**Honors Algebra 2**
**Summer Review Packet**

**Name:** _____

1. Consider the following two statements. Determine if these statements are always, sometimes, or never true. Explain.

   I. The product of any two rational numbers is always another rational number. always
   II. The product of two irrational numbers is always irrational. sometimes

2. Evaluate $\frac{xy - xz}{yz}$ if $x = 12$, $y = 3$, and $z = 2$. $\frac{12(3) - 12(2)}{3(2)} = \frac{36-24}{6} = \frac{12}{6} = 2$

3. Evaluate $k + np^2$ if $k = 0.5$, $n = -3$, and $p = -2$. $.5 + (-3)(-2)^2 =$ $.5 + (-3)(4) = .5 - 12 = -11.5$

4. Evaluate $1.2 + (3x + 2y)x$ if $x = 4$ and $y = -4$. $1.2 + [3(4) + 2(-4)]\,4$ $1.2 + (12-8)4$ $1.2 + (4)(4) = 1.2 + 16 = 17.2$

5. Amanda received a worksheet from her teacher. Unfortunately, one of the operations in an equation was covered by a blot. What operation is hidden by the blot?

   $10 + 3(4 \blacksquare 6) = 4$

   $10 + 3(4-6)$ $10 + 3(-2)$ $10 - 6 = 4$

   subtraction

6. A steak has thickness $w$ inches. Let $T$ be the time it takes to broil the steak. It takes 12 minutes to broil a one–inch–thick steak. For every additional inch of thickness, the steak should be broiled for 5 more minutes.

   a. Write a formula for $T$ in terms of $w$.

   $T = 12 + 5(w-1)$ or $T = 5w + 7$

   b. Use your formula to compute the number of minutes it would take to broil a 2–inch–thick steak.

   $T = 12 + 5(2-1) = 12 + 5(1) = 12 + 5 = 17$ min

7. Simplify $\frac{1}{2}(8y - 10z) - (3y + z)$. $4y - 5z - 3y - z$ $y - 6z$

8. Write an algebraic expression to represent the verbal expression *the difference of three times a number x and 7.*

   $3x - 7$

**Solve the given equation.**

9. $6(x - 5) = x + 5$ $6x - 30 = x + 5$ $5x = 35$ $x = 7$ $x = 7$

10. $\frac{3}{4} - \frac{1}{2}n = \frac{5}{8}$ $-2$ $-\frac{1}{2}n = -\frac{1}{8}$ $\cdot -2$ $n = \frac{1}{4}$

11. $6y - 5 = -3(2y + 1)$ $6y - 5 = -6y - 3$ $12y = 2$ $y = \frac{1}{6}$

12. $|t - 4| - 5 = 0$ $|t-4| = 5$ $t - 4 = 5$ $t - 4 = -5$ $t = 9$ $t = -1$ $t = 9, -1$

13. $|5b + 9| + 16 = 2$ $|5b+9| = -14$ no solution

14. $5f - |3f + 4| = 20$ $5f - 20 = |3f + 4|$ $5f - 20 = 3f + 4$ $2f = 24$ $f = 12$ $-5f + 20 = 3f + 4$ $-8f = -16$ $f = 2$

**Solve for the given variable.**

15. $E = \frac{1}{2}Iw^2 + U$, for $I$

$E - U = \frac{1}{2}Iw^2$

$2(E-U) = Iw^2$

$I = \frac{2E-2U}{w^2}$

16. $h = \frac{-b}{2a}$, for $b$

$2ah = -b$

$-2ah = b$

17. Luis and three friends went golfing. Two of the friends rented clubs for $6 each. The total cost of the rented clubs and the green fees for each person was $76. What was the cost of the green fees for each person? Define a variable, write an equation, and solve the problem.

$x$ = green fees per person

$4x + 6(2) = 76$

$4x + 12 = 76$

$4x = 64$

$x = \$16$

18. Martin makes exercise weights. For his 10–pound dumbbells, he guarantees that the actual weight of his dumbbells is within 0.1 pound of 10 pounds. Write and solve an equation that describes the minimum and maximum weight of his 10-pound dumbbells.

$x$ = weight of dumbbells

$|x - 10| \leq .1$

$x - 10 = .1$ $\quad x - 10 = -.1$

$x = 10.1$ $\quad x = 9.9$

$9.9 \text{ lbs} \leq x \leq 10.1 \text{ lbs}$

19. Define a variable, write an equation, and solve the problem. Adults' tickets to a play cost $5 and students' tickets cost $2. If 295 tickets were sold and a total of $950 was collected, how many students' tickets were sold?

$x$ = adult tickets

$y$ = student tickets

$5x + 2y = 950$

$-2(x + y = 295)$

$5x + 2y = 950$

$-2x - 2y = -590$

$3x = 360$

$x = 120$

$120 + y = 295$

$y = 175$

175 tickets

**Solve the linear inequality.**

20. $2z < -9 + 5z$

$9 < 3z$

$3 < z$


21. $7f - 9 > 3f - 1$

$4f > 8$

$f > 2$


**Define a variable and write an inequality for each problem. Then solve.**

22. The difference of three times a number and 16 is at least 8.

$3x - 16 \geq 8$

$3x \geq 24$

$x \geq 8$

23. One half of a number is more than 6 less than the same number.

$\frac{1}{2}x > x - 6$ $\quad -\frac{1}{2}x > -6$ $\quad x < 12$

24. Five less than the product of 6 and a number is no more than twice that same number.

$6x - 5 \leq 2x$ $\quad 4x \leq 5$ $\quad x \leq \frac{5}{4}$

25. The sample below shows how Brandon solved $5 < -2x - 7$. Study his solution and determine if it is correct. Explain your reasoning.

| |
|---|
| $5 < -2x - 7$ |
| $12 < -2x$ |
| $-6 < x$ |

Incorrect

Brandon did not change the inequality sign when dividing by −2

26. Manuel takes a job translating English instruction manuals to Spanish. He will receive $15 per page plus $100 per month. Manuel would like to work for 3 months during the summer and make at least $1500. Write and solve an inequality to find the minimum number of pages Manuel must translate in order to reach his goal.

$x$ = number of pages

$y$ = number of months

$15x + 100y \geq 1500$

$15x + 100(3) \geq 1500$

$15x + 300 \geq 1500$

$15x \geq 1200$

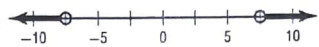
$x \geq 80$

80 pages

**Write an absolute value inequality for each graph.**

27. 


$|x| \leq 5$

28. 

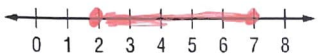

$|x| > 7.5$

**Solve the compound equation or inequality.**

29. $8 < 3x + 2 \leq 23$

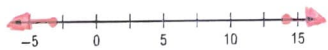
$6 < 3x \leq 21$

$2 < x \leq 7$




30. $w - 4 \geq 10$ or $-2w \geq 6$

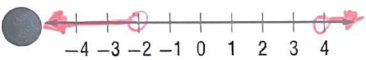
$w \geq 14$ or $w \leq -3$




31. $2x - 3 > 5$ or $3 - 7x > 17$

$2x > 8 \qquad -7x > 14$

$x > 4$ or $x < -2$




32. $15 - 5x \geq 0$ and $5x + 6 \geq -14$

$-5x \geq -15 \qquad 5x \geq -8$

$x \leq 3$ and $x \geq -\frac{8}{5}$

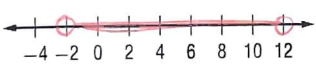
$-\frac{8}{5} \leq x \leq 3$


33. $|n - 5| < 7$

$n - 5 < 7$ and $n - 5 > -7$

$n < 12$ and $n > -2$

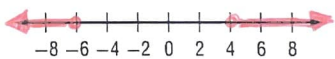
$-2 < n < 12$




34. $|h + 1| \geq 5$

$h + 1 \geq 5$ or $h + 1 \leq -5$

$h \geq 4$ or $h \leq -6$




35. Jacinta is organizing a large fund–raiser concert in a space with a maximum capacity of 10,000 people. Her goal is to raise at least \$100,000. Tickets cost \$20 per person. Jacinta spends \$50,000 to put the event together. Write and solve a compound inequality that describes $N$, the number of attendees needed to achieve Jacinta's goal.

$20N - 50{,}000 \geq 100{,}000 \qquad N \leq 10{,}000$

$20N \geq 150{,}000$

$N \geq 7500$

$7500 \leq N \leq 10{,}000$

**Simplify the expression. (NO DECIMALS)**

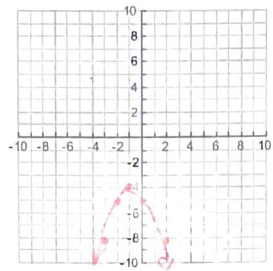
36. $\sqrt{80}$ $4\sqrt{5}$

37. $\sqrt{\frac{9}{4}}$ $\frac{3}{2}$

38. $\sqrt{\frac{5}{45}} = \sqrt{\frac{1}{9}} = \frac{1}{3}$

39. Use a table of values to sketch a graph of $y = -x^2 - 2x - 5$. State the vertex, axis of symmetry, domain, and range and $y$-intercept.

| $x$ | -3 | -2 | -1 | 0 | 1 |
|---|---|---|---|---|---|
| $y$ | -8 | -5 | -4 | -5 | -8 |




Vertex: $(-1,-4)$ $x = \frac{2}{2(-1)} = -1$

Axis of Symmetry: $x=-1$

Domain: $\mathbb{R}$

Range: $y \leq -4$

$y$ – intercept: $(0,-5)$

40. Write $y = -x^2 - 2x - 5$ in vertex form.

$y = -(x+1)^2 - 4$

**Solve the equation.**

41. $x^2 = 64$

$x = \pm 8$

42. $2x^2 - 3 = 95$

$2x^2 = 98$

$x^2 = 49$

$x = \pm 7$

**Find the zeros.**

43. $0 = x^2 - x - 14$

$x = \frac{1 \pm \sqrt{(-1)^2 - 4(1)(-14)}}{2(1)}$

$x = \frac{1 \pm \sqrt{57}}{2}$

44. $-10x = x^2 + 24$

$0 = x^2 + 10x + 24$

$0 = (x+6)(x+4)$

$x = -6, -4$

**Find the x-intercepts of the equation.**

45. $y = x^2 - 12x + 35$ $=0$

$(x-7)(x-5) = 0$

$(7,0)\ (5,0)$

46. $y = x^2 - 7x + 6$ $=0$

$(x-6)(x-1) = 0$

$(6,0)\ (1,0)$

**Add or subtract the polynomials.**

47. $(-8x^3 + 2x^2 + 4x + 4) + (-9x^3 + 4x^2 + 2x + 10)$

$-17x^3 + 6x^2 + 6x + 14$

48. $(2x + 1 + 9x^4) - (5x^4 + 2x + 12)$

$2x + 1 + 9x^4 - 5x^4 - 2x - 12$

$4x^4 - 11$

**Multiply the polynomials.**

49. $6x(4x - 3)$

$24x^2 - 18x$

50. $(x - 7)(4x + 2)$

$4x^2 + 2x - 28x - 14$

$4x^2 - 26x - 14$

51. $(x + 4)^2$

$(x+4)(x+4)$

$x^2 + 4x + 4x + 16$

$x^2 + 8x + 16$

52. $(x - 4)(x^2 - 2x - 3)$

$x^3 - 2x^2 - 3x - 4x^2 + 8x + 12$

$x^3 - 6x^2 + 5x + 12$

**Factor the expression.**

53. $2x^2 + 10x - 28$

$2(x^2+5x-14)$

$2(x+7)(x-2)$

54. $x^2 - 12x - 64$

$(x-16)(x+4)$

55. $2x^2 + 5x + 3$

$2x^2+2x+3x+3$

$2x(x+1)+3(x+1)$

$(x+1)(2x+3)$

56. $6x^2 + 14x + 4$

$2(3x^2+7x+2)$

$2(3x^2+6x+x+2)$

$2(3x(x+2)+1(x+2))$

$2(x+2)(3x+1)$

**Simplify the expression.**

57. $\dfrac{x^2+x-6}{x^2-6x-27}$

$\dfrac{(x+3)(x-2)}{(x-9)(x+3)}$

$\dfrac{x-2}{x-9}$

58. $\dfrac{3x+6}{4x^2} \div \dfrac{x+2}{16x}$

$\dfrac{3(x+2)}{4x^2} \cdot \dfrac{16x}{(x+2)}$

$\dfrac{12}{x}$

59. Solve: $\dfrac{x+6}{7} = \dfrac{x-4}{3}$

$3(x+6) = 7(x-4)$

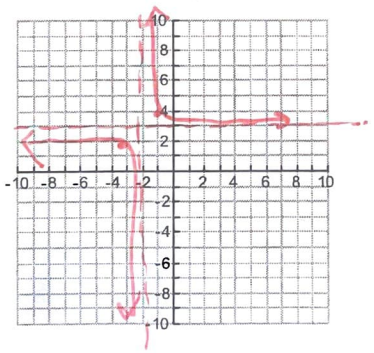
$3x+18 = 7x-28$

$-4x = -46$

$x = \dfrac{23}{2}$

**Sketch a graph of the function. Then find the domain and range.**

60. $y = \dfrac{1}{x+2} + 3$




Domain: $x \neq -2$

Range: $y \neq 3$

Simplify the expression. Write your answer with all positive exponents.

61. $\left(\dfrac{5x^3y^5}{4x^2y^7}\right)^3$

$\dfrac{125x^9y^{15}}{64x^6y^{21}}$

$\dfrac{125x^3}{64y^6}$

62. $(3x^2y)(6x^5y^8)^{-2}$

$3x^2y \cdot \dfrac{1}{36x^{10}y^{16}}$

$\dfrac{1}{12x^8y^{15}}$