JOBWORKS

ADULT LEARNING CENTRE

INFORMATION AND PREPARATION FOR APPLIED MATHEMATICS (40S)

For the best chance of success in this course, please be prepared to attend classes, study, and do homework regularly.

Students taking this course are **required** to have a graphing calculator (TI-83 Plus, TI-84, or TI-84 Plus). Staples, Walmart, and Amazon.ca have these calculators for sale. The cost ranges from $115.00 to $160.00 and up plus taxes. If you are interested in buying a used calculator, check with our front desk staff to see if any students are interested in selling their calculators. Checking on Kijiji may be another option. Note that many post-secondary courses will require the use of this graphing calculator.

Only calculators can be used during quizzes, tests, and exams. Staff will not have any spare calculators to loan.

The use of cell phones/electronic devices as a calculator will not be permitted.

Teachers will focus on covering the content in the curriculum of this course. Limited time will be spent on reviewing skills and concepts that should have already been acquired by this level. To prepare for this course in advance, being familiar with the following topics would be beneficial:

- Order of Operations
- Operations with Fractions
- Operations with Signed Numbers
- Operations with Exponents
- Percents
- Solving Equations

A basic review on the topics listed above is attached. Visit www.khanacademy.org for tutorials. Additional resources can also be found online.

Free tutoring may be available if necessary. Visit the front desk staff to sign up after attending at least one class. Note that there is always a high demand for the limited number of spots. Students will be accommodated on a first come, first served basis if a tutor is available. Students interested in paying for a tutor can contact the Association of Independent Tutors at 204-226-3437 or at www.independenttutors.com.

Contact us at (204) 453-8351 or visit our website at www.jobworksschool.com if there are any questions or concerns.

Order of Operations

The four basic operations of arithmetic are addition, subtraction, multiplication and division. When more than one operation appears we must follow a prescribed order:

i) Division ii) Multiplication iii) Addition iv) Subtraction

However, brackets are used to force an operation. This means that we must do brackets, along with exponents, first. Thus the order of operations becomes:

Brackets
Exponents
Division
Multiplication
Addition
Subtraction

} We can use the acronym "BEDMAS" to help us remember this order.

eg. $11 + \underbrace{20 \div 5} - \underbrace{3 \times 2}$

$= 11 + 4 - 6$

$= 15 - 6$

$= 9$

However, if we insert brackets and exponents we get:

eg. $11 + 20 \div (5-3)^2 \times 2$

$= 11 + 20 \div 2^2 \times 2$

$= 11 + \underbrace{20 \div 4} \times 2$

$= 11 + \underbrace{5 \times 2}$

$= 11 + 10$

$= 21$

Operations with Fractions

Additon :

$$\frac{a}{b}+\frac{c}{d}=\frac{ad+bc}{bd} \qquad \text{eg. } \frac{1}{3}+\frac{2}{5}=\frac{5+6}{15}=\frac{11}{15}$$

Subtraction:

$$\frac{a}{b}-\frac{c}{d}=\frac{ad-bc}{bd} \qquad \text{eg. } \frac{4}{5}-\frac{1}{2}=\frac{8-5}{10}=\frac{3}{10}$$

Multiplication:

$$\frac{a}{b}\times\frac{c}{d}=\frac{ac}{bd} \qquad \text{eg. } \frac{5}{8}\times\frac{3}{5}=\frac{5\times 3}{8\times 5}=\frac{15}{40}$$

Notes: 1) The final answer must always be reduced. We divide the 15 and 40 by the greatest common factor which is 5.

$$\frac{\cancel{15}^{3}}{\cancel{40}^{8}}=\frac{3}{8}$$

2) For multiplication only, we can cancel common factors before we begin the process. Thus for the example above:

$$\frac{\cancel{5}^{1}}{8}\times\frac{3}{\cancel{5}_{1}}=\frac{1\times 3}{8\times 1}=\frac{3}{8}$$

Division:

$$\frac{a}{b}\div\frac{c}{d}=\frac{a}{b}\times\frac{d}{c}=\frac{ad}{bc} \qquad \text{eg. } \frac{1}{8}\div\frac{3}{4}=\frac{1}{\cancel{8}_{2}}\times\frac{\cancel{4}^{1}}{3}=\frac{1\times 1}{2\times 3}=\frac{1}{6}$$

Operations with Signed Numbers

Addition:

Rules:

1) If signs are both the same then add the numbers and keep the same sign.

eg. $3 + 5 = 8$

$(-3) + (-5) = -8$

2) If signs are different then subtract the smaller number from the larger number and attach the sign of the larger number.

eg. $3 + (-5) = -2$

$(-3) + 5 = 2$

Subtraction:

Subtraction means adding the opposite. We change the subtraction operation "-" to adding the opposite "+-" and use the rules for addition.

eg. $(-5) - 3 = (-5) + (-3) = -8$

$5 - (-3) = 5 + -(-3) = 5 + 3 = 8$

Multiplication & Division:

Rules:

1) An even number of negative signs results in a positive answer.
2) An odd number of negative signs results in a negative answer.

eg. $(-2) \times (-3) = 6$

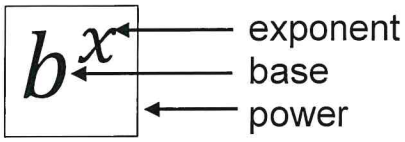
$2 \times (-3) = -6$

eg. $8 \div (-4) = -2$

$(-8) \div (-4) = 2$

Operations with Exponents

A power is made up of a base and an exponent.



The notation above means b multiplied by itself x times.

eg. $3^2 = 3 \times 3 = 9$

$(-2)^3 = (-2)(-2)(-2) = -8$

$-3^2 = -(3 \times 3) = -9$ .... only the '3' is squared

$(-3)^2 = (-3) \times (-3) = 9$ .... here "-3" is squared.

If the exponent is negative then:

eg. $3^{-2} = \frac{1}{3^2} = \frac{1}{3 \times 3} = \frac{1}{9}$

$-3^{-2} = -\frac{1}{3^2} = \frac{-1}{3 \times 3} = \frac{-1}{9}$

eg. $(1+x)^3 = (1+x)(1+x)(1+x)$

$(1+x)^{-3} = \frac{1}{(1+x)^3} = \frac{1}{(1+x)(1+x)(1+x)}$

Percents

$$0.25 = \frac{25}{100} = 25\%$$

The symbol "%" means "for every 100" OR "divided by 100"

eg. $12\% = \frac{12}{100} = 0.12$

$\frac{15.5}{100} = 0.155 = 15.5\%$

$0.16 = 16\% = \frac{16}{100}$

$0.013 = \frac{1.3}{100} = 1.3\%$

eg. What is 15% of $68.00?

0.15 x 68 = $10.20

eg. What percent is $30 of $40?

$\frac{30}{40} = \frac{3}{4} = \frac{75}{100} = 75\%$

or Using a calculator

$\frac{30}{40} = 0.75 = 75\%$

Solving Equations

To solve an equation means to find a value for the unknown variable that satisfies the equation. This process involves isolating the unknown variable.

eg. Solve for x:

$x + 3 = 5$ Subtracting '3' from both sides of the equation we get:

$x = 2$

Isolating involves undoing every operation that was done to the unknown variable. Undoing means performing the inverse operation to both sides of the equation.

ie In the eg above '3' was added to 'x' to give '5' so to undo adding '3' we must 'subtract 3' from both sides of the equation to get x = 2.

Notes:

1) Addition and Subtraction are inverse operations of each other.
2) Multiplication and Division are inverse operations of each other.

eg. $x - 1 = 4$

$x = 4 + 1$ (Add '1' to both sides)

$x = 5$

eg. $5x = 10$

$x = \frac{10}{5}$ (Divide both sides by '5')

eg. $20 = \frac{x}{2}$

$x = 20(2)$ (Multiply both sides by '2')

$x = 40$

eg. $2 - x = 5$

$2 = 5 + x$ (Add 'x' to both sides)

$-3 = x$ (Subtract '5' from both sides)

or $x = -3$

Solve for 'x' in each eg below.

eg. $x + c = b$

$\boxed{x = b - c}$

eg. $\frac{x + a}{b} = c$

$x + a = bc$

$\boxed{x = bc - a}$

eg. $\frac{x - A}{M} = y + B$

$x - A = M(y + B)$

$\boxed{x = A + M(y + B)}$

eg. $C - B = \frac{A + D}{x}$

$x(C - B) = A + D$

$\boxed{x = \frac{A + D}{C - B}}$

When the variable appears on both sides of the equation we must combine like terms first, then factor, in order to isolate.

eg. $Ax + B = Cx + D$

$Ax - Cx = D - B$

$x(A - C) = D - B$

$\boxed{x = \frac{D - B}{A - C}}$

eg. $5x - A = 3B - x$

$5x + x = 3B + A$

$6x = 3B + A$

$\boxed{x = \frac{3B + A}{6}}$