

Pre-calculus Summer Assignment

The questions in this problem set are considered pre-requisite material for a student entering Pre-calculus. All of the topics represented here were covered in prior classes (Algebra, for the most part), and are representative of topics essential for success in this course. The questions were selected to reinforce important basic algebraic principles, with the hope that we need not spend too much time reviewing the basics.

Surely, after a year of geometry, a student can forget many of the algebra skills learned previously. While there may be a couple of questions that present a struggle, please feel free to get assistance from a textbook or from an individual that can help, but only after you have attempted the problem on your own to the best of your abilities. Please show all work on the packet, and attach any extra scrap paper to the packet. **You may NOT use a calculator.**

Be prepared to submit this assignment on the second day of class – Wed. September 7th.

1. Find the length of \overline{CD} and the coordinates of the midpoint of \overline{CD} .

a. $C(3,3), D(15,12)$

b. $C(-2,-1), D(4,9)$

2. Which of the following points are on the graph of $3x - 2y = 15$?

a. $(8,4)$

b. $\left(-\frac{4}{3}, -\frac{19}{2}\right)$

3. Solve each of the following equations for x .

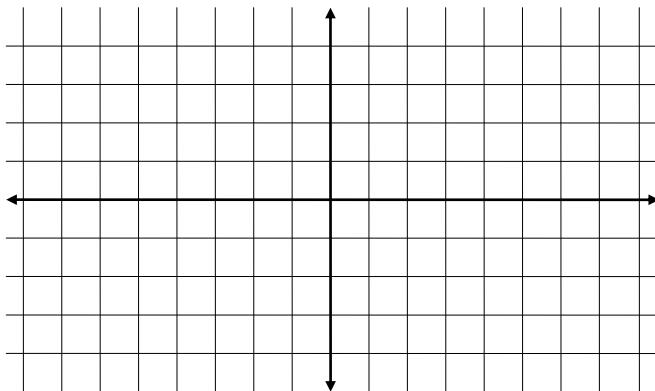
a. $\frac{x+1}{3} - \frac{x-1}{2} = 1$

b. $\frac{60}{x} - \frac{60}{x-5} = \frac{2}{x}$

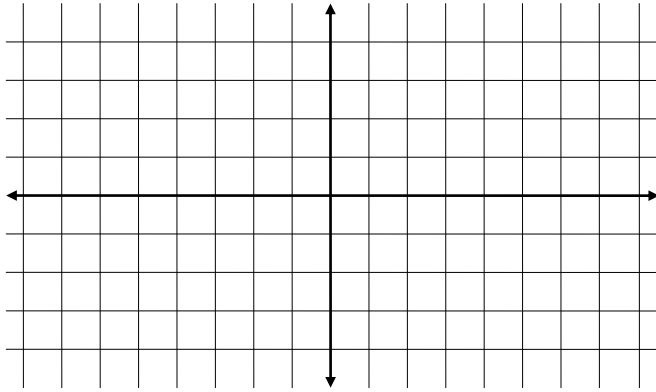
c. $2|2x-7|+11=25$

d. $x = \sqrt{x+7} + 5$

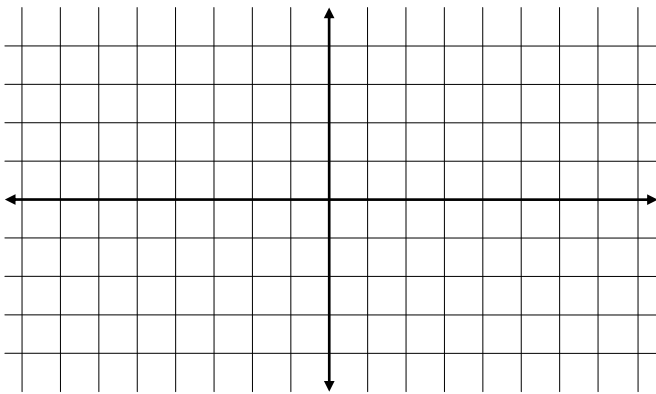
4. Find the equation of the line with slope -2 and y -intercept 8 . Graph this line.



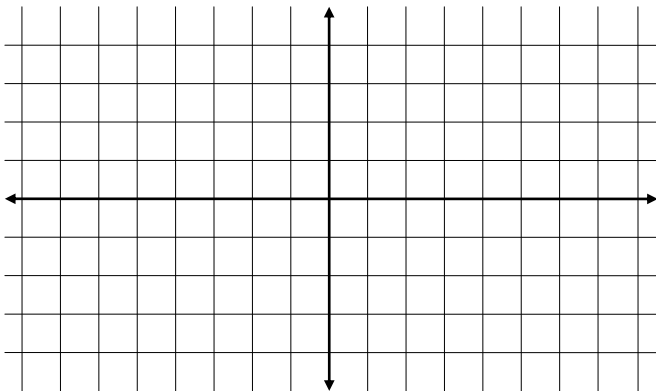
5. Find the equation of the line with y -intercept 4 and x -intercept -2. Graph this line.



6. Find the equation of the line through the points $(-1,4)$ and $(5,8)$. Graph this line.



7. Find the equation of the line through $(8,-2)$ perpendicular to the line $y = 7 - 2x$. Graph this line.



8. Let $f(x) = 3x^2 - 2x - 7$. Find:

a. $f(2)$

b. $f(-2)$

c. $f(-2a)$

d. $f(x+1)$

9. Solve the given systems of equations using any method.

a.
$$\begin{cases} x - 3y = 4 \\ 5x + y = -8 \end{cases}$$

b.
$$\begin{cases} 3s - 5t = -30 \\ 7s + 11t = 32 \end{cases}$$

10. Simplify the following. Express your answer using only positive exponents, where applicable.

a. $(4x-3) \cdot (2x-5)$

b. $(3x+4y)^2$

c. $\frac{4m-3}{18m^2} + \frac{3}{4m} - \frac{2m-1}{6m^2}$

d. $\left(\frac{5}{8}x^4 - \frac{1}{4}x^2\right) - \left(-\frac{3}{8}x^4 + \frac{3}{4}x^2\right)$

e. $\frac{10x^3y}{3xy+9y} \cdot \frac{x^2-9}{4x^2-12x}$

f. $\frac{a^2-b^2}{ab} \div \frac{a^2-2ab+b^2}{2a^2b^2}$

g. $\left(\frac{x^2}{y^4}\right)^{-3}$

h. $(3x^4y^{-3})^2$

i. $\left(\frac{8u^{-1}}{2^2u^2v^0}\right)^{-2}\left(\frac{u^{-5}}{u^{-3}}\right)^3$

j. $(121^{1/2} + 25^{1/2})^{-3/4}$

k. $\sqrt{27m^2n^7}$

l. $(8 + 3i)(2 - 5i)$

m. $\frac{5+i}{5-i}$

n. $\frac{6ab}{\sqrt{3a}}$

11. Factor the following, if possible.

a. $x^2 + 8x - 20$

b. $4a^2 - 9b^2$

c. $2a^4 - 5a^2 - 12$

d. $2y^3 - 22y^2 + 48y$

e. $4c^3 - 4c^2d + cd^2$

f. $2am - 3an + 2bm - 3bn$

12. Solve by factoring.

a. $x^2 + 7x = -10$

b. $3x^2 - 4x - 7 = 0$

13. Solve by completing the square.

a. $x^2 - 10x = 1575$

b. $x^2 + 6x + 10 = 0$

14. Solve using the quadratic formula.

a. $5x^2 + 2x - 1 = 0$

b. $3t^2 = 12t - 15$

15. Sketch the graph of $y = x^2 - 2x - 8$. Label the vertex, the axis of symmetry, and the x - and y - intercepts.

