 = 244.140\ 625$

d)  $(-1)^{40} = 1$  e)  $\left(\frac{2}{3}\right)^7 = \frac{128}{2187}$  f)  $\left(-\frac{3}{5}\right)^5 = -\frac{243}{3125}$

2. a)  $8^2 = 64$  b)  $(-5)^3 = -125$  c)  $3.2^3 = 32.768$

d)  $(-1)^{15} = -1$  e)  $\left(\frac{3}{4}\right)^3 = \frac{27}{64}$  f)  $\left(-\frac{2}{5}\right)^2 = \frac{4}{25}$

3. a)  $5^6 = 15\ 625$  b)  $(-4)^6 = 4096$

c)  $(0.2)^6 = 0.000\ 064$  d)  $(-1)^{18} = 1$  e)  $\left(\frac{1}{5}\right)^4 = \frac{1}{625}$

f)  $\left(-\frac{5}{6}\right)^6 = \frac{15\ 625}{46\ 656}$

4. a)  $3^7 = 2187$  b)  $4^2 = 16$  c)  $2^{12} = 4096$  d)  $2^2 = 4$

5. a)  $3^3 = 27$  b)  $4^5 = 1024$  c)  $0.2^3 = 0.008$

d)  $(-3)^1 = -3$  e)  $6^{10} = 60\ 466\ 176$  f)  $(-5)^4 = 625$

MPM 1 DO  
EXERCISE 4.5

BEDMAS WITH RATIONAL NUMBERS

B 1. Simplify.

(a)  $\frac{1}{2} + \frac{1}{3} - \frac{1}{4}$

(b)  $\frac{1}{2} \times \frac{1}{3} - \frac{1}{4}$

(c)  $\frac{1}{2} - \frac{1}{3} + \frac{1}{4}$

(d)  $\frac{1}{2} \div \frac{1}{3} + \frac{1}{4}$

(e)  $\frac{1}{2} - \frac{1}{3} \div \frac{1}{4}$

(f)  $\frac{1}{2} - \frac{1}{3} \times \frac{1}{4}$

(g)  $\frac{1}{2} + \frac{1}{3} \div \frac{1}{4}$

(h)  $\frac{1}{2} + \frac{1}{3} \times \frac{1}{4}$

(i)  $\frac{1}{2} + \frac{1}{3} + \frac{1}{4}$

(j)  $\frac{1}{2} \times \frac{1}{3} \times \frac{1}{4}$

(k)  $\frac{1}{2} \times \frac{1}{3} + \frac{1}{4}$

2. Simplify.

(a)  $-\frac{2}{3} - \frac{1}{4} + \frac{1}{2}$

(b)  $-\frac{2}{3} - \frac{1}{4} - \frac{1}{2}$

(c)  $(-\frac{2}{3}) \times (-\frac{1}{4}) - \frac{1}{2}$

(d)  $(-\frac{2}{3}) \div (-\frac{1}{4}) + \frac{1}{2}$

(e)  $-\frac{2}{3} \times (-\frac{1}{4}) \div (-\frac{1}{2})$

(f)  $-\frac{2}{3} - (-\frac{1}{4}) \times (-\frac{1}{2})$

(g)  $-\frac{2}{3} + (-\frac{1}{4}) \div (-\frac{1}{2})$

(h)  $(-\frac{2}{3}) \div (-\frac{1}{4}) \div (-\frac{1}{2})$

(i)  $(-\frac{2}{3}) \times (-\frac{1}{4}) \times (-\frac{1}{2})$

3. Simplify.

(a)  $\frac{3}{4} \times \frac{2}{3} + \frac{-3}{4}$

(b)  $\frac{3}{5}(-\frac{2}{3} + \frac{1}{2})$

(c)  $\frac{3}{4} + \frac{-2}{3} \times 1\frac{1}{2}$

(d)  $(1\frac{1}{4} - \frac{-2}{3}) \div 12$

(e)  $(-\frac{1}{2} + \frac{1}{3})(\frac{2}{5} + \frac{1}{2})$

(f)  $\frac{1}{2} \times \frac{-3}{4} + \frac{1}{2} \times \frac{5}{6}$

(g)  $(-2\frac{1}{5} + \frac{-3}{4}) + \frac{2}{3} \times \frac{1}{5}$

(h)  $(\frac{1}{2} - \frac{-2}{5}) - (\frac{-1}{2} - 2)$

(i)  $(5 - \frac{1}{3}) - (\frac{2}{3} - 2)$

4. Simplify.

(a)  $\frac{\frac{-2}{5} + \frac{3}{4}}{\frac{1}{2}}$

(b)  $\frac{\frac{1}{3} - \frac{1}{2}}{\frac{2}{3} + \frac{1}{5}}$

(c)  $\frac{\frac{-7}{8} + 1\frac{1}{4}}{\frac{-2}{5} \times 1\frac{2}{3}}$

(d)  $\frac{1\frac{1}{3} \times \frac{3}{5}}{\frac{-3}{4} \div \frac{1}{8}}$

(e)  $\frac{\frac{5}{6} - \frac{-1}{3}}{-4}$

(f)  $\frac{\frac{1}{2} + \frac{-3}{5} - \frac{2}{3}}{\frac{1}{15} \times (-3)}$

C 5. (a)  $\frac{(1\frac{1}{2} + 2\frac{1}{2}) \times 3\frac{1}{2}}{\frac{5}{8} - 2\frac{3}{8}}$

(b)  $(\frac{-3}{4} - \frac{2}{3}) \div \frac{5}{6} + \frac{1}{8}$

6. Simplify.

(a)  $\frac{1}{1 - \frac{1}{1 - \frac{1}{2}}}$

(b)  $\frac{2\frac{1}{2}}{1 - \frac{2\frac{1}{2}}{1 - 2\frac{1}{2}}}$

EXERCISE 4.5

1. (a)  $\frac{7}{12}$

(g)  $1\frac{5}{8}$

2. (a)  $-\frac{5}{12}$

(g)  $-\frac{1}{8}$

3. (a)  $-\frac{5}{4}$  or  $-1\frac{1}{4}$

(e)  $-\frac{3}{20}$

(i)  $\frac{20}{3}$  or  $6\frac{2}{3}$

4. (a)  $\frac{7}{10}$

(e)  $-\frac{7}{24}$

5. (a)  $-8$

(b)  $-\frac{1}{12}$

(h)  $\frac{7}{12}$

(b)  $-1\frac{5}{12}$

(h)  $-5\frac{1}{3}$

(b)  $-\frac{1}{10}$

(f)  $\frac{1}{24}$

(b)  $-\frac{5}{26}$

(f)  $\frac{23}{6}$  or  $3\frac{5}{6}$

(b)  $-\frac{73}{40}$  or  $-1\frac{33}{40}$

(c)  $\frac{5}{12}$

(i)  $1\frac{1}{12}$

(c)  $-\frac{1}{3}$

(i)  $-\frac{1}{12}$

(d)  $1\frac{1}{4}$

(j)  $\frac{1}{24}$

(d)  $3\frac{1}{8}$

(c)  $-\frac{1}{4}$

(g)  $-\frac{169}{60}$  or  $-2\frac{49}{60}$

(c)  $-\frac{9}{16}$

6. (a)  $-1$

(e)  $-\frac{5}{6}$

(k)  $\frac{5}{12}$

(e)  $-\frac{1}{3}$

(f)  $\frac{5}{12}$

(f)  $-\frac{19}{24}$

(d)  $\frac{23}{144}$

(h)  $\frac{17}{5}$  or  $3\frac{2}{5}$

(d)  $-\frac{2}{15}$

(b)  $\frac{15}{16}$

ANSWERS