GLENELG HIGH SCHOOL

Precalculus and Precalculus GT

Summer Pre-View Packet

DUE THE FIRST WEEK OF SCHOOL

The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in

Precalculus and Precalculus GT

Show all work that leads you to each solution on separate sheets of paper. You may use your notes from previous mathematics courses to help you. Additional copies of this packet may be obtained from the Main Office in your school or printed from the school's website.

ALL work should be completed and ready to turn in on the FIRST WEEK of school. This packet will count as part of your first quarter grade.

ENJOY YOUR SUMMER!! WE ARE LOOKING FORWARD TO SEEING YOU IN THE FALL.

Student Name: _____

School: _____

Date: _____

Notes:

- The use of a calculator is permitted.
- Unless otherwise specified, if a decimal approximation is used, it must be accurate to three places after the decimal point.

Reference Information:

Quadratic Formula: If $ax^2+bx+c=0$, then $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$.

Factoring: $a^3+b^3=(a+b)(a^2-ab+b^2)$ $a^3-b^3=(a-b)(a^2+ab+b^2)$

Laws of Exponents:

$(a^m)^n=a^{mn}$ $\dfrac{a^n}{a^m}=a^{n-m}$ $(ab)^n=a^nb^n$ $\left(\dfrac{a}{b}\right)^n=\dfrac{a^n}{b^n}$ $a^{-n}=\dfrac{1}{a^n}$

$a^{\frac{m}{n}}=\sqrt[n]{a^m}\ or\ \left(\sqrt[n]{a}\right)^m$

Compound Interest:

Continuously: $A=Pe^{rt}$ *n* times per year: $A=P\left(1+\dfrac{r}{n}\right)^{nt}$

Arithmetic Sequence and Series:

$a_n=a_1+(n-1)d$ $S_n=n\left(\dfrac{a_1+a_n}{2}\right)=n\left(\dfrac{2a_1+(n-1)d}{2}\right)$

Geometric Sequence and Series:

$a_n=a_1r^{n-1}$ $S_n=a_1\left(\dfrac{1-r^n}{1-r}\right)$

Conic Sections – GT ONLY

Circle	$x^2 + y^2 = r^2$ Center $(0,0)$ radius r
Parabola	$x^2 = 4py$ or $y = \frac{1}{4p}x^2$ opens up if $p > 0$, opens down if $p < 0$ Vertex $(0,0)$ $y^2 = 4px$ or $x = \frac{1}{4p}y^2$ opens right if $p > 0$, opens left if $p < 0$ Vertex $(0,0)$ p is the distance from the vertex to the focus and from the vertex to the directrix
Ellipse	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ major axis horizontal Center $(0,0)$ $a > b$ $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ major axis vertical Center $(0,0)$ $a > b$ $a =$ center to vertex, $c =$ center to focus $c^2 = a^2 - b^2$
Hyperbola	$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ transverse axis horizontal Center $(0,0)$ $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ transverse axis vertical Center $(0,0)$ $a =$ center to vertex $c =$ center to focus $c^2 = a^2 + b^2$

From Algebra 2 GT

Circle	$(x-h)^2+(y-k)^2=r^2$ Center (h,k) radius r
Parabola	$(x-h)^2=4p(y-k)$ or $y-k=\frac{1}{4p}(x-h)^2$ opens up if $p>0$, opens down if $p<0$ Vertex (h,k) $(y-k)^2=4p(x-h)$ or $x-h=\frac{1}{4p}(y-k)^2$ opens right if $p>0$, opens left if $p<0$ Vertex (h,k) p is the distance from the vertex to the focus or vertex to the directrix
Ellipse	$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$ major axis horizontal Center (h,k) $a>b$ $\frac{(x-h)^2}{b^2}+\frac{(y-k)^2}{a^2}=1$ major axis vertical Center (h,k) $a>b$ $a=$center to vertex, $c=$center to focus $c^2=a^2-b^2$
Hyperbola	$\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$ transverse axis horizontal Center (h,k) $\frac{(y-k)^2}{a^2}-\frac{(x-h)^2}{b^2}=1$ transverse axis vertical Center (h,k) $a=$center to vertex $c=$center to focus $c^2=a^2+b^2$

Name _____

USE A SEPARATE SHEET OF PAPER AND SHOW ALL WORK.
PROBLEMS WITH AN ASTERISK * ARE FOR GT ONLY.

I. Polynomials and operations on real and imaginary numbers.

A. Simplify these expressions

1. $\sqrt{-100}$
2. $\sqrt{-4 \cdot -9}$
3. $(i\sqrt{7})^2$
4. $\sqrt[3]{2x} \cdot \sqrt[3]{4x^2y^2} \cdot \sqrt[3]{2y^4}$
5. $(3 + 2i) + (5 + 7i)$
6. $2i\ (3 - i)$
7. $(3 + 2i)\ (3 - 2i)$
8. $(3+i\sqrt{5})^2$
9. $\dfrac{8}{-2i}$
10. $-\sqrt{-9}$

*11. $\dfrac{5i}{6-2i}$ (Hint: Use the conjugate of denominator)

B. Factor Completely

1. $t^2 - 4t - 21$
2. $8x^3 - 1$ hint: use formula
3. $x^3 + 125$ hint: use formula
*4. $x^3 - 2x^2 - 4x + 8$ Hint: grouping

C. Simplify the following expressions.

1. $5x^2 \bullet 2x^5$
2. $(-2c^3)^2$
3. $t^3 \bullet t^{(n-3)}$
4. $\dfrac{10 \cdot 2^6}{8 \cdot 2^{-2}}$

*5. $(x^m)^n \bullet (x^n)^{n-m}$

D. Divide and simplify these expressions. Use either polynomial long division or synthetic division.

1. $\frac{x^2+2x-3}{x+3}$

E. Solve each quadratic equation for x using either factoring techniques, or the quadratic formula.

1. (x - 1)(x + 3) = 0
2. x(x-4)=2(4 -x)
3. $x^2 + 4x = -3$
4. $2x^2 - 32x = 0$

F. Graph the functions using a calculator. Sketch it on your paper. Describe the following characteristics for each function:

a. domain and range b. zeros c. y-intercept d. end behavior
e. intervals where the function is increasing and/or decreasing

1. $f(x) = x^3 - 3x^2 + x + 1$
2. $f(x) = x^2+2x+1$

II. Function Operations

A. If $f(x) = x^2 - 4$ and $g(x) = \sqrt{2x+4}$, determine

1. f(3)
2. f(x) = 0 when x = ?
3. f(g(4))
4. f(g(x))
5. Domain of f(g(x))
6. g(f(0))
7. * g(f(a + 2))
8. $f^{-1}(x)$

III. Rational Expressions and Rational Functions

A. Graph the following functions using a table of 5 values. Also identify:
a. domain b. range c. asymptotes

1. $f(x)=\frac{2x}{x+4}$
2. $h(x)=\frac{3}{x+1}-2$
3. $k(x)=\frac{4}{x-2}$

B. Simplify. Write your answer as a single fraction.

1. $\frac{3x^2+6x^3}{9x}$

2. $\frac{x^2-25}{x^2+7x+10}$

3. $\frac{2x}{x+5} \div \frac{6x^2}{2x+10}$

4. $\frac{\frac{3}{x+2}}{\frac{6}{x}}$

5. $\frac{x-2}{x}+\frac{x+4}{2x}$

6. $\frac{4x}{x+6}+2$

IV. Rewriting and Solving Equations

A. Solve each equation for y.

1. $7y + 6x = 10$

2. $\frac{1}{4}y - 7x = \frac{15}{2}$

B. Find the solution(s) of the given systems of equations. Write answers in the form (x, y).

1. $-2x - 5y = 7$
   $7x + y = -8$

2. $4x + 9y = 2$
   $2x + 6y = 1$

C. Solve for x and y.

1. $x + 9y = 9$
   $3x + 6y = 6$

V. Pythagorean Theorem.

A. Solve for the missing side of the triangle using the Pythagorean Theorem $a^2 + b^2 = c^2$:

1. a = 6 ft. b = 8 ft.

2. b = 17 ft. c = 19 ft.