ACP Precalculus **Name**_____
Summer Pre-View Packet

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

- Show all work that leads you to each solution.
- You may use your notes from previous mathematics courses to help you.
- You may use a calculator for all problems, unless otherwise indicated.

ALL work should be completed and ready to turn in by _____.
You will be assessed on this material!

Enjoy your summer! We are looking forward to seeing you in the fall.

Reference Information

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

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

Difference of Cubes: $a^3-b^3=(a-b)(a^2+ab+b^2)$

Grouping:
$$\begin{aligned} xy+2x+3y+6 &= (xy+2x)+(3y+6) \\ &= x(y+2)+3(y+2) \\ &= (x+3)(y+2) \end{aligned}$$

Laws of Exponents:

$(a^m)^n=a^{mn}$ $\quad \dfrac{a^m}{a^n}=a^{m-n}$ $\quad (ab)^n=a^nb^n$

$\left(\dfrac{a}{b}\right)^n=\dfrac{a^n}{b^n}$ $\quad a^{-n}=\dfrac{1}{a^n}$ $\quad a^{\frac{m}{n}}=\sqrt[n]{a^m}$ or $\left(\sqrt[n]{a}\right)^m$

ACP Precalculus

Students entering ACP Precalculus should be able to:

1. Apply the laws of exponents to simplify expressions

2. Factor binomials using greatest common factor and difference of perfect squares

3. Factor binomials using greatest common factor and sum or difference of perfect cubes

4. Factor trinomials with a greatest common factor and coefficient $a \geq 1$ into two binomials

5. Factor four-term polynomials using grouping

6. Solve quadratic equations using factoring or the quadratic formula

7. Evaluate composite functions

8. Simplify radicals and be able to rationalize the denominator

9. Use special right triangle ratios to find the missing sides of triangles

10. Use right triangle trigonometric ratios to find missing sides and angles of triangles

11. Use sides of right triangles to determine trigonometric ratios

12. Write the equation of a line in slope-intercept form from a point and a slope or two points

13. Write the equation of a perpendicular or parallel line in slope-intercept form

14. Write the equation of a line tangent to a circle in slope-intercept form from a point given the center and radius of a circle

15. Write a quadratic function by completing the square.

16. Identify the vertex, axis of symmetry, zero(s), and *y*-intercept from a quadratic function.

17. Graph parabolas from a quadratic function in standard or vertex form.

18. Perform the four basic operations on rational expressions

19. Solve rational expressions

20. Find the distance and midpoint of two points.

Complete each problem. Be sure to show all work.

Simplify.

1. $\left(-2x^3\right)^2$

2. $5x^2 \bullet 2x^5$

3. $\left(x^m\right)^n \bullet \left(x^n\right)^{n-m}$

4. $\left(\dfrac{-8x^6}{y^{-3}}\right)^{\frac{2}{3}}$

5. $\dfrac{\left(p^2q^4\right)^{\frac{1}{2}}}{\left(27q^3p^6\right)^{\frac{1}{3}}}$

6. $t^3 \bullet t^{(n-3)}$

7. $\dfrac{7}{3-\sqrt{2}}$

Factor completely.

8. $4t^2+12t+9$

9. $3x^3+375$

10. $8x^3-1$

11. x^3-2x^2-4x+8

12. $35x^2-x-12$

13. $3x^2-7xy+2y^2$

14. $12a^2+11a-15$

15. $14u^2-33u-5$

Solve for *x* in each quadratic equation, using the method of your choice.

16. $(x-1)(x+3)=0$

17. $x(x-4)=2(4-x)$

18. $x^2+4x=-3$

19. $2x^2-32=0$

For #20-25, given $f(x)=x^2-4$ and $g(x)=\sqrt{2x+4}$, determine each of the following.

20. $f(3)$

21. $f(x)=0$, when $x=?$

22. $f(g(4))$

23. $g(f(0))$

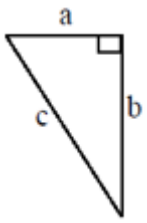
24. $f(g(x))$

25. $g(f(a+2))$

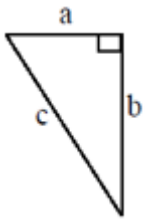
26. $h(x)=\frac{7}{4}x-2$ find $h^{-1}(x)$

For #27-31, using the right triangles, find the unknown side lengths. If necessary, round to the nearest hundredth.

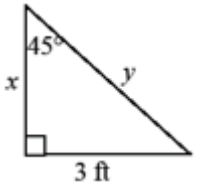
27. a = 6ft. and b = 8ft



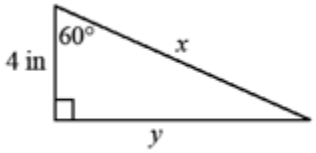
28. b = 17ft. and c = 19ft



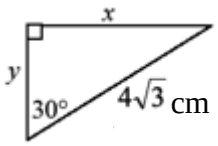
28.



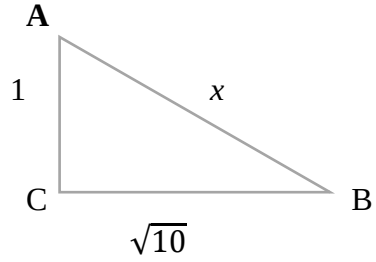
30.



31.

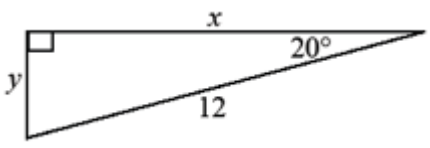


32. Given the right triangle below, determine the 6 trigonometric ratios for angle A.

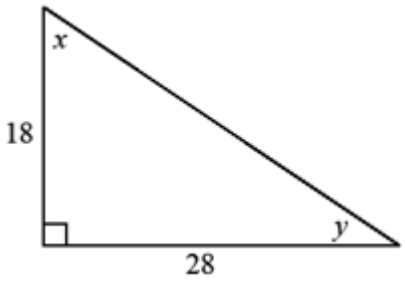


For #33-34, use trigonometric ratios to solve for *x* and *y* in each right triangle. If necessary round side lengths to the nearest hundredth and angles to the nearest tenth.

33.



34.



For 35-37 Include a picture depicting what the problem is asking.

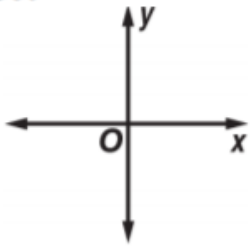
35. The angle of elevation from a sailboat to the top of a 121-foot lighthouse on the shore measures 16^o. How far is the sailboat from the lighthouse?

36. A road runs due east from the base of Sleeping Giant. From two points 235 feet apart on the road, the angle of elevation to the top of the mountain are 43^o and 35^o. How high above the road is the mountaintop?

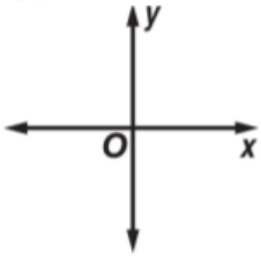
37. From the top of a fire tower 225 feet high, the angle of depression to a fire spotted in the distance 14^o. Find to the nearest foot, the distance from the boat to the foot of the firetower.

For 38-39 draw the angle with given measure in standard position.

38. $580°$



39. $-450°$



For #40-41 find one positive and one negative coterminal angle with the angle given. If the given angle is in radian the answers should be in radians.

40. 260^o

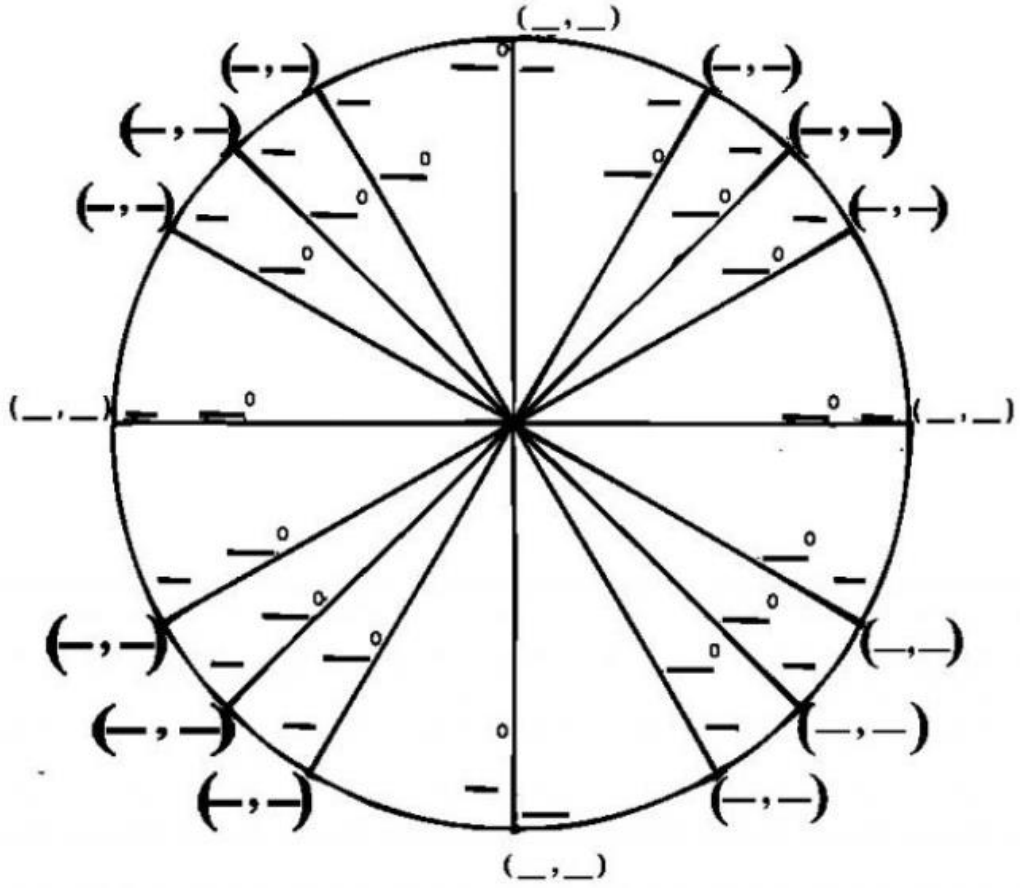
41. $\frac{8\pi}{5}$

For #42-43 rewrite degrees to radians and radians to degrees.

42. 305^o

43. $\frac{7\pi}{3}$

For #44 complete the unit circle.

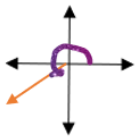
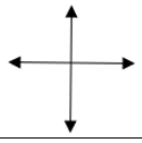
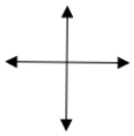
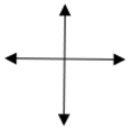


For #45-46 The terminal side of θ in standard position contains the given point. Draw the coordinate plane, label the point and draw the triangle. Find the EXACT (no decimals) value of the six trigonometric functions of θ.

45. $(-4,-11)$

46. $(-8,4)$

For #47-49 complete the table below.

Trig Function	Sketch the Angle	Quadrant	+ or -	Reference Angle	Ordered Pair of Reference Angle	Evaluate
example $sec\frac{4\pi}{3}$		III	negative	$\frac{4\pi}{3}-\frac{3\pi}{3}=\frac{\pi}{3}$ $(60°)$	$\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$	$x=1, y=\sqrt{3}$ $r=2$ $sec=\frac{r}{x}=-\frac{2}{1}$
47. $\sin(210°)$						
48. $\tan\frac{11\pi}{4}$						
49. $\cos(-270°)$						

For #50-55, find the equation in slope intercept form for each line described.

50. The line through $(3,2)$ with a slope of $m=\frac{4}{5}$.

51. The line through the points $(-1,-4)$ and $(3,2)$.

52. The line through $(-2,4)$ with a slope of $m=0$.

53. The line through $(2,-3)$ and parallel to the line $2x+5y=3$.

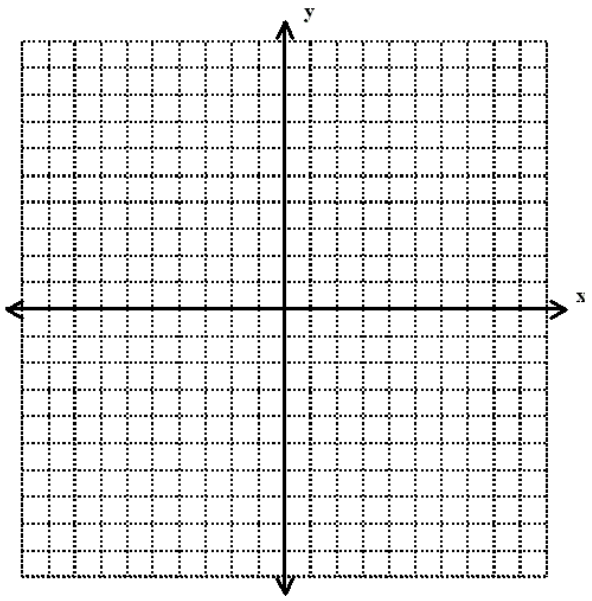
54. The line through $(2,-3)$ and perpendicular to the line $2x+5y=3$.

55. The line tangent to the circle $(x-3)^2+(y+5)^2=36$ at $(3,1)$.

56. Write the following quadratic function in vertex form, $y = a(x \pm h)^2 \pm k$, by completing the square. .

Identify the vertex, zero(s), and *y*-intercept. Graph the parabola.

$$y = x^2 + 2x - 3$$



Vertex form _____

Vertex _____

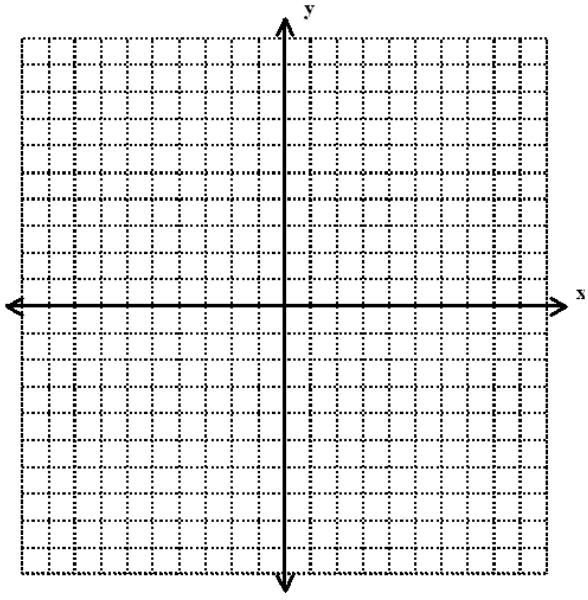
Axis of Symmetry _____

Zeros _____

***y*-intercept _____**

57. Graph the quadratic equation: $y = -x^2 - 4x - 7$.

State the vertex, axis of symmetry, zeros, and *y*-intercept.



Vertex _____

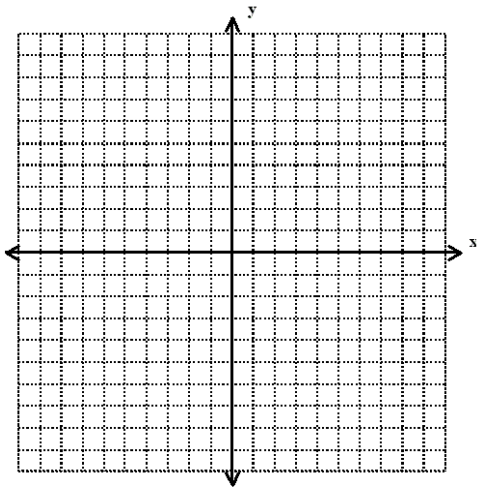
Axis of Symmetry _____

Zeros _____

***y*-intercept _____**

58. Graph the quadratic equation: $y = (x+3)^2 + 1$.

Find the vertex, axis of symmetry, zeros, and *y*-intercept.



Vertex _____

Axis of Symmetry _____

Zeros _____

***y*-intercept _____**

For #59-61, simplify the rational expression. State all domain restrictions.

59. $\dfrac{7}{x^2-64} + \dfrac{3}{x+8}$

60. $\dfrac{x}{x+3} + \dfrac{1}{x+1} = \dfrac{3x+5}{x^2+4x+3}$

61. $\dfrac{2}{x+3} + \dfrac{3}{8} = \dfrac{5}{4x+12}$

62. Find the distance between and midpoint of the given points.

$$A(-7,-6) \quad B(3,-10)$$