ACP PreCalculus **Name**_____
2019 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.
- Remember appropriate notation.

ALL work should be completed and ready to turn in by <u>August 30, 2019</u>.
You will be assessed on this material!

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

<u>Reference Information</u>

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

Changing between Logarithmic and Exponential Form: $y=\log_b(x)$ if and only if $b^y=x$

Basic Properties of Logarithms: $\log_b 1=0$ $\quad \log_b b=1$ $\quad \log_b b^y=y$ $\quad b^{\log_b x}=x$

Properties of Logarithms: Product Rule: $\log_b(RS)=\log_b R+\log_b S$

Quotient Rule: $\log_b\dfrac{R}{S}=\log_b R-\log_b S$

Power Rule: $\log_b R^c=c\log_b R$

Complete each problem. Be sure to show all work.

Simplify.

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

2. $5x^2 \cdot 2x^5$

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

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

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. $g(f(0))$

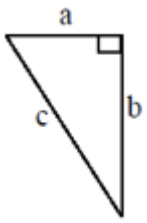
24. $f(g(x))$

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

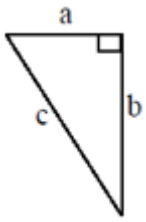
26. Given $h(x)=\frac{7}{4}x-2$, find $h^{-1}(x)$.

For #27-31, using the right triangles, find the unknown side lengths. Give exact values when possible and round to the nearest hundredth.

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



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



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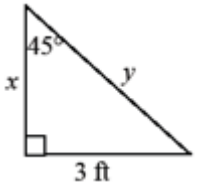

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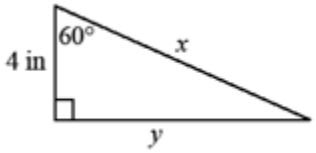
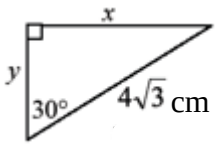
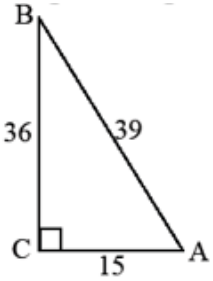


31.



For #32-35, given the right triangle below, determine the trigonometric ratios.



32. sin *A*

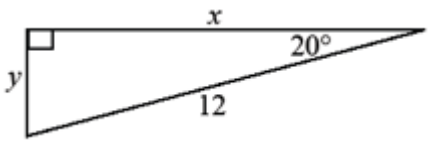
33. cos *A*

34. tan *A*

35. sin *B*

For #36-37, 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.

36.



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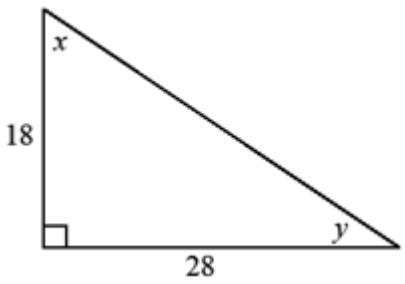


For #38-43, find the equation in slope-intercept form for each line described.

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

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

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

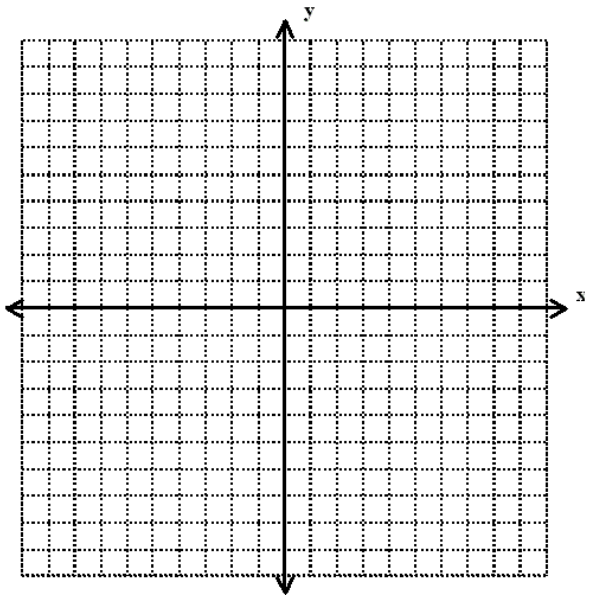
41. The line through $(2,-3)$ and parallel to the line $2x+5y=3$.

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

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

44. Write the following quadratic function in vertex form, $y = a(x \pm h)^2 \pm k$, by completing the square. Identify the vertex, axis of symmetry, zero(s), and *y*-intercept. Graph the parabola.

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



Vertex form _____

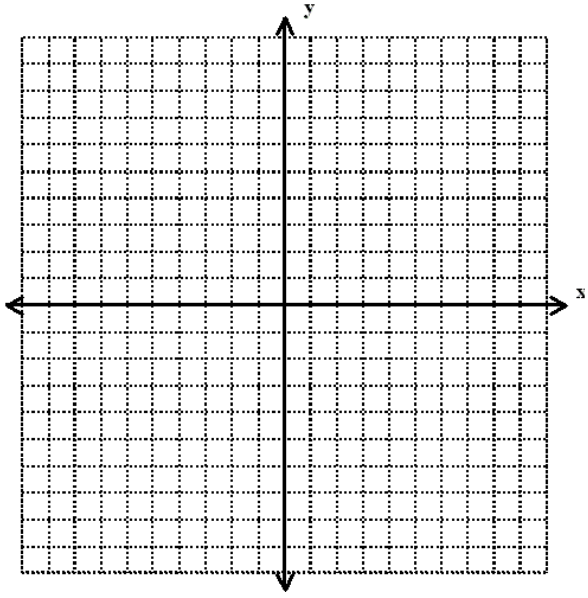
Vertex _____

Axis of Symmetry _____

Zero(s) _____

y-intercept _____

45. Graph the quadratic equation: $y = -x^2 - 4x - 7$.
State the vertex, axis of symmetry, zero(s), and *y*-intercept.



Vertex _____

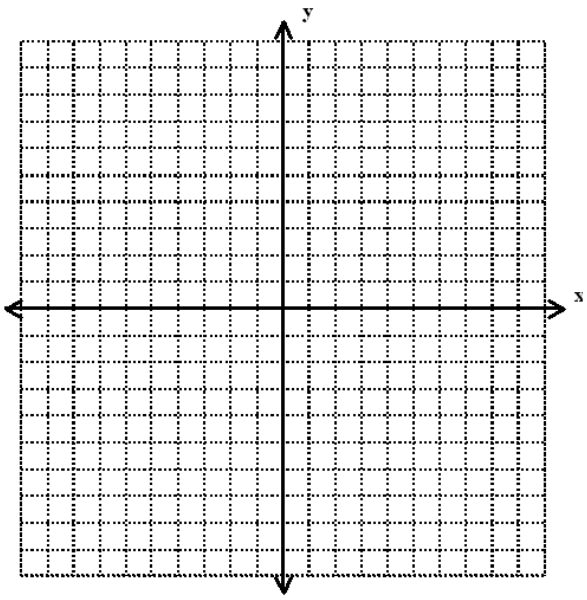
Axis of Symmetry _____

Zero(s) _____

y-intercept _____

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

State the vertex, axis of symmetry, zero(s), and *y*-intercept.



Vertex _____

Axis of Symmetry _____

Zero(s) _____

y-intercept _____

47. Simplify the rational expression $\frac{7}{x^2-64} + \frac{3}{x+8}$. State all domain restrictions.

For #48-49, solve for *x* in each equation.

48. $\frac{x}{x+3} + \frac{1}{x+1} = \frac{3x+5}{x^2+4x+3}$

49. $\frac{2}{x+3} + \frac{3}{8} = \frac{5}{4x+12}$

Write each equation in logarithmic form.

50. $2^7 = 128$

51. $3^{-4} = \frac{1}{81}$

Write each equation in exponential form.

52. $\log_2 64 = 6$

53. $\log_3 N = 2.1$

Evaluate each expression.

54. $\log_3\left(\frac{1}{3}\right)$

55. $\log_9 9^{n+1}$

56. $\log_3(9)$

57. $\log_5\left(\frac{1}{125}\right)$

Write each expression as a sum or difference of logarithms. Express powers as factors.

58. $\log_3 \frac{x}{9}$

59. $\log\left(m^2 n^3\right)$

Write each expression as a single logarithm.

60. $\log\left(x^2-1\right)-5\log\left(x+1\right)$

61. $\log_2\left(\frac{1}{x}\right)+\log_2\left(\frac{1}{x^2}\right)$

Use the properties of logarithms to solve for *x* in each equation. State the domain restrictions, if necessary.

62. $16^{4n-1}=128^{2n+1}$

63. $2^{3n-1}=\left(\frac{1}{8}\right)^n$

64. $2^x \bullet 8^{-x}=4^x$

65. $\log 4+\log x=2$

66. $4\log_2 x+\log_2 5=\log_2 405$

67. $\log_4(x^2-4)-\log_4(x+2)=\log_4 1$