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Intermediate Algebra – MTH 104
Class #5

Station 1. Order of Operations

1. $-9-(-5)-|-7|$

$= -9 + 5 - 7$

$= -11$

2. $3[4+(-2)(8)]+3^3$

$= 3[4+(-16)]+27$

$= 3[-12]+27$

$= -36+27$

$= -9$

3. Evaluate: $5x^2+4x$ *when* $x-2$ $x = -2$

$= 5(-2)^2 + 4(-2)$

$= 5(+4) - 8$

$= \cancel{+18}$

$= +20 - 8 = 12$

4. Evaluate: $\left(-\frac{5}{3}\right)^3$ $= \left(-\frac{5}{3}\right)\left(-\frac{5}{3}\right)\left(-\frac{5}{3}\right)$

$= -\frac{125}{27}$

5. Evaluate: $4x^2-3y-10$ *when* $x=4$ *and* $y=-1$

$4(4)^2 - 3(-1) - 10$

$= 4(16) + 3 - 10$

$= 64 + 3 - 10$

$= 57$

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Station 2 – Positive Exponents – Rules of Exponents

Write all final answers with positive exponents only.

1. Simplify: $(-7w^{-7})(-5w^{-3})$ $= +35w^{-10}$

$= +\frac{35}{w^{10}}$

2. Simplify: $(-10x^5y^2)^2$ $= +100x^{10}y^4$

3. Simplify: $\left(\frac{3x}{4y^2}\right)^{-2}$ $= \left(\frac{4y^2}{3x}\right)^{+2}$ ← Square Reciprocal

$= \frac{16y^4}{9x^2}$

4. Simplify: $\left(\frac{10x^2y}{5xy}\right)^{-3}$ $= \left(\frac{\cancel{2}\cdot\cancel{5}\cdot x\cdot\cancel{x^2}\cdot\cancel{y}}{\cancel{5}\cdot\cancel{x}\cdot\cancel{y}}\right)^{-3}$

$= (2x)^{-3}$

$= \frac{1}{8x^3}$

5. Simplify: $\left(\frac{x^8y^{-2}}{x^{-2}y^3}\right)^2$

$= \left(\frac{x^{16}y^{-4}}{x^{-4}y^6}\right)$

$= \frac{x^{16}x^4}{y^6y^4}$

$= \frac{x^{20}}{y^{10}}$

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Station 3: Scientific Notation

1. Write in Proper Scientific Notation:

a. 0.041 4.1×10^{-2}

b. 760,000 7.6×10^{5}

c. 0.0000126 1.26×10^{-5}

d. 40,500,000 4.05×10^{7}

2. Express each value in Scientific Notation:

a. $(4.78 \times 10^{9})(1.96 \times 10^{5})$ 9.37×10^{14}

b. $(8.32 \times 10^{-8})(9.14 \times 10^{-2}) = 76.04 \times 10^{-10}$ $= 7.60 \times 10^{-9}$

c. $\frac{4.36 \times 10^{-4}}{8.17 \times 10^{-8}}$ $= .534 \times 10^{4}$ 5.34×10^{3}

d. $\frac{3.11 \times 10^{11}}{4.72 \times 10^{-9}} = .659 \times 10^{20}$ $= 6.59 \times 10^{19}$

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Station 4: Equations and Literal Equations

1. Solve and check for the Given Variable.

a. $5x + 3 - 2x = 9$

$3x + 3 = 9$
$-3 \quad -3$
$3x = 6$
$x = 2$

$5(2) + 3 - 2(2) = 9$
$10 + 3 - 4 = 9$
$9 = 9$ ✓

$x = 2$

b. $4x - 8 = -4(2x - 3) + 4$

$4x - 8 = -8x + 12 + 4$
$4x - 8 = -8x + 16$
$+8x \qquad +8x$
$12x - 8 = 16$
$+8 \quad +8$
$12x = 24$
$x = 2$

$4(2) - 8 = -4(2(2) - 3) + 4$
$8 - 8 = -4(4 - 3) + 4$
$0 = -4(1) + 4$
$0 = -4 + 4$
$0 = 0$ ✓

$x = 2$

c. $\frac{1}{2}(6r - 10) = 7$ (2)

$6r - 10 = 14$
$+10 \quad +10$
$6r = 24$
$r = 4$

$\frac{1}{2}(6(4) - 10) = 7$
$\frac{1}{2}(24 - 10) = 7$
$\frac{1}{2}(14) = 7$
$7 = 7$ ✓

$r = 4$

d. Solve for x: $ax + bcx = D$

$\frac{x(a + bc)}{(a+bc)} = \frac{D}{(a+bc)}$

$x = \frac{D}{(a+bc)}$

e. Solve for h: (2) (2) $A = \frac{1}{2}bh$

$\frac{2A}{b} = \frac{bh}{b}$

$\frac{2A}{b} = h$

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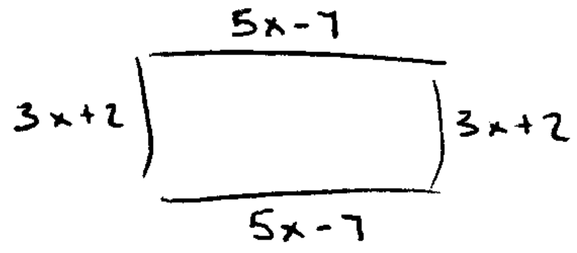
Station 5: Word Problems

1. Kate buys a monthly bus pass, which will entitle her to unlimited bus rides for $45 per month. Without the pass, the rides are $1.80 per ride. How many rides will Kate have to pay for to make the monthly fee a better deal?

x = # of Rides $\quad \frac{45}{1.80} = \frac{1.80x}{1.80}$ $\quad$ 25 Rides is the Break even.

$25 = x$

2. The length of a rectangle is represented by $5x - 7$ and the width is represented by $3x + 2$. If the perimeter of the rectangle is 70 inches, find the dimensions of the rectangle.



$P = 16x - 10$ $\quad$ Length = 18

$70 = 16x - 10$ $\quad$ Width = 17
$+10 \quad +10$

$\frac{80x}{16} = \frac{16x}{16}$ $\quad x = 5$

3. How many pounds of candy worth 70 cents per pound must be mixed with 30 pounds of candy worth 90 cents per pound to produce a mixture which can be sold for 85 cents per pound?

Kind of Nut	Amount	Value	Total
70 cent	x	70	$70x$
90 cent	30	90	$90(30)$
85 Mix	$(x+30)$	85	$85(x+30)$

$70x + 90(30) = 85(x+30)$ $\quad$ { 10 lbs of 70 cent Nuts }

$70x + 2700 = 85x + 2550$
$-70x \qquad -70x$

$2700 = 15x + 2550$
$-2550 \qquad -2550$

$150 = 15x$

$10 = x$

4. A sum of $3500 is invested at two rates. Part is invested at a 5% rate and the rest at an 8% rate. The total annual return is $250. Find the amount invested at each rate.

Investment	Amount	Rate	Total
5%	$(3500 - x)$	.05	$.05(3500 - x)$
8%	x	.08	$.08x$

$.05(3500 - x) + .08x = 250$

$175 - .05x + .08x = 250$

$175 + .03x = 250$
$-175 \qquad -175$

$\frac{.03x}{.03} = \frac{75}{.03}$

$x = 2500$

$2500 @ 8\%$
$1000 @ 5\%$

5. Find three consecutive even integers such that the sum of the smallest and twice the second is 20 more than the third.

x = 1st Even Int = 10

$(x+2)$ = 2nd Even Int = 12

$(x+4)$ = 3rd Even Int = 14

$x + 2(x+2) = (x+4) + 20$

$x + 2x + 4 = x + 24$

$3x + 4 = x + 24$
$-x \qquad -x$

$2x + 4 = 24$
$-4 \quad -4$

$2x = 20$

$x = 10$