

Algebra Finals Review

1. $3(4-2x) = 4(x-4) + 2x + 11$

$$12 - 6x = 4x - 16 + 2x + 11$$

$$\begin{array}{r} 12 - 6x = 6x - 5 \\ + 6x \quad -6x \quad -6x \quad -6x \\ \hline \end{array}$$

$$17 = 12x$$

$$x = \frac{17}{12}$$

2. a term is when a variable(s) is separated by a plus or a minus sign.

3. $P = 6b + 5k$

4. $8(4x-2) + g = 16(2x-1) + g = 32x - 16 + g$

5. $A = \frac{1}{2}(b_1 + b_2)h$ solve for b_2

$$2A = (b_1 + b_2)h$$

$$\frac{2A}{h} = b_1 + b_2$$

$$\frac{2A}{h} - b_1 = b_2$$

6. $2x - 7 \leq -3$

$$2x \leq 4$$

$$x \leq 2$$

7. $4x + 3 \geq -7$

$$4x \geq -10$$

$$x \geq \frac{-10}{4}$$

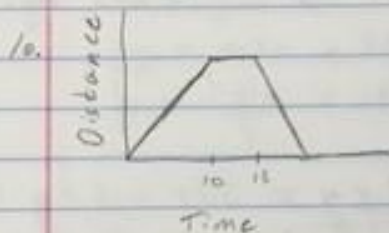
$$x \geq \frac{-5}{2}$$

8. $f(x) = \frac{2}{3}x - 3$

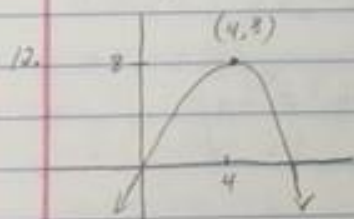
$f(x) = \frac{2}{3} \cdot 42 - 3$

$f(x) = 28 - 3 = \boxed{25}$

9. buying a book or a car etc.



11. Domain / Range ; increasing / decreasing ; opening up / down ; x and y-intercepts



maximum height @ $x=4$

maximum height is 8

13. 5, 8, 11, 14, 17, 20, 23, $\boxed{26}$

14. $a_n = a_1 r^{n-1}$ $a_1 = -5$ $r = 3$

$\boxed{a_n = -5(3)^{n-1}}$

$$15. a_1 = 12 \quad ; \quad a_{n+1} - 5 = a_n$$

$$a_2 = 12 - 5 = 7$$

$$a_3 = 7 - 5 = 2$$

$$a_4 = 2 - 5 = -3$$

$$a_5 = -3 - 5 = -8$$

$$16. 5x + 2y = 36 \quad (\text{put in } y = mx + b)$$

$$2y = -5x + 36$$

$$y = \frac{-5x + 36}{2}$$

$$y\text{-int: } \boxed{0, 18}$$

$$17. (7, 1) \quad (-3, 19)$$

$$m = \frac{19 - 1}{-3 - 7} = \frac{18}{-10} = \boxed{\frac{-9}{5}}$$

18. method 1:

$$m = -2 \quad (5, -3)$$

$$y = mx + b \quad \leftarrow ?$$

$$-3 = 5(-2) + b$$

$$-3 = -10 + b$$

$$b = 7$$

$$\boxed{y = -2x + 7}$$

method 2:

$$m = -2 \quad (5, -3)$$

$$y - y_1 = m(x - x_1)$$

$$y + 3 = -2(x - 5)$$

$$y + 3 = -2x + 10$$

$$-3 \qquad -7$$

$$\boxed{y = -2x + 7}$$

$$19. (-4, 3) \quad m = 5$$

$$y - 3 = 5(x + 4)$$

$$y - 3 = 5x + 20$$

$$\boxed{5x - y = -23}$$

20. $y = x^2$; $y = \sqrt{x}$; $y = |x|$; $y = 2^x$, etc.

21. $(3, 4)$ $(-1, 6)$ $y = mx + b$

$$m = \frac{6-4}{-1-3} = \frac{-1}{2}$$

$$4 = -\frac{1}{2}(3) + b$$

$$4 = -\frac{3}{2} + b$$

$$\frac{8}{2} - \frac{3}{2}$$

$$\frac{5}{2} = b$$

$$y = -\frac{1}{2}x + \frac{11}{2}$$

22. $10m + 15r = 500$

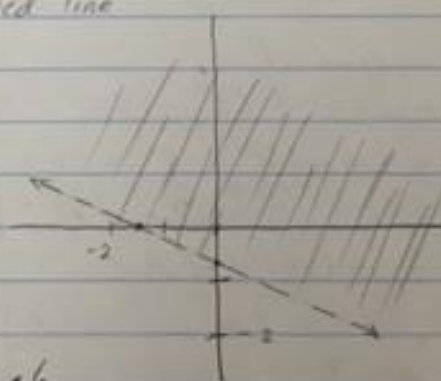
23. $6x + 15y > -9$ → dashed line

x-int: $6x = -9$

$$x = -\frac{3}{2} = -1.5$$

y-int: $15y = -9$

$$y = -\frac{3}{5} = -0.6$$



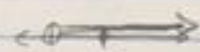
Test point: $(0, 0)$

$$0 + 0 > -9 \rightarrow \text{True}$$

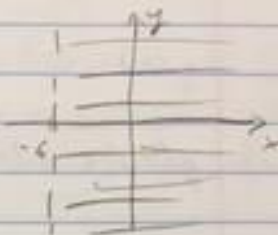
shade where Test point is

24. $3x > -18$

$x > -6$



or



25. $x + y = -1$

+ $x - y = -7$

$2x = -8$

$x = -4$

$x + y = -1$

$-4 + y = -1$

$y = 3$

$(-4, 3)$

26. $b + g = 10$

$1.75b + 2.25g = 20.50$

$b = 10 - g$

$1.75b + 2.25g = 20.50$

$1.75(10 - g) + 2.25g = 20.50$

$17.50 - 1.75g + 2.25g = 20.50$

$17.50 + 0.50g = 20.50$

$0.50g = 3.00$

$g = 6$

$\therefore b = 10 - 6 = 4$

(6 girls) and 4 boys

27. multiple questions & confusing

(a)

opens up; x-ints at $x = 3, 1, -2$

(b) on back

27. $g(x) = |x| - 3$

28. $g(x) = f(x+h)$ or $g(x) = |x+3|$

29. $V: (-3, 0)$

30. $3|x+6| = 3$

$$|x+6| = 1$$

$$x+6 = 1$$

$$\text{or } x+6 = -1$$

$$\boxed{x = -5}$$

$$\text{or } \boxed{x = -7}$$

31. $9 \geq |x-6| - 3$

$$12 \geq |x-6|$$

$$\text{or } |x-6| \leq 12$$

$$x-6 \leq 12 \quad \text{and} \quad x-6 \geq -12$$

$$\boxed{x \leq 18} \quad \text{and} \quad \boxed{x \geq -6}$$

$$\begin{array}{c} \text{-----} \\ -6 \qquad 18 \end{array}$$

32. $|\frac{x}{3}| + 2 \leq 4$

$$|\frac{x}{3}| \leq 2$$

$$\frac{x}{3} \leq 2$$

$$\text{and } \frac{x}{3} \geq -2$$

$$x \leq 6$$

$$\text{and } x \geq -6$$

$$\begin{array}{c} \text{-----} \\ -6 \qquad 6 \end{array}$$

33. $2|x+6| + 3 \geq 29$

$$2|x+6| \geq 26$$

$$|x+6| \geq 13$$

$$x+6 \geq 13 \quad \text{or} \quad x+6 \leq -13$$

$$\boxed{x \geq 7} \quad \text{or} \quad \boxed{x \leq -19}$$

→ short cut: $(\frac{3}{2})^{5/2} = \frac{9\sqrt{3}}{4\sqrt{2}} = \boxed{\frac{9\sqrt{6}}{8}}$

$$34. \left(\frac{2}{3}\right)^{-5/2} = \frac{1}{\left(\frac{2}{3}\right)^{5/2}} = \frac{1}{\sqrt{\left(\frac{2}{3}\right)^5}} = \frac{1}{\sqrt{\frac{2^5}{3^5}}} = \frac{1}{\frac{4}{9}\sqrt{\frac{2}{3}}} = \frac{9}{4\sqrt{\frac{2}{3}}} = \text{Ignore}$$

$$35. 9^{3/2} = (\sqrt{9})^3 = 3^3 = \boxed{27}$$

$$36. \sqrt{(9\omega^2)^3} \sqrt{(9\omega^2)^4}$$

$$\downarrow$$

$$(\sqrt{9\omega^2})^3 \cdot 9\omega^3$$

$$(3\omega)^3 \cdot 9\omega^3$$

$$27\omega^3 \cdot 9\omega^3 = \boxed{243\omega^6}$$

$$37. r = \frac{9}{3} = \frac{27}{9} = \boxed{3}$$

$$38. a_n = a_{n-1} \cdot \frac{1}{2}$$

$$39. 3, 6, 9, \Rightarrow d=3 \quad a_n = 3 + (n-1)3$$

$$a_n = 3 + 3n - 3 = \boxed{3n}$$

40. 45 or exponentials + didn't cover

46. degree is highest power or sum of powers of a polynomial.

ex. $2x^4 + 6x$ has degree 4

$x^2y^2 + x^3$ has degree 4

47. $9y^2 + 3y = 3y(3y+1)$

48. $(x-3)(x^2-2x+3)$

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

$$-3x^2 + 6x - 9$$

$$\boxed{x^3 - 5x^2 + 9x - 9}$$

49. $A = lw$

$$\boxed{} x^2 - 2$$

$$A = (x^2 - 3)(x + 2)$$

50. $A = (3^2 - 3)(3 + 2)$

$$= (9 - 3)(5)$$

$$= 6(5) = \boxed{30 \text{ units}^2}$$

51. $(4x+2)(x-3)$

$$4x^2 - 12x + 2x - 6$$

$$\boxed{4x^2 - 10x - 6}$$

52. $(3x-2)^2 = (3x-2)(3x-2) = \boxed{9x^2 - 6x + 4}$

53. shifted 5 units down

54. reflected across the x-axis and shifted 3 units up.

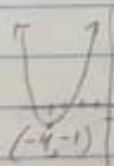
55. $(x+3)(x-7)=0$ (x-ints are same as zeros!)
 $x+3=0$ $x-7=0$
 $x=-3$ $x=7$

56. $2x^2 - 4x + 3 = y$ (axis of sym is the same as the x-component of the vertex.)
 $x = h = \frac{-b}{2a}$

$x = \frac{-(-4)}{2(2)} = \frac{4}{4} = 1$ \therefore $x=1$

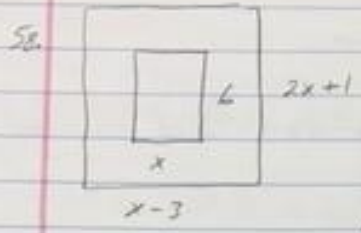
57. keep $y = a(x-h)^2 + k$ in mind where (h, k) is the vertex.

$y = (x+4)^2 - 1$ \rightarrow has vertex $(-4, -1)$; opens up



$D: (-\infty, \infty)$ or all Reals

$R: [-1, \infty)$ or $x \geq -1$



$$A_{\text{big}} = Lw \quad A_{\text{small}} = Lw$$

$$A = (2x+1)(x-3) \quad A = 6 \cdot x$$

$$A = A_{\text{big}} - A_{\text{small}}$$

$$= (2x+1)(x-3) - 6x \quad \text{or}$$

$$= 2x^2 - 5x - 3 - 6x$$

$$= 2x^2 - 11x - 3$$

59. $x^2 = 15 - 2x$

$$x^2 + 2x - 15 = 0$$

$$(x+5)(x-3) = 0$$

$$x = -5, 3$$

60. $4x^2 - 9 = 0$

$$4x^2 = 9$$

$$x^2 = \frac{9}{4}$$

$$x = \pm \sqrt{\frac{9}{4}} = \pm \frac{3}{2}$$

61. $3x^2 + 8x - 2$

$$-b \pm \sqrt{b^2 - 4ac}$$

$$\frac{-8 \pm \sqrt{64 - 4(3)(-2)}}{2(3)}$$

$$\frac{-8 \pm \sqrt{64 + 24}}{6} = \frac{-8 \pm \sqrt{88}}{6} = \frac{-8 \pm 2\sqrt{22}}{6} = \frac{-4 \pm \sqrt{22}}{3}$$

62. 25

63. when ball hits the ground $h(t) = 0$

$$0 = -16t^2 + 80t + 3$$

$$\frac{-80 \pm \sqrt{6400 - 4(3)(-16)}}{2(-16)} = \frac{-80 \pm \sqrt{6400 + 192}}{-32}$$

too big \rightarrow use calculator

64. $3 = -16t^2 + 80t + 3$

$$0 = -16t^2 + 80t$$

$$0 = -16t(t - 5)$$

$$\bullet -16t = 0 \quad t - 5 = 0$$

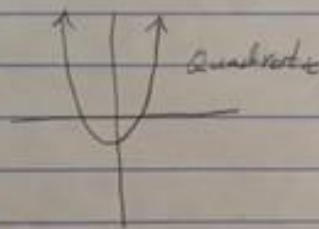
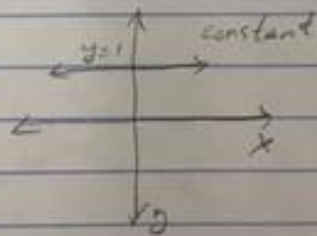
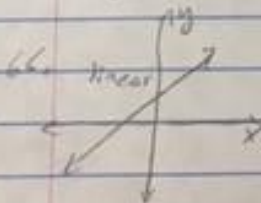
$$t = 0 \quad t = 5$$

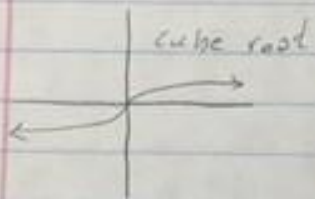
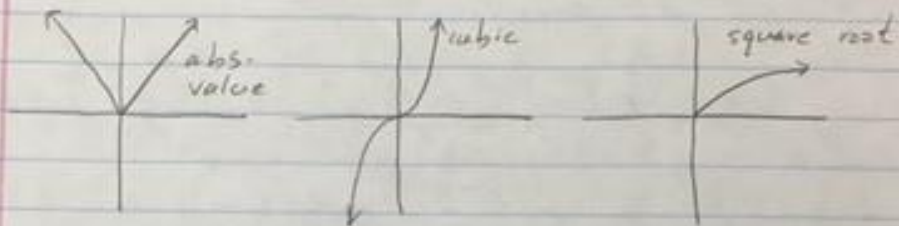
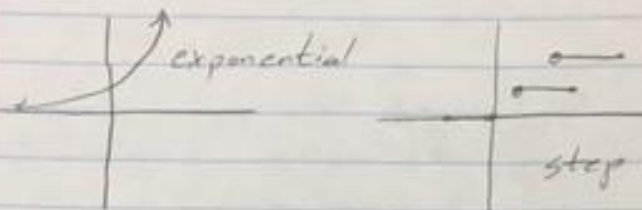
X

\approx 5 seconds

65. $y = -16(0)^2 + 80(0) + 3$

y-int $\Rightarrow (0, 3)$





$$62. y = 2x^2 - 1$$

$$x = 2y^2 - 1$$

$$x + 1 = 2y^2$$

$$\frac{x+1}{2} = y^2$$

$$\pm \sqrt{\frac{x+1}{2}} = y$$