Math 2 – Things to Remember

Probability

Sets: Know union and intersections & how to create Venn diagrams from info

Probability $= \frac{Event\ outcomes}{Total\ possible\ outcomes}$

Odds$=\frac{Events\ occurs}{Event\ does\ NOT\ occur}$

P(A and B) = P(A) * P(B)
P(A or B) = P(A) + P(B) – P(A and B)
Complement: A^C = 1-P(A)
Conditional Probability

$$P(B|A) = \frac{P(A\ and\ B)}{P(A)}$$

Factorial (!) 5! = 5*4*3*2*1

Transformations

Reflections

$r_{x-axis}\ (x,y) \rightarrow (x,-y)$
$r_{y-axis}\ (x,y) \rightarrow (-x,y)$
$r_{y=x}\ (x,y) \rightarrow (y,x)$
$r_{y=-x}\ (x,y) \rightarrow (-y,-x)$

Rotations (counterclockwise)

$R_{90\ degrees}\ (x,y) \rightarrow (-y,x)$
(Same as 270 clockwise)
$R_{180\ degrees}\ (x,y) \rightarrow (-x,-y)$
$R_{270\ degrees}\ (x,y) \rightarrow (y,-x)$
(Same as 90 clockwise)

Translations

$(x,y) \rightarrow (x \pm \#, y \pm \#)$

Dilations

$D_k\ (x,y) \rightarrow (kx,ky)$

Similarity

Two figures are similar if they have all corresponding angles congruent AND if all corresponding sides are proportional (must have the same scale factor for all sides)

Ways to Prove Triangles Similar
AA~ SSS~ SAS~

Congruence

Two figures are congruent if all corresponding angles and sides are congruent.

Ways to Prove Triangles Congruent
SSS SAS ASA AAS
*<u>**NEVER**</u> ASS OR SSA*
Corresponding parts of congruent triangles are always congruent

Triangles

Scalene – no congruent sides
Isosceles – at least 2 congruent sides
Base angles of isosceles triangles are congruent
Equilateral – 3 congruent sides

Acute – all angles <90 degrees
Right – one 90 degree angle
Obtuse – one obtuse angle (>90)

Equiangular – 3 congruent angles
Equilateral↔Equiangular

<u>Mid-segments of triangles</u> are half the length of their parallel side.

<u>Rotational Symmetry:</u> A rotation which the figure is its own image. *To find the rotational degrees where a polygon will rotate onto its own image*, take 360°/# of sides.

Multiplying Polynomials

Multiply: (distribute or foil or box)
$(4x+3)(x+2) = 4x^2+11x+6$
or
$(2x+3)(x^2-3x+9)$

Solve Quadratic Equations

$= ax^2+bx+c = 0$
Must be set equal to 0 at first

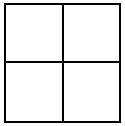
Set each factor equal to zero & solve
x^2-5x+6=0 so (x-3)(x+2) so x=3 &-2

<u>Factoring:</u>
Look to see if there a GCF (greatest common factor) first!

$$ab+ac = a(b+c)$$

<u>Factor 3 terms:</u>
Find two numbers that multiply to give a*c but add to give b value

Use these two numbers to help factor using a box method.



<u>Factor 4 terms (Grouping)</u>:
Check for GCF first. Place all 4 terms into a box and factor.

<u>Difference of Squares</u>:

$$(a^2-b^2) = (a-b)(a+b)$$

<u>Square roots</u>:
Isolate the variable and take the square root of each side.

$$if\ x^2 = m, then\ x = \pm\sqrt{m}$$

Quadratic Formula

$ax^2+bx+c=0$
Must be set equal to 0 at first

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

Discriminant: tells info about roots

$b^2-4ac > 0$ Two real roots
Perfect Square: factorable
Non perfect square: quad formula
Graph has two x-intercepts

$b^2-4ac = 0$ One real roots
This root will be repeated 2 times
Graph has one x-intercept

$b^2-4ac < 0$ Zero real roots
Two imaginary/complex roots
Graph will have zero x-intercepts

Graphing Parabolas

Axis of symmetry: $\frac{-b}{2a}$
Vertex: $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$ *Substitute the axis of symmetry into the function*

+a: parabola will have a minimum and open up
-a: parabola will have a maximum and open down.

Domain: all real numbers
Range: Look at the y-value of vertex. Your graph is greater/equal or less/equal to this number.

Function Transformations

$$y = a(x-h)^2+k$$

a: Reflections across x axis
h: Left & right k: Up, down
a: Horizontal & Vertical Stretch
a: Hori & Vert Compression (Shrinks)

Exponent Rules

$$x^m * x^n = x^{m+n}$$

$$\frac{x^m}{x^n} = x^{m-n}$$

$$x^{-n} = \frac{1}{x^n} \text{ or } \frac{1}{x^{-n}} = x^n$$

$$(x^m)^n = x^{m*n}$$

$$x^m * x^n = x^{m+n}$$

$$\left(\frac{x^m}{x^n}\right)^p = \frac{x^{mp}}{x^{np}}$$

$$(x^m y)^n = x^{mn} y^n$$

$$x^0 = 1, x \neq 0$$

Exponent Form: $x^{\frac{2}{3}}$

Radical Form: $\sqrt[3]{x^2} or (\sqrt[3]{x})^2$

Polynomials
Combine Like Terms

$$(3x^2 - 4 + 2x) + (5x - 6x^2 + 7) = -3x^2 + 7x + 3$$

$$(3x^2 - 4 + 2x) - (5x - 6x^2 + 7) = 9x^2 - 3x - 11$$

Advanced Functions

Solving Rational/Radical Equations
1: Isolate the radical
2: Square or cube the radical to eliminate it
3. Solve the multistep equation for the variable
4. Substitute answers into original equation to check for extraneous solutions.

Direct Variation $y = kx$
"y varies directly with x" Solve: $\frac{y}{x} = \frac{y}{x}$

Inverse Variation $y = \frac{k}{x}$
"y varies inversely with x" Solve: xy=xy

Direct/Inverse Variation (combined) $y = \frac{kx}{z}$
"y varies directly with x and inversely with z"

Solving Rational Equations:
Get rid of the denominators by multiplying all terms by a common denominator.

$$\frac{22}{2x^2 - 9x - 5} - \frac{3}{2x + 1} = \frac{2}{x - 5}$$
$$22 - 3(x - 5) = 2(2x + 1)$$
$$22 - 3x + 15 = 4x + 2$$
$$37 - 3x = 4x + 2$$
$$35 = 7x \quad so\ x = 5$$
x=5 doesn't work so NO SOLUTION

Excluded Values: Values that make the rational expression undefined. Set the denominators equal to zero and solve to find E.V.'s

Trigonometry

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

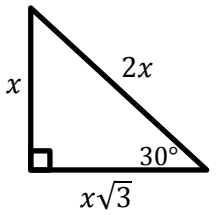
$$sin(\theta) = \frac{Opp}{Hyp} \quad cos(\theta) = \frac{Adj}{Hyp} \quad tan(\theta) = \frac{Opp}{Adj}$$

Use regular trig for find missing sides
Use inverse trig for finding missing angles

Angle of Elevation: From horizontal line of sight – up
Angle of Depression: horizontal line of sight – down

Special Right Triangles

$30° - 60° - 90°$



$45° - 45° - 90°$