Accelerated Precalculus
Summer Work

Name _____

Due the first day of school . Show all work for credit.
Do not show work on this handout - use notebook or graph paper.
Give exact answers (no decimals) whenever possible.

Reference Information

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

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

Laws of Exponents: $(a^m)^n=a^{mn}$ $\qquad$ $\dfrac{a^n}{a^m}=a^{n-m}$ $\qquad$ $(ab)^n=a^nb^n$

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

Forms of Equations of Lines:

General (Standard) Form: $Ax+By=C$ $\qquad$ Slope-Intercept Form: $y=mx+b$

Point – Slope Form: $y-y_1=m(x=x_1)$

Vertical Line: $x=a$ $\qquad$ Horizontal Line: $y=b$

Distance Formula (given points (x_1, y_1) and (x_2, y_2)): $d=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$

Midpoint Formula (given points (a, b) and (c, d)): $M=\left(\dfrac{a+c}{2},\dfrac{b+d}{2}\right)$

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

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

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

Imaginary Numbers: $i=\sqrt{-1}$ $\qquad$ $i^2=-1$

Complex Number written in Standard Form: a + b*i*

Properties of Absolute Value: $|a|\geq 0$ $\qquad$ $|-a|=|a|$ $\qquad$ $|ab|=|a||b|$ $\qquad$ $\left|\dfrac{a}{b}\right|=\dfrac{|a|}{|b|}$

SHOW ALL WORK ON A SEPARATE SHEET OF PAPER.

Leave all answers in simplest radical form, if necessary.
Do not evaluate using your calculator.

Simplify each expression.

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. $(-2 + \sqrt{-9})(6 + \sqrt{-25})$

Factor each polynomial completely.

12. $t^2 - 4t - 21$
13. $8x^3 - 1$
14. $6x^2 - 7x - 3$
15. $x^3 - 2x^2 - 4x + 8$

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Simplify each expression.

16. $(5x^2)(2x^5)$
17. $(-2c^3)^2$
18. $(t^3)(t^{n-3})$
19. $\dfrac{10 \bullet 2^6}{8 \bullet 2^{-2}}$

Solve each quadratic equation.

20. $(x - 1)(x + 3) = 0$
21. $x(x - 4) = 2(4 - x)$
22. $x^2 + 4x = -3$
23. $2x^2 - 32x = 0$

Graph the functions using a table of values, symmetry, rational zero theorem, or other properties of polynomials to plot points. Verify the graph with the calculator. Describe the following characteristics for each function:

a. domain and range **b. zeros** **c. y-intercept** **d. end behavior**

24. $f(x) = x^3 - 3x^2 + x + 1$
25. $g(x) = x^2 + 2x + 1$
26. $f(x) = |x + 3| - 4$

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

27. $f(3)$

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

29. $f(g(4))$

30. $f(g(x))$

31. Domain of $f(g(x))$

32. $f^{-1}(x)$

33. Is the inverse of $f(x)$ a function?

Simplify each and write your answer as a single fraction. State any restrictions on the variable.

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

35. $\dfrac{x^2-5x+6}{x^2-4}\bullet\dfrac{x^2+3x+2}{x^2-2x-3}$

36. $\dfrac{2x}{x+5}\div\dfrac{6x^2}{2x+10}$

37. $\dfrac{2x}{x-3}-\dfrac{x}{x+3}$

Solve each equation for y.

38. $7y+6x=10$

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

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

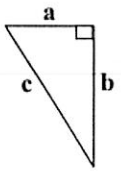
40. $\begin{cases}-2x-5y=7\\7x+y=-8\end{cases}$

41. $\begin{cases}4x+9y=2\\2x+6y=1\end{cases}$

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

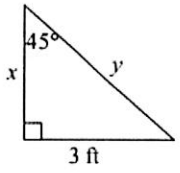
42. a = 6 ft., b = 8 ft.

43. b = 17 ft., c = 19 ft.



Solve for x and y using a 45-45-90 (ratio of sides $1:1:\sqrt{2}$) **or a 30-60-90 triangle** (ratio of sides $1:\sqrt{3}:2$).

44.



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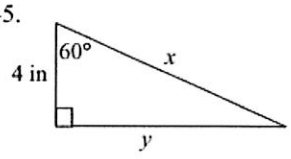

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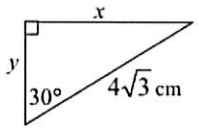
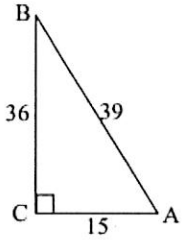


Given the right triangle, determine the trigonometric ratios.



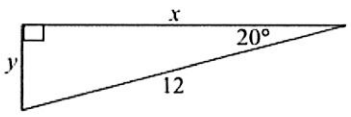
47. $\sin A$ 48. $\cos A$

49. $\tan A$ 50. $\sin B$

51. $\cos B$ 52. $\tan B$

Use trig ratios to solve for x and y (to the nearest thousandth) in each right triangle.

53.



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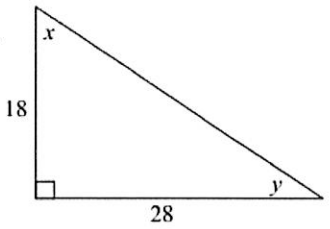

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Evaluate each logarithmic expression without a calculator.

55. $\ln\frac{1}{e}$ 56. $\log 0.01$ 57. $\log_3\frac{1}{9}$ 58. $\log_5 25$

Solve each equation or inequality.

59. $|2x-1|+3=6$ 60. $|x+4|>6$ 61. $2|4-3x|-2<10$

Find an equation in slope intercept form for the line described.

62. The line through (3, –2) with slope m = 4/5

63. The line through the points (–1, – 4) and (3, 2)

64. The line through (–2, 4) with a slope m = 0

65. The line through (2, –3) and parallel to the line 2x + 5y = 3

66. The line through (2, –3) and perpendicular to the line 2x + 5y = 3

Find the distance between the two points. Then find the midpoint of the segment joining the two points.

67. (– 4, –3), (1, 1)