PRE-ADMISSION TESTING SAMPLE QUESTIONS – TECHNICAL MATH

Testing Information:
• Multiple choice style, computer based test, timed at 1 hour
• Topics include: fractions, decimals, percents, order of operations, laws of signs, basic algebra, equations, exponents, radicals, and algebraic fractions (approx. 50 questions)
• Calculators NOT permitted, scrap paper and pencils will be provided for rough calculations.

For information regarding minimum score requirements for eligibility into your program, please contact Admissions.

Testing Policies:
• Pre-Admission math tests can only be written once per year.
• It replaces a Math from your transcript for eligibility into a program at Mohawk College only.
• The grades are not transferrable to other colleges
• Photo I.D is required for check-in

*Please identify yourself if you require testing accommodations due to a disability.

Please remember to bring Photo I.D.
You will not be permitted to test without valid Photo I.D.

FENNEL CAMPUS- ROOM A124
905-575-2448
preadmissiontesting@mohawkcollege.ca
Topic 1: Fractions

1) Reduce \( \frac{9}{36} \)

2) Convert this fraction into a mixed number in lowest terms \( \frac{60}{25} \)

3) Find the Least Common Denominator of \( \frac{1}{3}, \frac{1}{15}, \frac{1}{9} \)

4) Two pins measure \( \frac{3}{6} \) and \( \frac{4}{9} \)
   a) What is the length of the larger pin?
   b) What is the length difference between the two pins?

5) Add the fractions and bring your answer to lowest terms \( \frac{1}{5} + \frac{1}{10} + \frac{1}{6} \)

6) Add \( \frac{2}{2} + \frac{1}{4} + \frac{1}{5} \)

7) Add \( 4\frac{1}{3} - \frac{1}{7} \)

8) Multiply \( \frac{4\frac{2}{9}}{\times} \cdot 1\frac{1}{6} \)

9) Divide \( 3\frac{1}{2} \div 1\frac{2}{3} \)

10) Simplify \( \frac{9\frac{3}{4} + \frac{1}{5}}{5\frac{5}{8}} \)

11) Find the value of \( x \) given \( \frac{x}{23} = \frac{15}{3} \)
Topic 2: Decimals

1) Divide 1.3289 by 0.431 and round to three decimal places

2) Convert $158 \frac{3}{5}$ to a decimal. Round to one decimal place.

3) Convert 11.78 to a mixed fraction

4) Evaluate 2,300 + 3.13 + 1.09. Round to one decimal place.

5) Evaluate $1.35 - 26.491 + 11.7$. Round to three decimal places.

6) Evaluate 0.6 x 12.34 x 1.4. Round to two decimal places.

7) Divide 1.113 by 0.56. Round to three decimal places

8) Determine the volume of an aquarium with these definitions: Length = 78 cm; Width = 6 cm; Height = 43 cm

9) Bob makes $888.87 per week before deductions. The following deductions are made from his paycheque: Income Tax $124.00; Company Pension $42.86; C.P.P. $38.97; and Dental Plan = $31.97.
What are his total Deductions? What is his take-home pay?

10) Determine how much change you would get from $100 if you purchased 31.9 litres of gas at a cost of 96.7 cents per litre.
Topic 3: Percents

1) Express the following as percents:

<table>
<thead>
<tr>
<th>Decimal</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 0.62</td>
<td></td>
</tr>
<tr>
<td>b) 3.312</td>
<td></td>
</tr>
<tr>
<td>c) 13</td>
<td></td>
</tr>
</tbody>
</table>

2) Express the following percents as decimals:

<table>
<thead>
<tr>
<th>Percent</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 79 %</td>
<td></td>
</tr>
<tr>
<td>b) 317.2 %</td>
<td></td>
</tr>
<tr>
<td>c) 14 1/3 %</td>
<td></td>
</tr>
</tbody>
</table>

3) Express the following fractions as percents:

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) (\frac{887}{962})</td>
<td></td>
</tr>
<tr>
<td>b) (\frac{14}{100})</td>
<td></td>
</tr>
<tr>
<td>c) (7 \frac{7}{14})</td>
<td></td>
</tr>
</tbody>
</table>
4) Express the following percents in fractional form in lowest terms:

<table>
<thead>
<tr>
<th>Percent %</th>
<th>Fraction Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 86 %</td>
<td></td>
</tr>
<tr>
<td>b) 52 %</td>
<td></td>
</tr>
<tr>
<td>c) 7 1/2 %</td>
<td></td>
</tr>
</tbody>
</table>

5) Determine 89 1/2 % of $3,633 rounded to the nearest cent.

6) 316 kg is 15% of what measurement?

7) Helmer Co. Produces 1,090 DVD's per year. If 1.4% of these are defective, how many defective DVD's are produced per year? Round your answer to the nearest whole number.

8) Mohawk Digital Centre sells webcams for $120 each. In an attempt to increase profit they increased the price by $5.81. Express this increase as a percent of the original price.

9) Mohawk Digital Centre sells digital cameras for $390.45 each. In an attempt to increase sales they reduced the price by 2%. What is the new price after the reduction?

**Topic 4: Order of Operations**

1) Evaluate the expression to two decimal places:

\[5 + 5 - 8 + 4 \div 6\]

2) Evaluate the expression to two decimal places:

\[(2 \div 6 \times 5)^2 \div 5 - 6\]

3) Evaluate the expression to two decimal places:

\[6 - \left\lfloor 8 - (2 + 9 \times 3) \right\rfloor\]

4) Evaluate the expression to two decimal places:

\[4^2 - \left\{ 9^3 + \left[ 1^2 - (4 + 3) \right] \right\} \]
5) The formula to obtain the area of a certain shape is:

\[
Area = \frac{L}{2} (w + d - t)
\]

Determine the area when:
\(L = 18 \text{ m}; \ t = 2.3 \text{ m}; \ w = 4.6 \text{ m}; \ d = 10.1 \text{ m}\)

6) Calculate the future value of \(S\) of an annuity using the following formula:

\[
S = R \left[ \frac{(1 + i)^n - 1}{i} \right]
\]

Given: \(R = 250; \ i = 0.01; \ n = 13\)

7) Calculate the Book Value \(B\) using the following formula:

\[
B = P - \left[ \frac{5m(2n - 0.75m)}{n^2 - 2} \right] (P - S)
\]

Given: \(P = 151,788; \ m = 9; \ n = 11; \ S = 35,000\)

**Topic 5: Laws of Signs**

1) Simplify: 

\[
-\left[ + \left( -19 \right) \right]
\]

2) Simplify: 

\[
-\left[ -\left( -234 \right) \right]
\]

3) True or False? 

\[
| -88 | = | 88 |
\]

4) True or False? 

\[
-96 \not> -105
\]

5) Evaluate: 

\[
7 + \frac{1}{-3} + 4\frac{1}{6}
\]

6) Evaluate:

\[
\left( 7\frac{1}{3} \right) \left( \frac{3}{-4} \right) \div (-2)
\]

7) A person leaves the bus terminal and goes 15 blocks WEST for coffee. Next, he goes 2 blocks EAST to mail a letter and then 5 blocks WEST to visit a friend. Upon leaving his friend’s house he is struck by a car and an ambulance takes him 9 blocks EAST to the hospital. Determine the direction and number of blocks he must travel from the hospital to make it back to the bus terminal.
**Topic 6: Exponents**

Enter your answer in fraction form:

1) Evaluate:
\[
\left( \frac{2}{8} \right)^2
\]

2) Evaluate:
\[
(5^2)^2
\]

3) Evaluate:
\[
(4x)^{-3}; 4x^3; 4(x)^{-3}
\]

4) Evaluate:
\[
-4 A^2\left(3 A B^2 + 4 A^4 B + 6 A^{-5} B^4\right)
\]

5) Simplify:
\[
\left( \frac{2}{3} x^2 \right) (15 x^2 - 9)
\]

6) Simplify:
\[
\frac{17 x^7 y^9}{30 x^2 y}
\]

Simplify:
\[
(2 x^7 y^4)^3
\]

8) Simplify:
\[
\frac{3 y (3 x + y^2)^{19}}{10 x (3 x + y^2)^3}
\]

9) Simplify and eliminate all negative exponents:
\[
\frac{6 x^{-2} y^4}{12 x^4 y^{-4}}
\]

10) Simplify and eliminate all negative exponents:
\[
4 \left( x^{-7} y^2 \right)^{-3}
\]
**Topic 7: Basic Algebra**

1) Perform the indicated operations and simplify:

\[ 3a - 3b - 27a + 9b \]

2) Simplify. Round the coefficient part of your answer to four decimal places:

\[ \frac{3x}{2} + 4x - x \]

3) Perform the indicated operations and simplify:

\[ 5x - 3[(11x - 5) - (x - 2)] \]

4) Perform the indicated operations and simplify:

\[ 13x - (x - 3y) - [2x - (x - y)] \]

5) Perform the indicated operations and simplify:

\[ (x^2 - xy - 5y^2) - (19x^2 - 7xy - y^2) \]

6) Expand and Simplify:

\[ (3a - 5b)^2 \]

7) Perform the indicated operation(s) and simplify:

\[ 18xy(3x^2) \]

8) Perform the indicated operations and simplify:

\[ (x - 24)(3x^2 - 3x - 4) \]

9) Perform the indicated operations and simplify:

\[ 23(x + y)(4y)(y^4) \]

10) Perform the indicated operations and simplify:

\[ \frac{240a^2b - 60ab + 105ab^2}{30ab} \]
**Topic 8: Equations**

1) Solve for B in fraction form: \(4B + 15 = 100\)

2) Solve for x: \(ad = 12ax + 25\)

3) Solve for x in fraction form: \(\frac{2}{3}x + 16 = 19\)

4) Solve for E in fraction form: \(7E + 3(8 - 4E) = -20\)

5) Solve for y: \(y = \frac{t}{7}(x + y)\)

6) Solve for x: \(\frac{3x - 1}{2} = \frac{1}{2} + \frac{2x - 1}{2} + 1\)

7) Solve for R: \(D = \sqrt{\frac{R - r}{R + r}}\)

8) A formula used for gear calculation is:
   \[ S = T - \frac{1.299}{N} \]
   a. Solve for N
   b. Calculate the value of N when \(S = 49\) and \(T = 60\)

9) A formula used in pipe calculation is: \(A = \frac{M}{P}(P + t)\)
   a. On a piece of paper, re-write this formula and solve for \(t\), the pipe thickness.
   b. Determine the value of \(t\) when \(A = 48.31\), \(M = 16.12\) and \(P = 3.55\)
Answer Sheet – Technical Math

Topic 1: Fractions

1) $\frac{1}{4}$
2) $2 \frac{2}{5}$
3) 45
4) $\frac{1}{2} \cdot \frac{1}{18}$
5) $\frac{7}{15}$
6) $2 \frac{19}{20}$
7) $3 \frac{4}{21}$
8) $4 \frac{25}{27}$
9) $2 \frac{1}{10}$
10) $15 \frac{23}{25}$
11) 115

Topic 2: Decimals

1) 3.083
2) 158.6
3) $11 \frac{39}{50}$
4) 2,304.2
5) -13.441
6) 10.37
7) 1.988
8) 20, 124 cm$^3$
9) $237.80; 651.07$
10) $69.15$
Topic 3: Percents

1) 
   a. 62 %
   b. 331.2 %
   c. 1,300 %
2) 
   a. 0.79
   b. 3.172
   c. 0.143
3) 
   a. 92.2%
   b. 14%
   c. 750%
4) 
   a. \(\frac{43}{50}\)
   b. \(\frac{13}{25}\)
   c. \(\frac{3}{40}\)
5) $3251.54

6) 2,106.67 kg

7) 15

8) 4.84%

9) $382.64
Topic 4: Order of Operations

1) 2.67
2) -5.44
3) 27
4) -707
5) 111.6 m²
6) $3452.33
7) $91482.68

Topic 5: Laws of Signs

1. 19
2. -234
3. True
4. True
5. \(10 \div 5\)
6. \(2 \div 4\)
7. 9 Blocks in the East Direction

Topic 6: Exponents

1) \(\frac{1}{16}\)
2) 625
3) \(\frac{1}{64x^4} \cdot \frac{4}{x^2} \cdot \frac{4}{x^3}\)
4) \(-12A^3B^2 - 16A^6B - 24A^{-3}B^4\)
5) \(10x^4 - 6x^2\)
6) \(\frac{17x^6y^8}{30}\)
7) \(8x^21y^{12}\)
8) \(\frac{3y(3x + y^2)^{16}}{10x}\)
Topic 7: Basic Algebra

1) \(-24a + 6b\)

2) \(4.5x\)

3) \(-25x + 9\)

4) \(11x + 2y\)

5) \(-18x^2 + 6xy - 4y^2\)

6) \(9a^2 - 30ab + 25b^2\)

7) \(54x^3y\)

8) \(3x^3 - 75x^2 + 68x + 96\)

9) \(92xy^5 + 92y^6\)

10) \(\frac{16a - 4 + 7b}{2}\)
Topic 8: Equations

1) \[ B = \frac{85}{4} \]

2) \[ x = \frac{ad - 25}{12a} \quad \text{or} \quad x = \frac{d}{12} - \frac{25}{12a} \]

3) \( x = \frac{9}{2} \)

4) \( E = \frac{44}{5} \)

5) \( y = \frac{7V}{t} - x \ \text{OR} \quad y = \frac{7V - tx}{t} \)

6) \( x = \frac{1.5}{0.5} = 3 \)

7) \( \frac{-r(1+D^2)}{(D^2-1)} \quad \text{or} \quad \frac{-r-D^2r}{(D^2-1)} \)

8) a. \( \mathcal{N} = \frac{-1.299}{(S - T)} \);  
    b. 0.118

9) a. \( t = \frac{AP}{M} - P \);  
    b. \( t = 7.09 \)