

Welcome to MATH1435: Math Fundamentals for Woodworking

1. Introductions:

Instructor: Mukto Akash

Experience in Woodworking:

Experience in math: Grad. deg from UW,
10+ years of math teaching

Background and Interests:

2. Course Overview:

- Tour of eConestoga
- Instructional Plan
- Evaluations and grading

3. Communications:

Instructor email: makash@conestogac.on.ca

- Notes:
1. Use conestoga email
 2. Subject line: MATH1435
 3. Appointments by email
 4. Response Time: 12-48 hours

4. Math Help

5. Ground Rules:

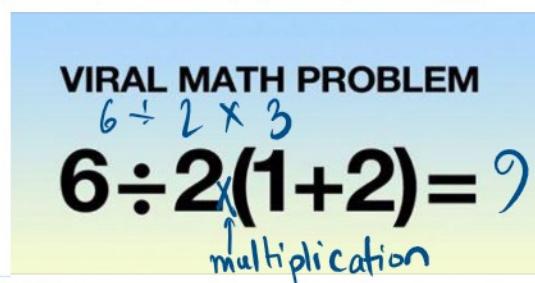
while meeting online

- speak up or use the zoom chat anytime to ask questions
- otherwise, keep yourself on mute
- preferably have your camera on
- be on time.

TODAY'S LESSON: Whole numbers and Decimals

Collected from
Facebook

This math problem has been going viral. Can you solve it? 🤔🤔



- Top fan · 1h · 9 what's so hard about this? I'm concerned for America if this is viral · 13 likes · 7 replies
- Please excuse my dear aunt sally PEMDAS · 17 likes · 2y
- The answer is 1 · 19 likes · 2y · Where does the order of operations say solve from left to right? 😊

1.

Can you solve the following?

$$2(3+7)x(8-2^2/2) = ?$$

Where do we start?



2.

Whole Numbers

• Whole numbers are complete units with no fractional parts. (all the numbers to the left of the decimal).

• When adding or subtracting, be sure to align the like columns. (ones with ones, tens with tens, etc.)

$$\begin{array}{r} +1 \\ 152 \\ \hline 167 \end{array}$$

219

$$\begin{array}{r} 344 \\ -128 \\ \hline 216 \end{array}$$

$$\begin{array}{r} 344 \\ -28 \\ \hline 16 \end{array}$$

• When subtracting, don't forget to borrow from the next column if the upper number is lower than the number you are subtracting.

• Be sure to show your work.



Extra Practice

$$\begin{array}{r} 251 \\ + 124 \\ \hline 375 \end{array}$$

$$\begin{array}{r} 21 \\ 349 \\ - 195 \\ \hline 154 \end{array}$$

3.

Order of operations

$$\begin{array}{r} (2+1) \downarrow (3+2) \\ = (3) \times (5) = 15 \\ \text{multiplication implied} \end{array}$$

Acronym "BEDMAS"

B = Brackets



$$2 \times (2+1) = 2 \times 3 = 6$$

E = Exponents



$$4^3 \quad \begin{array}{l} 4 \text{ to the power 3} \\ 4 \text{ to the exponent 3} \end{array}$$

$$4^3 = 4 \times 4 \times 4 = 64$$

D = Division

M = Multiplication



Division & Multiplication in order from left to right

A = Addition

S = Subtraction



Addition & Subtraction in order from left to right

4.

Order of operations - examples

Consider these formulas, what are their answers?

1. $32 + 20 - 16 : 4 + 4 \times 3^2 = 84$

2. $(32 + 20 - 16) : (4 + 4) \times 3^2 = 40.5$

3. $32 + 20 - 16 : (4 + 4) \times 3^2 = 34$

4. $32 + (20 - 16) : 4 + 4 \times 3^2 = 69$

1. $32 + 20 - 16 \div 4 + 4 \times 3^2$

$= 32 + 20 - 16 \div 4 + 4 \times 9$

division

exp

multiplication

$= 32 + 20 - 4 + 36 = 52 - 4 + 36 = 48 + 36 = 84$

5, 6, 7, 8:

Order of Operations – example #1

- BIDMAS

1. $32 + 20 - 16 \div 4 + 4 \times 3^2 =$
 - No brackets
 - Solve exponents
 - $= 32 + 20 - 16 \div 4 + 4 \times 9 =$
 - Solve Division & Multiplication from left to right
 - $= 32 + 20 - 4 + 36 =$
 - Solve Addition & Subtraction from left to right
 - Answer = 96

Order of operations – example #2

- BIDMAS

2. $62 + 25 - 16 \div (4 - 4) \times 3^2 =$
 - Solve brackets
 - $= 62 + 25 - 16 \div 0 \times 3^2 =$
 - Solve exponents
 - $= 62 + 25 - 16 \times 1 =$
 - Now solve division & Multiplication from left to right
 - Answer = 46.6

Order of operations – example #3

- BIDMAS

3. $32 + 20 - 16 \div (4 + 4) \times 3^2 =$
 - Solve brackets
 - $= 32 + 20 - 16 \div 8 \times 3^2 =$
 - Then exponents
 - $= 32 + 20 - 16 \times 8 \div 3^2 =$
 - Next solve division & Multiplication from left to right
 - $= 32 + 20 - 19 =$
 - Now addition & Subtraction from left to right
 - Answer = 54

Order of operations – example #4

- BIDMAS

4. $32 + 20 - 16 \div 4 + 4 \times 3^2 =$
 - Plus solve brackets
 - $= 32 + 20 - 16 \div 4 + 4 \times 3^2 =$
 - Next solve exponents
 - $= 32 + 20 - 16 \div 4 + 4 \times 9 =$
 - Now solve Division & Multiplication from left to right
 - $= 32 + 20 - 4 =$
 - Finally solve addition & subtraction from left to right
 - Answer = 46

9.

Feet to inches

- $12'' = 1'$
- To convert feet into inches multiply the number by 12.
 - $10' \times 12 = 120''$
- To convert inches into feet divide by 12.
 - $84'' \div 12 = 7'$
- To convert to a mixed dimension (feet & inches) divide inches into equal groups of 12 to equal feet, what's left over is inches.
 - $42'' \div (\text{equal groups of } 12) = (3 \text{ groups of } 12 = 36'') \text{ & } (42'' - 36'') = 6''$
 - therefore $3'6''$

$$\begin{array}{r} 42 \\ - 12 \\ \hline 30 \\ - 12 \\ \hline 18 \\ - 12 \\ \hline 0 \end{array}$$

Extra Practice:

Inches

$$12 \times 8 = 96$$

$$\begin{aligned} &= (8 \text{ groups of } 12) + (100 - 96) \\ &= (8 \text{ groups of } 12) + (101 - 96) \\ &= (8 \text{ groups of } 12) + (98 - 96) \\ &= (14 \text{ groups of } 12) + (175 - 168) \end{aligned}$$

Feet'

$$8'4"$$

$$8'5"$$

$$8'2"$$

$$14'7"$$

Feet'

$$\begin{array}{r} 12'7'' \\ 16'0'' \\ \hline \end{array}$$

$$\begin{aligned} &= (12 \times 12'') + 7'' = 144' + 7'' \\ &= 151'' \end{aligned}$$

Inches

$$\begin{array}{r} 151 \\ 192 \\ \hline \end{array}$$

Feet'		Inches
12' 7"	$= (12 \times 12") + 7" = 144 + 7 =$	<u>151</u>
16' 0"	$= 16 \times 12$	<u>192</u>
7' 7"	$= 7 \times 12 + 7 = 84 + 7 =$	<u>91</u>
14' 11"	$= 14 \times 12 + 11 = 168 + 11 =$	<u>179</u>

10.

Rounding

$$\begin{aligned} \$12.735421 \\ = \$12.74 \text{ (rounding to tenths)} \end{aligned}$$

- Rounding is deciding the level of accuracy you need and changing a number to suit.
- Particularly handy when ordering items like screws, glue, finishing materials etc.
- Rules for rounding.
 - Decide on the level of accuracy. (i.e. tens, hundred, tenths)
 - Round the answer not the numbers in an equation.
 - 3 cabinets take 3.9L of finishing material - $3 \times 3.9 = 11.7$ L (rounded to 12L)
 - If the number to the right of the desired place is 5 or more, add 1 to the number to the left.
 - If the number to the right of the desired place is less than 5, leave the number to the left alone, all numbers to the right change to zeros.

I will tell you

→ don't round in between steps

W.

Rounding examples

- Consider the following:

- Round 1235 to the nearest hundreds.
 - 1235 changes to 1300.
- Round 754.75 to the nearest ones.
 - 754.75 changes to 755.
- Round 1332 to the nearest hundreds.
 - 1332 changes to 1300.

755.00 no need to write

Extra Practice:

Round off 7335 to the nearest ten.

7 340

Round off 939 to the nearest hundred.

900

Round off 7716 to the nearest thousand.

8000

12.

Decimals

- Decimals are all numbers to the right of the decimal.
- When adding or subtracting, be sure to align the like columns. (tenths with tenths, hundredths with hundredths, etc.)

$$\begin{array}{r} .152 \\ + .670 \\ \hline .822 \end{array}$$

$$\begin{array}{r} .544 \\ - .128 \\ \hline .416 \end{array}$$

- When subtracting, don't forget to borrow from the next column if the upper number is lower than the number you are subtracting.
- Be sure to show your work.

Extra Practice

*tenths hundredths
↓ ↓
12.345 + 6*

Round off 97.81 to the nearest tenth.

97.8

Round off 60.058 to the nearest hundredth.

60.06

Round off 19.578 to the nearest hundredth.

19.58

Averages

Defn:

Average – the sum of a list of numbers divided by the number of numbers in the list.

- We can use averages to calculate marks in school, wages in certain fields or even average cost of products or materials.
- To calculate average, simply add all of the numbers in a list together then divide the product of the sum by the number of numbers in your list.
- Example: You want to know the average yearly salary for the staff of a well known woodworking shop. The salaries are as follows: \$51,950.00, \$47,675.00, \$42,300.00, \$41,985.00, and \$39,899.00.

$$\begin{array}{r} \$51,950.00 \\ \$47,675.00 \\ \$42,300.00 \\ \$41,985.00 \\ + \$39,899.00 \\ \hline \$223,509.00 \end{array}$$

Now take the $\$223,509.00 \div 5 =$

\$44,701.80 Average wage.

Extra Practice:

Q.1. Find the average of numbers 87, 84, 86, 90, 82, 88, 78.

A. 85

B. 84

C. 83

D. 82

$$\frac{87 + 84 + 86 + 90 + 82 + 88 + 78}{7}$$

Q.3. The average age of A, B and C was 25 years and that of B and C was 25 years. A's present age is:

A. 30 years

B. 25 years

C. 40 years

D. 42 years

$$\text{Average} = \frac{\text{Total Sum}}{\text{Total Count}}$$

$$25 = \frac{\text{Total age of A+B+C}}{3}$$

$$\text{Total age of A+B+C} = 25 \times 3 = 75$$

$$\frac{\text{Total age of B+C}}{2} = 25$$

$$\text{Total age of B+C} = 25 \times 2 = 50$$

Q9. The average of 5 terms is 50. If the first 4 terms are 45, 42, 119, and 84, what will be the last term?

A. 56

B. -20

C. -40

D. -50

Average is 50

Sum of 5 numbers = 50
(5)

$$\text{Sum of 5 numbers} = 50 \times 5 = 250$$

$$\begin{aligned} 45 + 42 + 119 + 84 + \text{unknown} &= 250 \\ \text{unknown} &= 250 - 45 - 42 - 119 - 84 = -40 \end{aligned}$$

15.

Can you solve the following?

(from the beginning of class)

Follow BEDMAS

$$2(3+7) \times (8-2^2/2) =$$

$$2(3+7) \times (8-4/2) =$$

$$2(10) \times (8-2) =$$

$$2(10) \times (6) =$$

$$20 \times 6 = 120$$



Recap:

- BEDMAS
- Feet → inches
- Rounding
- Averages

Concluding Remarks:

- P ← preview
- A ← attend
- R ← review
- S ← study
- E ← evaluate