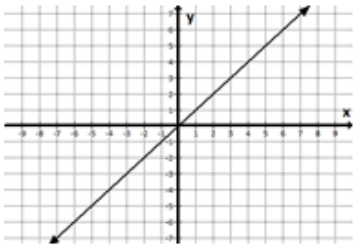
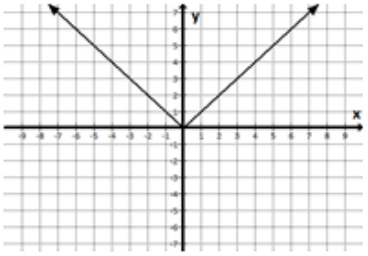
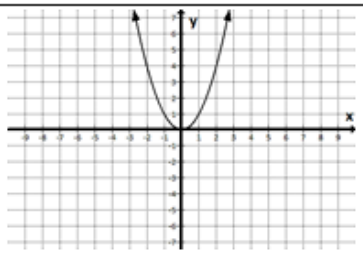
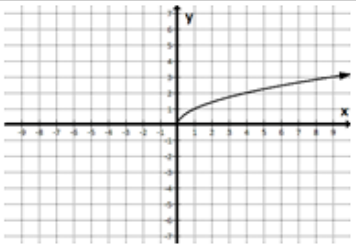
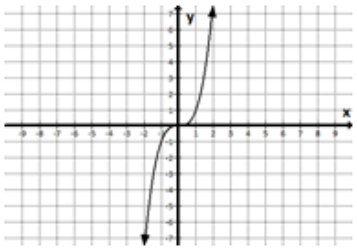
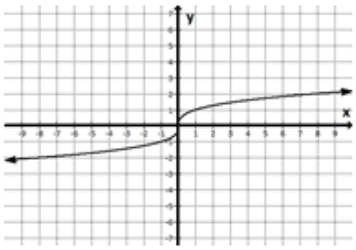
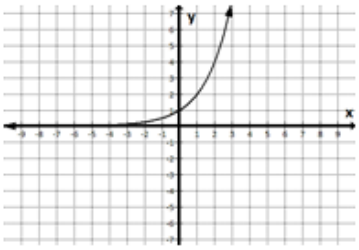
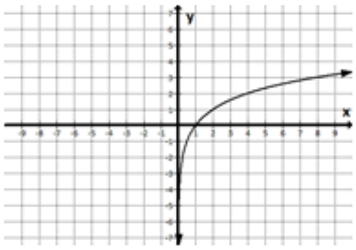
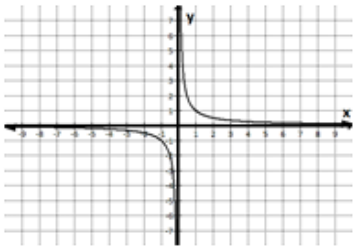
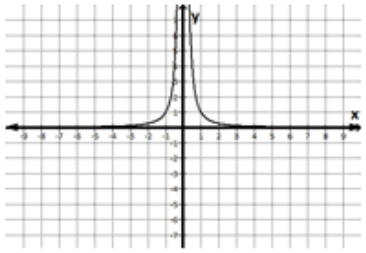
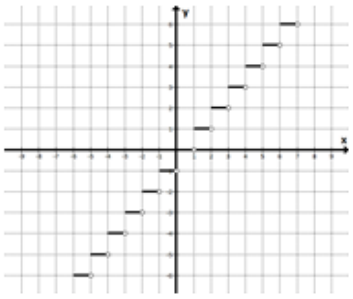
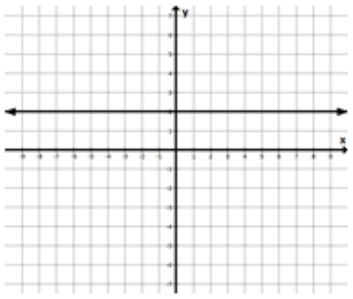
Honors Precalculus Summer Packet

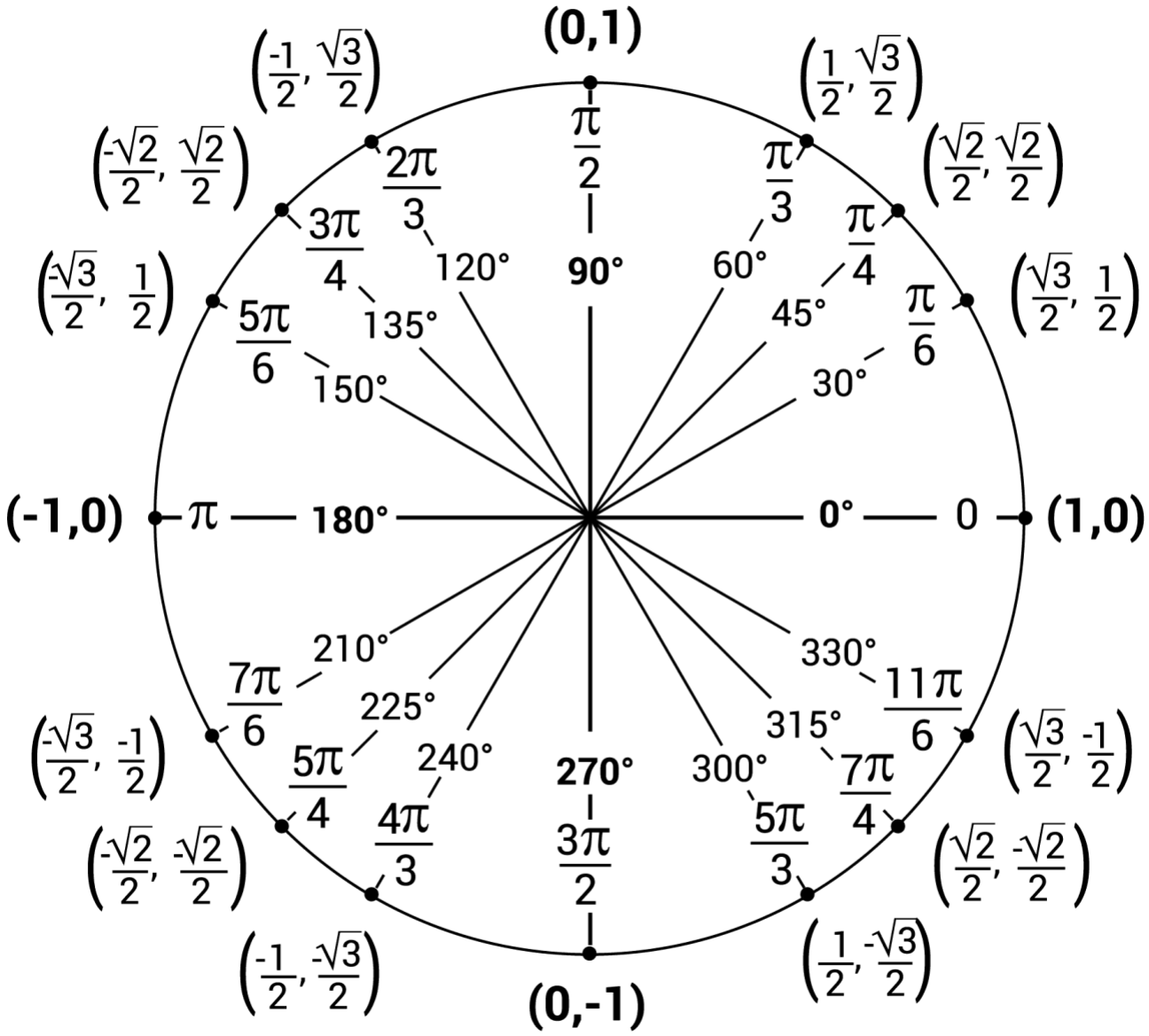
Honors precalculus is a rigorous course designed to prepare students for AP Calculus. It is a course that moves quickly and requires students to be able to recall and use knowledge from all of their previous mathematics courses. This packet is designed to engage your prior knowledge and allow you to practice the skills that are necessary for getting deeper into the curriculum of precalculus.

If you are having trouble with any problems you should be researching how to do them. This research could include old notes or online forums including Khan Academy. It is expected that you will be able to complete all problems by the first day of class. The packet will be collected and there will be a quiz on it during the second class. This quiz will serve as an indicator of your command of the needed math skills for the course.

FOR THE SUMMER:

- You must complete ALL problems in the packet, showing work (which can be done on separate paper) as evidence of understanding your solutions.
- You should think of clarifying questions for the first day of class (highly suggest circling any problems from the packet that were difficult for you, as well as writing a note to self for why).
- You must be able to sketch the 12 Basic parent functions by hand and be able to recognize their graphs visually
- You must be able to fill in a unit circle with no assistance (in both degrees & radians)
- A graphing calculator is HIGHLY RECOMMENDED for the course. The investment is more than worth it. You will use it for the rest of your schooling and for SAT's and other national tests, including AP exams. The TI-84 is recommended because it is the model for which your teachers are most familiar.

Parent Function	Graph	Parent Function	Graph
$y = x$ Linear Odd Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$		$y = \lvert x \rvert$ Absolute Value Even Domain: $(-\infty, \infty)$ Range: $[0, \infty)$	
$y = x^2$ Quadratic Even Domain: $(-\infty, \infty)$ Range: $[0, \infty)$		$y = \sqrt{x}$ Square Root Neither Domain: $[0, \infty)$ Range: $[0, \infty)$	
$y = x^3$ Cubic Odd Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$		$y = \sqrt[3]{x}$ Cube Root Odd Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$	
$y = b^x,\ b > 1$ Exponential Neither Domain: $(-\infty, \infty)$ Range: $(0, \infty)$		$y = \log_b(x),\ b > 1$ Log Neither Domain: $(0, \infty)$ Range: $(-\infty, \infty)$	
$y = \frac{1}{x}$ Rational or Inverse Odd Domain: $(-\infty, 0) \cup (0, \infty)$ Range: $(-\infty, 0) \cup (0, \infty)$		$y = \frac{1}{x^2}$ Inverse Squared Even Domain: $(-\infty, 0) \cup (0, \infty)$ Range: $(0, \infty)$	
$y = \text{int}(x) = [x]$ Greatest Integer Neither Domain: $(-\infty, \infty)$ Range: $\{y : y \in \mathbb{Z}\}$ (only integers)		$y = C$ Constant Function Even Domain: $(-\infty, \infty)$ Range: $\{y : y = C\}$	


(0,1)
$\left(\frac{-1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
$\left(\frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$
$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
$\frac{\pi}{2}$
$\frac{2\pi}{3}$
$\frac{\pi}{3}$
$\frac{3\pi}{4}$
$\frac{\pi}{4}$
$\frac{5\pi}{6}$
$\frac{\pi}{6}$
120°
90°
60°
135°
45°
150°
30°
(-1,0)
π
180°
0°
0
(1,0)
210°
330°
$\frac{7\pi}{6}$
$\frac{11\pi}{6}$
225°
315°
$\left(\frac{-\sqrt{3}}{2}, \frac{-1}{2}\right)$
$\left(\frac{\sqrt{3}}{2}, \frac{-1}{2}\right)$
$\frac{5\pi}{4}$
240°
270°
300°
$\frac{7\pi}{4}$
$\left(\frac{-\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\left(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$
$\frac{4\pi}{3}$
$\frac{5\pi}{3}$
$\frac{3\pi}{2}$
$\left(\frac{-1}{2}, \frac{-\sqrt{3}}{2}\right)$
$\left(\frac{1}{2}, \frac{-\sqrt{3}}{2}\right)$
(0,-1)

H.Algebra 2 to H.Precalculus Name_____ ID: 1

HPC Summer Packet

Date_____ Period____

Solve each equation.

1) $-5(1 + 7b) - 5 = 42 - 9b$

Simplify.

2) $\dfrac{-5 + 5i}{-2 - 9i}$

3) $\dfrac{5i}{-1 - 9i}$

Factor each completely.

4) $5x^3 + 45x^2 + 40x$

5) $25n^2 - 9$

6) $9v^2 - 6v + 1$

Solve each equation by factoring.

7) $8a^2 + 128 = 80a$

8) $6n^2 = 6n$

Solve each equation with the quadratic formula.

9) $5n^2 = 21 + 8n$

10) $12n^2 = -6 - 9n$

Factor each completely.

11) $x^3 + 216$

12) $375 + 192x^3$

Evaluate each function at the given value.

13) $f(x) = 2x^3 + 4x^2 - 22x - 22$ at $x = -4$

State the possible rational zeros for each function. Then find all zeros. You should be able to do this by hand and using a calculator.

14) $f(x) = 2x^3 + 5x^2 + 4x + 1$

15) $f(x) = x^3 - 16x^2 + 50x + 25$

Simplify.

16) $-\sqrt[4]{243} - 2\sqrt[4]{3} - 2\sqrt[4]{80}$

Solve each equation. Remember to check for extraneous solutions.

17) $\sqrt{3n - 22} = \sqrt{n - 4}$

18) $\sqrt{4m - 23} = m - 5$

Simplify each and state the excluded values.

19) $\dfrac{n + 5}{n^2 + 8n + 15}$

Simplify each expression.

20) $\dfrac{\frac{5}{4} - \frac{10}{u^2}}{\frac{25}{4}}$

21) $\dfrac{\frac{x}{2} - \frac{25}{4}}{4}$

Solve each equation. Remember to check for extraneous solutions.

22) $\frac{r^2 + 2r - 24}{2r} = \frac{1}{2r} + 1$

23) $\frac{6}{n^2 + 4n + 4} = \frac{1}{n + 2} + 5$

Rewrite each equation in exponential form.

24) $\log_{64} \frac{1}{2} = -\frac{1}{6}$

Rewrite each equation in logarithmic form.

25) $121^{\frac{1}{2}} = 11$

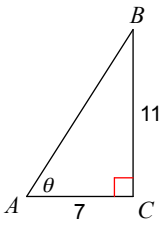
Evaluate each expression.

26) $\log_2 32$

27) $\log_6 \frac{1}{216}$

Solve the triangles. Find all missing sides and angles. Round angles to the nearest degree and side lenghts to the nearest tenth.

28)



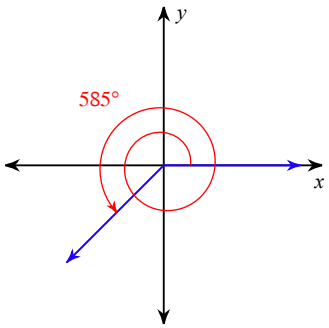
Find a positive and a negative coterminal angle for each given angle.

29) $-240°$

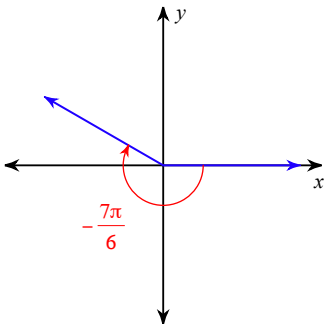
30) $-\frac{23\pi}{12}$

Find the exact value of each trigonometric function.

31) tan θ



32) sin θ



33) $\sin \frac{25\pi}{6}$

34) $\sin 930°$

35) $\tan -90°$

Answers to HPC Summer Packet (ID: 1)

1) $\{-2\}$

2) $\frac{-7 - 11i}{17}$

3) $\frac{-5i - 45}{82}$

4) $5x(x + 1)(x + 8)$

5) $(5n + 3)(5n - 3)$

6) $(3v - 1)^2$

7) $\{8, 2\}$

8) $\{1, 0\}$

9) $\left\{3, -\frac{7}{5}\right\}$

10) $\left\{\frac{-3 + i\sqrt{23}}{8}, \frac{-3 - i\sqrt{23}}{8}\right\}$

11) $(x + 6)(x^2 - 6x + 36)$

12) $3(5 + 4x)(25 - 20x + 16x^2)$

13) 2

14) Possible rational zeros: $\pm 1, \pm \frac{1}{2}$

Zeros: $\left\{-\frac{1}{2}, -1 \text{ mult. } 2\right\}$

15) Possible rational zeros: $\pm 1, \pm 5, \pm 25$

Zeros: $\left\{5, \frac{11 + \sqrt{141}}{2}, \frac{11 - \sqrt{141}}{2}\right\}$

16) $-5\sqrt[4]{3} - 4\sqrt[4]{5}$

17) $\{9\}$

18) $\{6, 8\}$

19) $\frac{1}{n + 3}$; $\{-5, -3\}$

20) $\frac{u^2 - 8}{5u^2}$

21) $\frac{2x - 25}{16}$

22) $\{5, -5\}$

23) $\left\{-1, -\frac{16}{5}\right\}$

24) $64^{-\frac{1}{6}} = \frac{1}{2}$

25) $\log_{121} 11 = \frac{1}{2}$

26) 5

27) -3

28) $57.5°$

29) $120°$ and $-600°$

30) $\frac{\pi}{12}$ and $-\frac{47\pi}{12}$

31) 1

32) $\frac{1}{2}$

33) $\frac{1}{2}$

34) $-\frac{1}{2}$

35) Undefined