Dear Future Pre-Calculus Honors Student,

Congratulations on your successful completion of Algebra 2! Below you will find the summer enrichment assignment. It is assumed that these concepts, along with many others, have been mastered by you, the incoming Pre-Calculus student. This enrichment will be an indicator of your foundation for the course.

All material in this enrichment will be assessed during the two-three weeks of the quarter, therefore it is strongly recommended that you take some time to review the concepts over the summer. If you find yourself unable to answer a question, try not to skip it – research it! That research can be in the form of a parent, a friend, free online help such as Khan Academy and Math Nation, or your old Algebra 2 notebook!

Enjoy your summer and we look forward to hopefully being back in the classroom in the Fall!

Ms. Halsey

SECTION P.1 EXERCISES

Exercise numbers with a gray background indicate problems that the authors have designed to be solved *without a calculator*.

In Exercises 1–4, find the decimal form for the rational number. State whether it repeats or terminates.

1. $-37/8$

2. $15/99$

3. $-13/6$

4. $5/37$

In Exercises 5–10, describe and graph the interval of real numbers.

5. $x \le 2$

6. $-2 \le x < 5$

7. $(-\infty, 7)$

8. $[-3, 3]$

9. x is negative.

10. x is greater than or equal to 2 and less than or equal to 6.

In Exercises 11–16, use an inequality to describe the interval of real numbers.

11. $[-1, 1)$

12. $(-\infty, 4]$

13.

14.

15. x is between -1 and 2.

16. x is greater than or equal to 5.

In Exercises 17–22, use interval notation to describe the interval of real numbers.

17. $x > -3$

18. $-7 < x < -2$

19.

20.

21. x is greater than -3 and less than or equal to 4.

22. x is positive.

In Exercises 23–28, use words to describe the interval of real numbers.

23. $4 < x \le 9$

24. $x \ge -1$

25. $[-3, \infty)$

26. $(-5, 7)$

27.

28.

In Exercises 47–52, simplify the expression. Assume that the variables in the denominators are nonzero.

47. $\dfrac{x^4 y^3}{x^2 y^5}$

48. $\dfrac{(3x^2)^2 y^4}{3y^2}$

49. $\left(\dfrac{4}{x^2}\right)^2$

50. $\left(\dfrac{2}{xy}\right)^{-3}$

51. $\dfrac{(x^{-3} y^2)^{-4}}{(y^6 x^{-4})^{-2}}$

52. $\left(\dfrac{4a^3 b}{a^2 b^3}\right)\left(\dfrac{3b^2}{2a^2 b^4}\right)$

In Exercises 11–18, find the distance between the points.

11. $-9.3, 10.6$ **12.** $-5, -17$

13. $(-3, -1), (5, -1)$ **14.** $(-4, -3), (1, 1)$

15. $(0, 0), (3, 4)$ **16.** $(-1, 2), (2, -3)$

17. $(-2, 0), (5, 0)$ **18.** $(0, -8), (0, -1)$

In Exercises 19–22, find the area and perimeter of the figure determined by the points.

19. $(-5, 3), (0, -1), (4, 4)$

20. $(-2, -2), (-2, 2), (2, 2), (2, -2)$

21. $(-3, -1), (-1, 3), (7, 3), (5, -1)$

22. $(-2, 1), (-2, 6), (4, 6), (4, 1)$

In Exercises 23–28, find the midpoint of the line segment with the given endpoints.

23. $-9.3, 10.6$ **24.** $-5, -17$

25. $(-1, 3), (5, 9)$

26. $(3, \sqrt{2}), (6, 2)$

27. $(-7/3, 3/4), (5/3, -9/4)$

28. $(5, -2), (-1, -4)$

In Exercises 41–44, find the standard form equation for the circle.

41. Center $(1, 2)$, radius 5

42. Center $(-3, 2)$, radius 1

43. Center $(-1, -4)$, radius 3

44. Center $(0, 0)$, radius $\sqrt{3}$

In Exercises 45–48, find the center and radius of the circle.

45. $(x - 3)^2 + (y - 1)^2 = 36$

46. $(x + 4)^2 + (y - 2)^2 = 121$

47. $x^2 + y^2 = 5$

48. $(x - 2)^2 + (y + 6)^2 = 25$

SECTION P.3 EXERCISES

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In Exercises 1–4, find which values of x are solutions of the equation.

1. $2x^2 + 5x = 3$
   (a) $x = -3$ (b) $x = -\dfrac{1}{2}$ (c) $x = \dfrac{1}{2}$

2. $\dfrac{x}{2} + \dfrac{1}{6} = \dfrac{x}{3}$
   (a) $x = -1$ (b) $x = 0$ (c) $x = 1$

3. $\sqrt{1 - x^2} + 2 = 3$
   (a) $x = -2$ (b) $x = 0$ (c) $x = 2$

4. $(x - 2)^{1/3} = 2$
   (a) $x = -6$ (b) $x = 8$ (c) $x = 10$

21. $\dfrac{1}{2}x + \dfrac{1}{3} = 1$ 22. $\dfrac{1}{3}x + \dfrac{1}{4} = 1$

23. $2(3 - 4z) - 5(2z + 3) = z - 17$

24. $3(5z - 3) - 4(2z + 1) = 5z - 2$

In Exercises 25–28, solve the equation. Support your answer with a calculator.

25. $\dfrac{2x - 3}{4} + 5 = 3x$ 26. $2x - 4 = \dfrac{4x - 5}{3}$

27. $\dfrac{t + 5}{8} - \dfrac{t - 2}{2} = \dfrac{1}{3}$ 28. $\dfrac{t - 1}{3} + \dfrac{t + 5}{4} = \dfrac{1}{2}$

In Exercises 5–10, determine whether the equation is linear in x.

5. $5 - 3x = 0$ 6. $5 = 10/2$

7. $x + 3 = x - 5$ 8. $x - 3 = x^2$

9. $2\sqrt{x} + 5 = 10$ 10. $x + \dfrac{1}{x} = 1$

In Exercises 11–24, solve the equation without using a calculator.

11. $3x = 24$ 12. $4x = -16$

13. $3t - 4 = 8$ 14. $2t - 9 = 3$

15. $2x - 3 = 4x - 5$ 16. $4 - 2x = 3x - 6$

17. $4 - 3y = 2(y + 4)$ 18. $4(y - 2) = 5y$

19. $\dfrac{1}{2}x = \dfrac{7}{8}$ 20. $\dfrac{2}{3}x = \dfrac{4}{5}$

In Exercises 35–42, solve the inequality, and draw a number line graph of the solution set.

35. $x - 4 < 2$ 36. $x + 3 > 5$

37. $2x - 1 \le 4x + 3$ 38. $3x - 1 \ge 6x + 8$
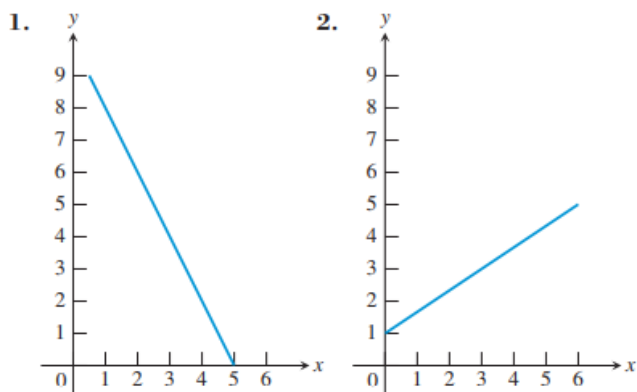
39. $2 \le x + 6 < 9$ 40. $-1 \le 3x - 2 < 7$

41. $2(5 - 3x) + 3(2x - 1) \le 2x + 1$

42. $4(1 - x) + 5(1 + x) > 3x - 1$

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In Exercises 1 and 2, estimate the slope of the line.

1.

2.

In Exercises 3–6, find the slope of the line through the pair of points.

3. $(-3, 5)$ and $(4, 9)$ 4. $(-2, 1)$ and $(5, -3)$

5. $(-2, -5)$ and $(-1, 3)$ 6. $(5, -3)$ and $(-4, 12)$

In Exercises 7–10, find the value of x or y so that the line through the pair of points has the given slope.

Points	Slope
7. $(x, 3)$ and $(5, 9)$	$m = 2$
8. $(-2, 3)$ and $(4, y)$	$m = -3$
9. $(-3, -5)$ and $(4, y)$	$m = 3$
10. $(-8, -2)$ and $(x, 2)$	$m = 1/2$

In Exercises 11–14, find a *point-slope form* equation for the line through the point with given slope.

Point	Slope	Point	Slope
11. $(1, 4)$	$m = 2$	12. $(-4, 3)$	$m = -2/3$
13. $(5, -4)$	$m = -2$	14. $(-3, 4)$	$m = 3$

In Exercises 15–20, find a *general form equation* for the line through the pair of points.

15. $(-7, -2)$ and $(1, 6)$ 16. $(-3, -8)$ and $(4, -1)$

17. $(1, -3)$ and $(5, -3)$ 18. $(-1, -5)$ and $(-4, -2)$

19. $(-1, 2)$ and $(2, 5)$ 20. $(4, -1)$ and $(4, 5)$

In Exercises 21–26, find a slope-intercept form equation for the line.

21. The line through $(0, 5)$ with slope $m = -3$

22. The line through $(1, 2)$ with slope $m = 1/2$

23. The line through the points $(-4, 5)$ and $(4, 3)$

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

In Exercises 41–44, (a) find an equation for the line passing through the point and parallel to the given line, and (b) find an equation for the line passing through the point and perpendicular to the given line. Support your work graphically.

Point	Line
41. $(1, 2)$	$y = 3x - 2$
42. $(-2, 3)$	$y = -2x + 4$
43. $(3, 1)$	$2x + 3y = 12$
44. $(6, 1)$	$3x - 5y = 15$

Factor out the Greatest Common Factor (GCF):

1. $15a + 25b$

2. $7c^3 - 28c^2d + 35cd^3$

3. $4a^4b - 16a^2b^2 + 4ab$

Factor by grouping:

4. $3x^2 + 9x + 4x + 12$

5. $2x^2 - 5x - 2x + 5$

6. $3x^2 + 18x - 7x - 42$

7. $m^2 + 8mn - 3mn - 24n^2$

Factor completely:

8. $x^2 - 13x + 36$

9. $x^2 - 2x - 48$

10. $x^2 + 12x - 45$

11. $x^2 - 6x + 5$

12. $x^2 - 5x - 6$

13. $4x^2 + 24x - 64$

14. $2x^2 + 11x + 15$

15. $3x^2 - 13x + 14$

16. $5x^2 + 28x + 15$

17. $2x^2 - 3x - 35$

18. $2x^2 - 7x - 72$

19. $12x^4 + 60x^3 + 27x^2$

20. $36x^2 - 49y^2$

21. $121 - 144y^2$

22. $27x^3 + 125$

23. $64 - y^3$