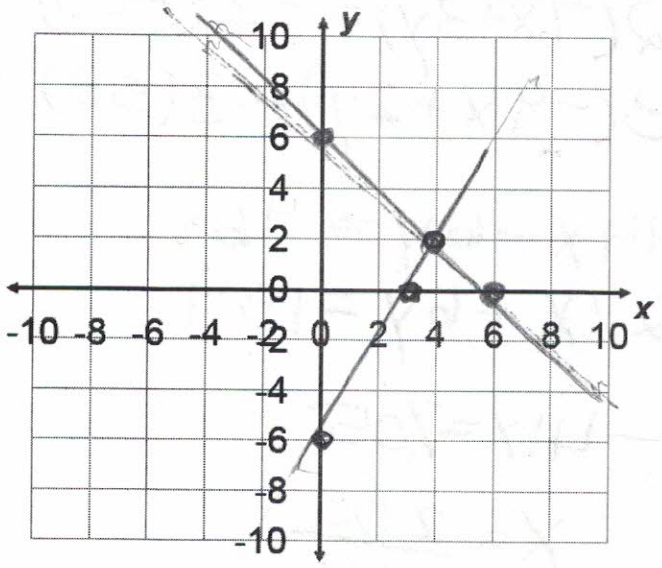
1. Use the **intercept method** to graph the system $\begin{cases} y_1 = -x + 6 \\ y_2 = 2x - 6 \end{cases}$. **Make sure to show your two data tables.** Using your graph, estimate any point both functions share.

X	Y_1
0	6
6	0

X	Y_2
0	−6
3	0



The point they share is (4, 2).

2. A tourist has two options for their vacation. The first option requires a "cleaning fee" of $750 up front and then charges $150 per day. The second option charges $210 per day but only requires $300 up front. If the tourist is looking for the lowest cost option, which option should they choose? You must use a system of linear equations to **answer the question**.

$y_1 = 750 + 150x$ where x = # of days rented.

$y_2 = 300 + 210x$

$y_1 = y_2$

$750 + 150x = 300 + 210x$

$450 = 60x$

$\frac{450}{60} = x$

$7.5 = x$

for 0 days y_2 is cheaper so

Choose option 2 for 7 days or less and option 1 for 8 days or more.

3. Solve $\begin{matrix} 7x+3y=-23 \\ -9x+2y=53 \end{matrix}$ **using addition** and write your solution as an ordered pair. **You must check your ordered pair.**

$-2(7x+3y)=-2(-23)$

$3(-9x+2y)=3(53)$

$-14x-6y=46$

$-27x+6y=159$

$-41x=205$

$x=\frac{205}{-41}$

$\boxed{x=-5}$

$7(-5)+3y=-23$

$3y=12$

$\boxed{y=4}$

Check

$-9(-5)+2(4)$

$45+8$

53 ✓

$\boxed{(-5,4)}$

4. Solve $\begin{matrix} 6x+4y=-2 \\ 4x-y=17 \end{matrix}$ **using substitution** and write your solution as an ordered pair. **You must check your ordered pair.**

$4x-y=17$

$\boxed{4x-17=y}$

$6x+4(4x-17)=-2$

$6x+16x-68=-2$

$22x=66$

$\boxed{x=3}$

$4(3)-y=17$

$-y=5$

$\boxed{y=-5}$

Check

$6(3)+4(-5)$

$18+-20$

-2 ✓

$\boxed{(3,-5)}$

5. Simplify each of the following. **Calculate** any power with a numerical base.

a) $\left(\frac{a^{12}}{a^9}\right)^{-1}$

$(a^3)^{-1}$

a^{-3}

$\frac{1}{a^3}$

b) -2^{-3}

$-\frac{1}{2^3}$

$-\frac{1}{8}$

c) $(-3t^{-2})^{-2}$

$(-3)^{-2}t^4$

$\frac{1}{(-3)^2}t^4$

$\frac{t^4}{9}$

d) $\frac{-n^{-4}}{(n^2)^{-1}}$

$\frac{-n^{-4}}{n^{-2}}$

$-\frac{n^2}{n^4}$

$-\frac{1}{n^2}$

e) $(x^3)^{-6}(x^{-9})^{-2}$

$x^{-18}x^{18}$

x^0

1

f) $\left(\frac{-10k^{-2}}{5k^5}\right)^2$

$\left(\frac{-2}{k^5k^2}\right)^2$

$\left(\frac{-2}{k^7}\right)^2$ $\Rightarrow$ $\frac{4}{k^{14}}$

$\frac{(-2)^2}{(k^7)^2}$

6. Solve $\frac{3k}{2}+\frac{k}{3}=\frac{k-4}{18}+2$. You **don't** have to check your answer.

LCD = 18

$\frac{18}{1}\left(\frac{3k}{2}+\frac{k}{3}\right)=\frac{18}{1}\left(\frac{k-4}{18}+2\right)$

$\frac{18(3k)}{2}+\frac{18k}{3}=\frac{18(k-4)}{18}+2(18)$

$9(3k)+6k=k-4+36$

$27k+6k=k+32$

$33k=k+32$

$32k=32$

$k=1$

Check

$\frac{3}{2}+\frac{1}{3}$

$\frac{9}{6}+\frac{2}{6}=\frac{11}{6}$

$-\frac{3}{18}+2$

$-\frac{1}{6}+\frac{12}{6}=\frac{11}{6}$ ✓

7. Simplify $7a^2b - 15ba^2 + 6b^2 + 3ab^2 - 9b^2 + 14ba^2$.

$6a^2b + 3ab^2 - 3b^2$

8. Simplify $(3x-4y)(3x+4y)$.

$9x^2 - 16y^2$

9. Simplify $\frac{(x^3-y^3)^2}{x^3y^3}$.

$(x^3-y^3)(x^3-y^3)$

$x^6 - x^3y^3 - x^3y^3 + y^6$

$\frac{x^6 - 2x^3y^3 + y^6}{x^3y^3}$

$\frac{x^6}{x^3y^3} - \frac{2x^3y^3}{x^3y^3} + \frac{y^6}{x^3y^3}$

$\frac{x^3}{y^3} - 2 + \frac{y^3}{x^3}$

$\frac{x^3}{y^3} + \frac{y^3}{x^3} - 2$

10. Simplify $(h^2-p)^3$.

$(h^2-p)(h^2-p)$

$(h^4 - 2h^2p + p^2)(h^2-p)$

$h^6 - h^4p - 2h^4p + 2h^2p^2 + p^2h^2 - p^3$

$h^6 - 3h^4p + 3p^2h^2 - p^3$

11. Factor $x^2 + xy - 2y^2$ completely.

$(x+2y)(x-y)$

12. Factor $8m^3 - 1$ completely.

$(2m)^3 - 1^3 \Rightarrow (2m-1)(4m^2+2m+1)$

13. Factor $27x^3 + 64y^3$ completely.

$(3x)^3 + (4y)^3 \Rightarrow (3x+4y)((3x)^2 - (3x)(4y) + (4y)^2)$

$(3x+4y)(9x^2 - 12xy + 16y^2)$

14. Factor $4a^2 - 23ab + 15b^2$ completely.

$4a^2 - 3ab - 20ab + 15b^2$

$a(4a-3b) - 5b(4a-3b)$

$(4a-3b)(a-5b)$

$4(15) = 60 \quad b = -23$

$2 \cdot 3 \cdot 2 \cdot 5$

$1 \cdot 60$

$2 \cdot 30$

$3 \cdot 20 \quad -3 \cdot -20$

$4 \cdot 15$

$5 \cdot 12$

$6 \cdot 10$

15. Factor $-2w^2 + 16w - 32$ completely.

$-2(w^2 - 8w + 16)$

$-2(w-4)(w-4)$ OR

$-2(w-4)^2$

16. The linear function $E(t) = 34t + 904$ estimates the average weekly earnings (in dollars), E, for people in the financial services industry if you supply t, the number of years since 2006.

a) Using the function answer the question $E(-1)$ is asking.

$E(-1) = 34(-1) + 904$

$= 870$

AVERAGE WEEKLY EARNINGS IN 2005 were $870.

b) Using the function answer the question $E(t) = 1{,}516$ is asking.

$1516 = 34t + 904$

$612 = 34t$

$18 = t$

AVERAGE WEEKLY EARNINGS will be $1,516 IN 2024.