Algebra Review

Notations

1. Real Numbers all except imaginary
2. Natural Numbers 1, 2, 3, ...
3. Integers ..., -2, -1, 0, 1, 2, ...
4. Rational Numbers any number that can be written as a fraction
5. Irrational Numbers $\sqrt{11}$ π non-terminating, non-repeating decimals

Evaluating Expressions

-substitute values in for x and y and then simplify

Examples: Let x = 2 and y = 5

1. $4x + 2y(3x + 6)$
   $4(2) + 2(5)(3(2)+6)$
   $8 + 10(12)$
   $8 + 120 = 128$
2. $7xy - 4y$
   $7(2)(5) - 4(5)$
   $70 - 20$
   50
3. $\frac{6y}{4-x}$ $\frac{6(5)}{4-2}$ $\frac{30}{2} = 15$

** Now do on the TI-83. Type in number, store, x and then return. Type in number, store, y, return. Then type in equation and return (see pg 992).

Determining Domain

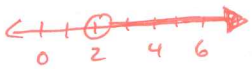
1. If fraction, denominator cannot be zero.
2. If square root, underneath the radical cannot be negative.

Examples: Determine the domain.

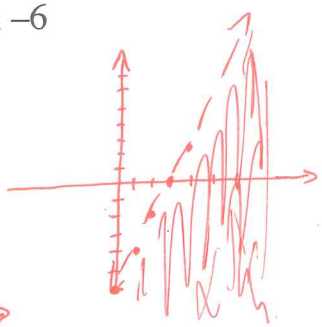
1. $\frac{10-2x}{4x-2}$ $x \neq \frac{1}{2}$
2. $x + 6x$ all reals
3. $\frac{3x}{6x}$ $x \neq 0$
4. $\sqrt{5x+2}$
   $5x + 2 \geq 0$
   $5x \geq -2$
   $x \geq -\frac{2}{5}$

Graphing Inequalities

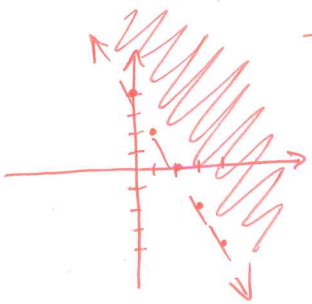
1. $x > 2$



2. $y < 2x - 6$



3. $4x + 2y > 8$
   $2y > -4x + 8$
   $y > -2x + 4$



Finding Distance

A. Number Line | a-b |

B. In a Plane $d = \sqrt{(x-x)^2 + (y-y)^2}$

Ex. 1 (2, 6) and (-3, 4)

$\sqrt{(-3-2)^2 + (4-6)^2}$

$\sqrt{(-5)^2 + (-2)^2}$

$\sqrt{25+4}$

$\sqrt{29} \approx 5.39$

Ex. 2 Find distance between –3 and 8

$|-3-8|$ $|8--3|$

$|-11|$ $|11|$

11 11

Laws of Exponents

a. $a^0 = 1$

b. $a^n = a * a * a$ (n times)

c. $a^{-n} = 1/a^n$

d. $a^m a^n = a^{m+n}$

e. $(a^m)^n = a^{mn}$

f. $(ab)^n = a^n b^n$

g. $a^m/a^n = a^{m-n}$

Evaluating Square Roots

Remember: $\sqrt{b^2} = b$

$\sqrt{b} \rightarrow$

** b cannot be negative and get a real answer

** if b is negative, you have imaginary solutions

$$\sqrt{-1} = i$$

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

1. c = 12 b = 8 a = ? 8.94

$a^2+8^2=12^2$
$a^2+64=144$
$a^2=80$
$a=\sqrt{80}$

2. Is 3, 7, 11 a right triangle?

$3^2+7^2=11^2$
$9+49=121$
$58 \neq 121$
NO

Geometry Formulas

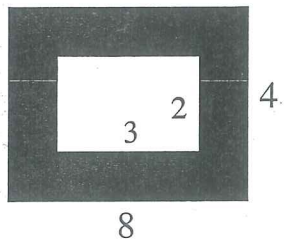
Perimeter: Distance around an object

Area: Amount of space a figure contains

Equations:
Perimeter of Rect. = 2l + 2w
Perimeter of Square = 4s
Area of Square = s^2
Area of Rectangle = $l \cdot w$
Area of Triangle = $\frac{1}{2}bh$
Area of Parallelogram = bh
Area of Rhombus = bh
Area of Trapezoid = $\frac{1}{2}h(b_1+b_2)$
Area of Circle = πr^2
Circumference of Circle = $2\pi r$ or πd
Volume of Box = $l \cdot w \cdot h$
Volume of Sphere = $\frac{4}{3}\pi r^3$
SA of Sphere = $4\pi r^2$
Volume of Cylinder = $B \cdot h = \pi r^2 h$

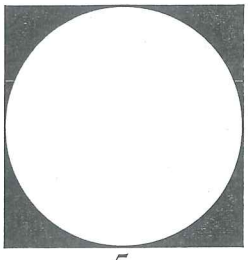
Ex. Find the area of:

1.



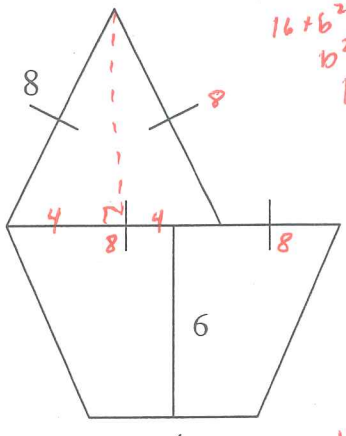
$8 \cdot 4 - 3 \cdot 2$
$32 - 6$
26 units^2

2.



$5^2 - 2.5^2\pi$
$25 - 6.25\pi$
5.37 units^2

3.



$4^2+b^2=8^2$
$16+b^2=64$
$b^2=48$
$b=\sqrt{48}$

$A=\frac{1}{2}bh$
$=\frac{1}{2}(8)(\sqrt{48})$
$A=4\sqrt{48}$

$A=\frac{1}{2}h(b_1+b_2)$
$=\frac{1}{2}(6)(16+4)$
$=3.20$
$A=60$

$A = 87.71 \text{ units}^2$

Adding and Subtracting Polynomials

**Group like terms and then combine them.

Ex. $8x^3 - 2x^2 + 6x - 2$ and $3x^4 - 2x^3 + x^2 + x$

Add: $3x^4 + 6x^3 - x^2 + 7x - 2$ Subtract: $-3x^4 + 10x^3 - 3x^2 + 5x - 2$

Multiplying Polynomials

**Use laws of exponents and Distributive property.

Ex. $(2x + x^3) * (5x - 3 + 2x^4) =$

$10x^2 - 6x + 4x^5 + 5x^4 - 3x^3 + 2x^7$

$2x^7 + 4x^5 + 5x^4 - 3x^3 + 10x^2 - 6x$

HOMEWORK: Worksheet Handout