Name:_____

Algebra II with Statistics Pre-Requisite Summer Packet 2023-2024

IMPORTANT: *Questions should be completed with a 4-function calculator only. You will be assessed on this content the first week of school, and must be able to do the problems with only a basic (non-scientific) calculator. (Here is a link if you do not have one.) Be sure to show all of your work on each problem*

Operations with Fractions

1. $\frac{3}{12} + \frac{2}{8}$

2. $\frac{2}{3} - \frac{5}{4}$

3. $\frac{7}{9} \cdot \frac{5}{2}$

4. $\frac{2}{6} \div \frac{5}{8}$

5. $\frac{1}{x} + \frac{1}{y}$

Solving Equations

Solve the following equations:

6. $x+2+7x=-6$

7. $-140=4(-6b+7)$

8. $x(2x+5)-2x^2=14$

9. $3(x-1)-x=3+2(x-3)$

10. $4(2a-8)=\frac{1}{7}(49a+70)$

11. $\frac{-3x+8}{2}=10$

12. $8x+1=4(2x+1)$

13. $9-\frac{4x}{5}=-2$

14. $\frac{2}{3}(6x+3)=4x+2$

15. $\frac{x+7}{x}=\frac{4}{3}$

16. $\frac{x+3}{7}=\frac{x-2}{4}$

17. $\frac{4}{3}x=16$

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Linear Functions

18. What is the slope of the line passing through (-5,9) and (-5,6)?

19. Write an equation of a line that is perpendicular to the line $6x - 9y = 45$ and passes through the point (0,5).

20. Write an equation for the line in point slope form and slope-intercept form that passes through the points (-3,-11) and (2,-1).

21. Use the table to find the slope and then write an equation of the line in all 3 forms:

x	y
−10	−7
0	−3
5	−1
20	5

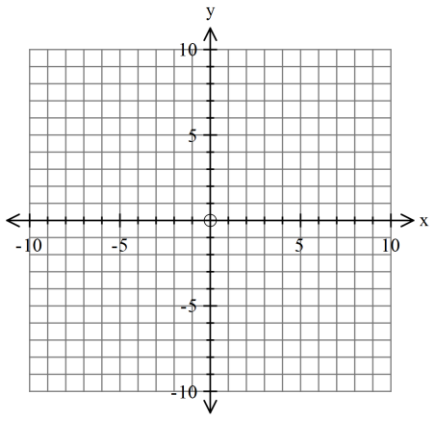
Slope: _____

Point-slope: _____

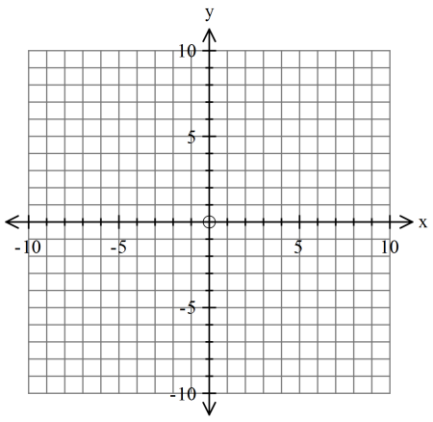
Slope Intercept: _____

Standard: _____

22. Graph $y = -4x + 6$.



23. Graph $3x - 4y = 12$



x-intercept: _____

y-intercept: _____

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Functions

24. Describe the transformations from f(x) to h(x). (Think about shifts and reflections.)

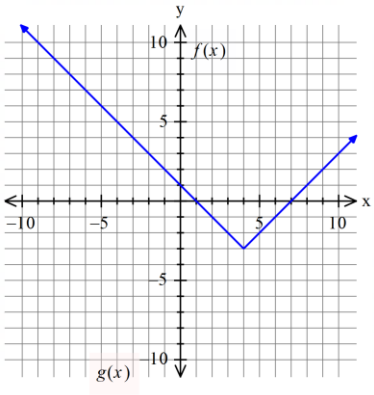
a.) $f(x) = x^2$
$h(x) = (x-4)^2$

b.) $f(x) = |x|$
$h(x) = -|x| + 4$

25. If f(x) = 3x-1 and g(x) = 5x, find:

a.) f(2) b.) g(-3) c.) f(1) + g(4) d.) f(-2)·g(-10)

26. Given the graph, answer the following questions:



_____a.) What are the x-intercept(s) of the function?

_____b.) What is the y-intercept of the function?

_____ c.) What is the minimum value of the function?

_____ d.) What is the domain of the function?

_____ e.) What is the range of the function?

_____ f.) Interval(s) where f(x) is increasing

_____ g.) Interval(s) where f(x) is decreasing

_____ h.) Interval(s) where f(x) is constant

i.) End Behavior: As x approaches $-\infty$, f(x) approaches _____.

As x approaches ∞, f(x) approaches _____.

Inequalities and Absolute Value Inequalities

Solve, write the solution in interval notation and graph the solution.

27. $-3x + 2 \geq 5$.

28. $4x + 8 < -16$ or $2x + 10 > 12$

29. $|6x| + 8 \leq 20$

30. $|x| - 9 > -8$

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Systems of Equations

31. Find the solution to the system: $x + y = 5$ and $x + 2y = 10$

What is the value of x?

What is the value of y?

What is the value of (x – y)?

For #32 and 33, write answer as an ordered pair, if necessary.

32. Solve the system with substitution:

$$4y - 3x = 5$$
$$\frac{3}{4}x = y - 4$$

33. Solve the system with elimination:

$$4x + 5y = 44$$
$$3x - 2y = 10$$

Exponents and Exponential Functions

34. Rewrite and simplify the following. No negative exponents should remain.

a. $(a)^2(a)^4$ b. $(b)^0(b)^7$ c. $[(c)^4]^4$ d. $36^{\frac{3}{2}}$

e. $(-8)^{\frac{2}{3}}$ f. $(-2xy)^3(-2xy^3)^2$ g. $\left(\frac{2x^4}{3x^{-3}}\right)^{-2}$ h. $\frac{(2x^3y^2)^3}{2x^{-2}x^2}$

35. Write an exponential function ($y = a \cdot b^x$) that represents the data in the table:

Equation: _____

x	-2	-1	0	1	2
y	1/9	1/3	1	3	9

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Factoring

Factor the following expressions completely.

36. $x^2 - 8x - 48$

37. $3x^2 - 17x - 6$

38. $12x^4 + 10x^3 - 12x^2$

39. $2a^3 + 16a^2 + 30a$

40. $6x^2 + 9x - 105$

41. $x^2 - 25$

42. $3x^2 - 75y^2$

43. Factor by grouping: $4x^3 - 7x^2 - 16x + 28$

Quadratics

44. Solve for x: $x^2 - 2x - 24 = 0$

45. Solve for x: $2x^2 - 18 = 0$

46. What are the x-intercepts of $f(x) = x^2 - 13x + 36$?

47. What is the vertex of the graph of $y = -2x^2 + 16x - 15$?

48. Solve using quadratic formula: $x^2 + 8x = 18$. Answer should be exact and in simplest radical form.

49. Solve $(x-4)^2 = 16$.

50. Solve by using the quadratic formula: $2x^2 - 8x = 7$. Answer should be exact and in simplest radical form.

Radicals: Simplify completely.

51. $\sqrt{150}$

52. $\sqrt{343}$

53. $\sqrt{175}$

54. $\sqrt{128}$

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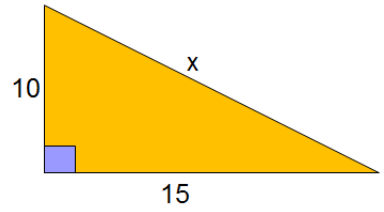
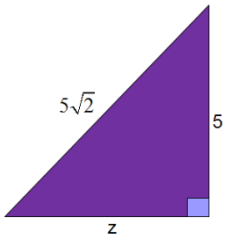
Geometry:

Solve for the variable.

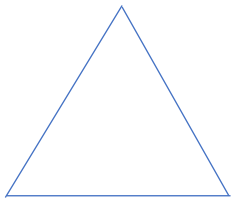
55.



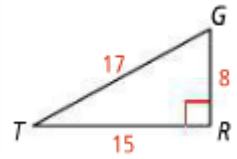
56.



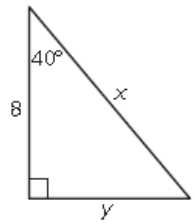
57. Label the angles and sides of triangle ABC.



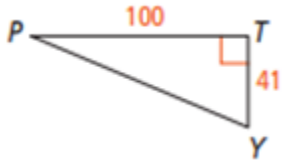
58. Find the ratios for sin, cos, and tan.



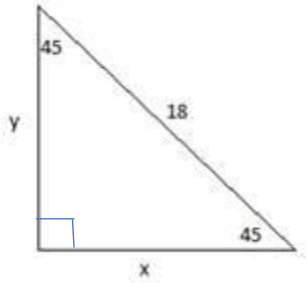
59. Using right triangle trigonometry, find x and y.



60. Using right triangle trigonometry, find $m\angle Y$



61. Using the properties of a $45^\circ - 45^\circ - 90^\circ$ triangle, find x and y.



62. Using the properties of a $30^\circ - 60^\circ - 90^\circ$ triangle, find x and y.