Algebra 2 // Final 1 Review worksheet

1 $|2x-3| = 10$

$2x-3=10$ $\quad +3 \quad +3$

$\frac{2x}{2} = \frac{13}{2}$

$x = \frac{13}{2}$

$2x-3=-10$ $\quad +3 \quad +3$

$\frac{2x}{2} = \frac{-7}{2}$

$x = -\frac{7}{2}$

2 $|6-3x| \geq 9$

$6-3x \geq 9$ $\quad -6 \quad -6$

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

$x \geq -1$

$6-3x \leq -9$ $\quad -6 \quad -6$

$\frac{-3x}{-3} \geq \frac{-15}{-3}$

$x \geq 5$

3 $\left|\frac{4x-2}{5}\right| \leq 2$

$\frac{4x-2}{5} \leq 2 \cdot 5$

$4x-2 \leq 10$ $\quad +2 \quad +2$

$\frac{4x}{4} \leq \frac{12}{4}$

$x \leq 3$

$\frac{4x-2}{5} \geq -2 \cdot 5$

$4x-2 \geq -10$ $\quad +2 \quad +2$

$\frac{4x}{4} \geq \frac{-8}{4}$

$x \geq -2$

or $-2 \leq x \leq 3$

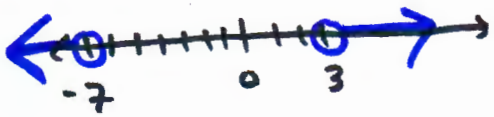
4 $|x+2| > 5$

$x+2 > 5$ $\quad -2 \quad -2$

$x > 3$

$x+2 < -5$ $\quad -2 \quad -2$

$x < -7$



5 $y = 4x-3$ } substitute

$3x-y=7$

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

$3x-4x+3=7$

$-x+3=7$

$-3 \quad -3$

$-x=4 \rightarrow x=-4$

6 $2(-2x - 4y = -4) \rightarrow -4x - 8y = -8$

$4x - y = -10 \quad 4x - y = -10$

$\frac{-9y}{-9} = \frac{-18}{-9} \rightarrow \boxed{y = 2}$

7 $2(x - 3y + 2z = 5) \rightarrow 2x - 6y + 4z = 10$ ①

$2x - 6y + 4z = 10$ ②

$4(x + 2y - z = -2) \quad 4x + 8y - 4z = -8$ ③

① $2x - 6y + 4z = 10$

② $-2x + 6y + 4z = 10$

$0 = 0$

↳ True

8 ① $2x + y = -3$

② $x - z = -6$

③ $3y + z = 7$

$x - z = -6$

$3y + z = 7$

④ $(x + 3y = 1) \rightarrow -2x - 6y = -2$

① $2x + y = -3 \quad 2x + y = -3$

$-5y = -5$

$\frac{-5y}{-5} = \frac{-5}{-5}$

$y = 1$

$2x + (1) = -3$

$2x + y = -3$

$-1 \quad -1$

$\frac{2x}{2} = \frac{-4}{2} \rightarrow \boxed{x = -2}$

9 $5c + 3d = 46$

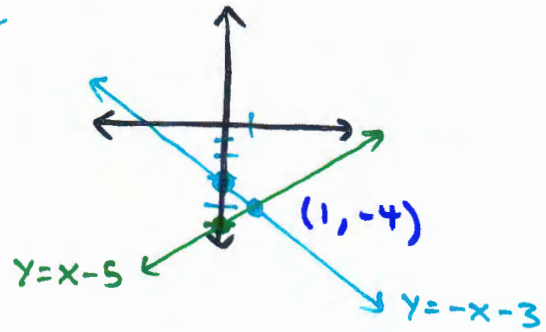
$-3(c + d = 10) \rightarrow -3c - 3d = -30$

$5c + 3d = 46$

$\frac{2c}{2} = \frac{16}{2} \rightarrow c = 8$ ... 8 bunches of carnations

10 $x + y = -3 \rightarrow y = -x - 3$ ✓

$y = x - 5$ ✓

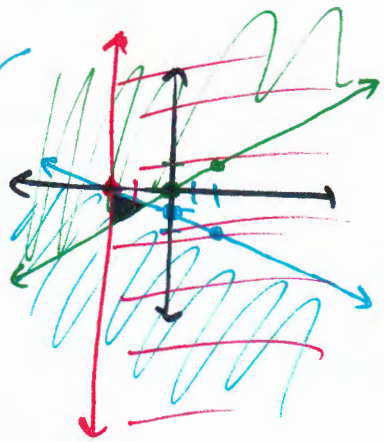


11 $x + 2y \leq -2 \rightarrow 2y \leq -x - 2 \rightarrow y \leq -\frac{1}{2}x - 1$ ✓

$y \geq \frac{1}{2}x$ ✓

$x \geq -2$ ✓

look for the tortilla chip →



12 $7i(5i) = 35i^2 = 35(-1) = \boxed{-35}$

13 $(8+i)(8-i) = 64 - 8i + 8i - i^2 = 64 - i^2 = 64 - (-1) = 64 + 1 = \boxed{65}$

14 i^{157}?

i . . . .

-1 . . . .

$-i$ . . . . → $\boxed{-i}$

1 . . . .

15 Sum: $(8 - 3i) + (2 + 6i)$

$\boxed{10 + 3i}$

16 difference: $(7 - i) - (4 - 5i)$

$7 - i - 4 + 5i$

$\boxed{3 + 4i}$

17 $\frac{5}{3+i} \cdot \frac{3-i}{3-i} = \frac{15-5i}{9-3i+3i-i^2} = \frac{15-5i}{9-i^2} = \frac{15-5i}{9-(-1)} = \frac{15-5i}{10} = \frac{15}{10} - \frac{5}{10}i$

FOIL

$\boxed{\frac{3}{2} - \frac{1}{2}i}$

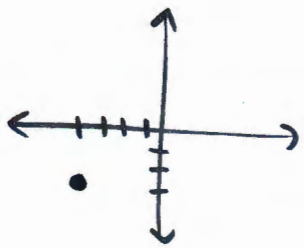
18 $\frac{2-3i}{4+2i} \cdot \frac{4-2i}{4-2i} = \frac{8-4i-12i+6i^2}{16-8i+8i-4i^2} = \frac{8-16i+6i^2}{16-4i^2}$

FOIL

$= \frac{8-16i+6(-1)}{16-4(-1)} = \frac{8-16i-6}{16-4} = \frac{2-16i}{12} = \frac{2}{12} - \frac{16}{12}i = \boxed{\frac{1}{6} - \frac{4}{3}i}$

19 Graph $-4-3i$

like $(-4, -3)$ (x, y)



20 $x^2 + 2x + 26 = 0$

$a=1 \quad b=2 \quad c=26$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-2 \pm \sqrt{(2)^2-4(1)(26)}}{2(1)} = \frac{-2 \pm \sqrt{4-104}}{2} = \frac{-2 \pm \sqrt{-100}}{2}$

$= \frac{-2 \pm \sqrt{100}\,i}{2} = \frac{-2 \pm 10i}{2} = -\frac{2}{2} \pm \frac{10}{2}i = \boxed{-1 \pm 5i}$

21 $3x^2 - 3 = 45$

$+3 \quad +3$

$\frac{3x^2}{3} = \frac{48}{3}$

$\sqrt{x^2} = \sqrt{16}$

$\boxed{x = \pm 4}$

22 $x^2 + 49 = 0$

$-49 \quad -49$

$\sqrt{x^2} = \sqrt{-49}$

$x = \sqrt{49}\,i$

$\boxed{x = \pm 7i}$

23 $x^2 = 9x$

$-9x \quad -9x$

$x^2 - 9x = 0$

$x(x-9) = 0$

$\boxed{x = 0}$

$x - 9 = 0$

$+9 \quad +9$

$\boxed{x = 9}$

24 $y = 6x^2 + x - 2$

2, -1, 3, 4, 2, -3

$(2x-1)(3x+2) = 0$

$2x - 1 = 0$ $\quad +1 \; +1$

$\frac{2x}{2} = \frac{1}{2}$

$x = 1/2$

$3x + 2 = 0$ $\quad -2 \; -2$

$\frac{3x}{3} = \frac{-2}{3}$

$x = -2/3$

25 $f(x) = x^2 + 5x - 24$

1, +8, 1, -3

$(x+8)(x-3) = 0$

$x + 8 = 0$ $\quad -8 \; -8$

$x = -8$

$x - 3 = 0$ $\quad +3 \; +3$

$x = 3$

26 $y = x + 5$ ↘ substitute

$xy = x + y - 7$

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

$x^2 + 5x = 2x - 2$

$+2 \quad -2x \quad -2x \quad +2$

$x^2 + 3x + 2 = 0$

1, 2, 1, 1

$(x+2)(x+1) = 0$

$x + 2 = 0$ $\quad -2 \; -2$

$x = -2$

$y = -2 + 5$

$y = 3$

$x + 1 = 0$ $\quad -1 \; -1$

$x = -1$

$y = -1 + 5$

$y = 4$

$-2, 3 \qquad -1, 4$

27 max value $f(x) = -2(x-7)^2 + 4$

4

28 min point $y = x^2 - 6x + 1$

aka vertex

$x = -b/2a$

↓

$y = \ldots$

↳ $a = 1 \quad b = -6 \quad c = 1$

$x = \frac{--6}{2(1)} = \frac{6}{2} = 3$

$y = (3)^2 - 6(3) + 1$

$= 9 - 18 + 1 = -9 + 1$

$= -8$

$(3, -8)$

29 $y = \overset{a}{6}(x+1)^2 \overset{h}{-} \overset{k}{9}$

opp ↓ ↓ same

$(-1, -9)$

30 "a" affect ?

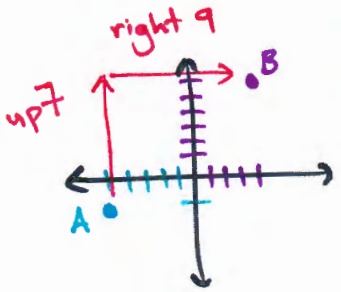
$a > 1$ thinner

$0 < a < 1$ wider

$a < 0$ downward

31 translation: $y = (x+5)^2 - 1 \rightarrow y = (x-4)^2 + 6$

A $(-5, -1)$ B $(4, 6)$



up 7 right 9

32 true?

$y = \overset{a}{3}(x+\overset{h}{4})^2 \overset{k}{-1}$ $y = \overset{a}{3}(x+\overset{h}{4})^2 \overset{k}{+2}$

a's are the same and positive, so both have minimums and have same shape.

(h,k)'s are different (-4,-1) and (-4,2) so different vertices.

B ←

33 b is -4 and c is 5

34 write in completed square form: $y = 3x^2 - 18x + 2$

vertex form

↳ $x = -b/2a$ --→ $y = \ldots$

$x = \frac{--18}{2(3)} = \frac{18}{6} = 3$ //

$y = 3(3)^2 - 18(3) + 2$

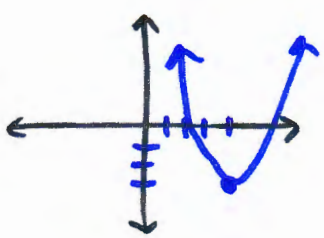
$= 3(9) - 54 + 2 = 27 - 54 + 2 = -27 + 2 = -25$ //

↳ $y = a(x-h)^2 + k$ --→ $y = 3(x-3)^2 - 25$

35 Sketch $y = \overset{a}{2}(x-\overset{h}{4})^2 \overset{k}{-3}$

↳ a = 2 h = 4 k = -3

up vertex (4, -3)



←doesn't need to be perfect...get vertex... ...up or down.... done!

36 $49^{-1/2} = \frac{1}{49^{1/2}} = \frac{1}{\sqrt{49}}$

$\boxed{\frac{1}{7}}$

37 $64^{2/3} = \sqrt[3]{64^2} = 4^2 =$

$\boxed{16}$

38 $\frac{2^{2/3}}{2^{-1/5}} = 2^{\frac{2}{3}--\frac{1}{5}} = 2^{\frac{2}{3}+\frac{1}{5}}$

$= 2^{\frac{10}{15}+\frac{3}{15}} = \boxed{2^{13/15}}$

39 $8^{\frac{7}{8}} \cdot 8^{\frac{1}{2}} = 8^{\frac{7}{8}+\frac{1}{2}} = 8^{\frac{7}{8}+\frac{4}{8}}$

$\boxed{8^{11/8}}$

40 $\frac{1}{n^{-4}} = \uparrow$ $\boxed{n^4}$

41 $(-27)^{4/3} = \sqrt[3]{(-27)^4} = (-3)^4$

$\boxed{81}$

42 $\left(12^{\frac{1}{3}}\right)^{\frac{3}{4}} = 12^{\frac{3}{12}} = \boxed{12^{\frac{1}{4}}}$

↑ Final Exam is worth 15% of your grade! Study Up!