1050 REVIEW 1 KEY

1. For polynomial or quadratic form equations, start by getting $=0$.

$(-8p+3)^2 = -10(-8p+3) - 21$

$+10(-8p+3) + 21 \qquad +10(-8p+3) + 21$

$(-8p+3)^2 + 10(-8p+3) + 21 = 0$

Let $u = (-8p+3)$

$u^2 + 10u + 21 = 0$

$(u+7)(u+3) = 0$

$u = -7 \quad , u = -3$

now backsubstitute $u = -8p+3$.

$-8p+3 = -7 \quad , -8p+3 = -3$

$\quad -3 \quad -3 \qquad\qquad -3 \quad -3$

$\frac{-8p}{-8} = \frac{-10}{-8} \qquad \frac{-8p}{-8} = \frac{-6}{-8}$

$\boxed{p = \frac{5}{4}} \qquad \boxed{p = \frac{3}{4}}$

2. This function is made up of 2 pieces. The x-values of the left piece are $-3 \le x \le 0$ ($\le$ because of the solid dots). The x-values of the right piece are $x > 0$ (hollow dot)

The left piece is linear, with y-intercept $b = 4$, slope $m = 4/3$.

The right piece is the identity function $y = x$, so

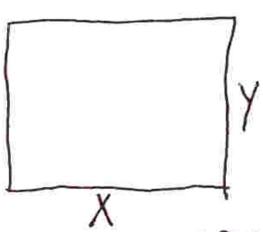
$$\boxed{f(x) = \begin{cases} \frac{4}{3}x + 4 & , -3 \le x \le 0 \\ x & , x > 0 \end{cases}} \quad \begin{matrix} \text{Left} \\ \text{Right} \end{matrix}$$

3. $f - g = (9x-8) - (3x-7) = 9x - 8 - 3x + 7 = \boxed{6x - 1}$

4. $\frac{A}{3\pi} = \frac{3\pi a^2}{3\pi} \Rightarrow \sqrt{a^2} = \pm\sqrt{\frac{A}{3\pi}} \Rightarrow a = \pm\sqrt{\frac{A}{3\pi}} \cdot \frac{\sqrt{3\pi}}{\sqrt{3\pi}} = \boxed{\pm\frac{\sqrt{3\pi A}}{3\pi}}$

5. 1400 yards is perimeter, so $2x + 2y = 1400$

$\quad -2x \qquad\qquad -2x$



$A = xy$

$\frac{2y}{2} = \frac{1400}{2} - \frac{2x}{2}$

$y = 700 - x$

$\boxed{A = x(700 - x)}$

AREA MUST BE ≥ 0, SO $x \ge 0$, $x \le 700$

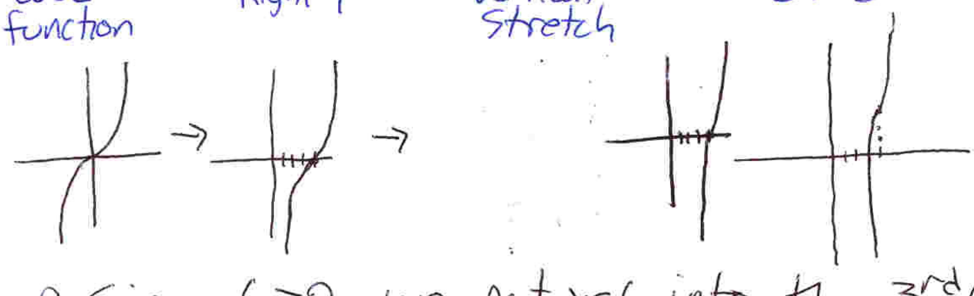
DOMAIN $\boxed{[0, 700]}$

6. $(f+g)(3) = f(3) + g(3) = [(3)-6] + [(3)+3] = -3+6 = \boxed{3}$

7. $f(x) = 4(x-4)^3+3$

$x^3 \rightarrow (x-4)^3 \rightarrow 4(x-4)^3 \rightarrow 4(x-4)^3 + 3$

Cube function Right 4 Vertical Stretch UP 3



8. Since $6>0$, we put $x=6$ into the 3rd (bottom) piece, so $f(6) = 2(6)+1 = \boxed{13}$

9. THE Graph has y-Axis symmetry = $\boxed{\text{Even function}}$.
(origin symmetry = Odd)

10. The smallest x-value is $-\infty$, the largest x value is ∞.
(no endpoints on the graph) so $\boxed{\text{Domain}}$ is $\boxed{(-\infty,\infty)}$
The smallest y-value is 0 (with the graph on $y=0$)
& the largest y-value is ∞, so $\boxed{\text{range}} = \boxed{[0,\infty)}$

11. No endpoints will be included in these answers, nor should they be (is a single point increasing?)
INCREASING, DECREASING, CONSTANT is an x-interval question.

increasing $\{x \mid -2<x<-1,\ x>2\}$
Decreasing $\{x \mid 1<x<2\}$
constant $\{x \mid -1<x<1\}$

12. DOMAIN: Since $x = y^2+9$, and the smallest y^2+9 can be is 9, the $\boxed{\text{domain is } [9,\infty)}$

RANGE: No Restrictions on y (no $\sqrt{y}$, $\frac{1}{y}$, etc)

so $\boxed{\text{RANGE is } (-\infty,\infty)}$

13. $f(-6) = -5(-6)+3 = 30+3 = \boxed{33}$

14. $f(k-1) = 4(k-1)^2 - 4(k-1) - 6 = 4(\underbrace{k^2-2k+1}_{\text{(FOIL)}}) - 4k + 4 - 6$

$= 4k^2 - 8k + 4 - 4k - 2 = \boxed{4k^2 - 12k + 2}$

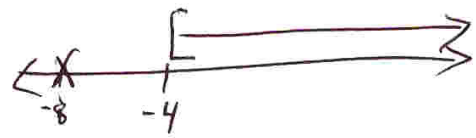
15. SMALLEST x-value is $-\infty$, largest is ∞: $\boxed{\text{DOMAIN } (-\infty,\infty)}$

SMALLEST y-VALUE is -2, largest is ∞, so $\boxed{\text{RANGE } [-2,\infty)}$

16. DOMAIN: There is a $\sqrt{\ }$ and a denominator in this function; both can cause problems.

First, $\frac{\quad}{(x+8)(x+8)}$; Denominator $\neq 0$, so $x+8 \neq 0 \Rightarrow \underline{\underline{x \neq -8}}$

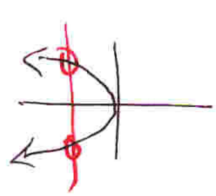
Next, $\sqrt{x+4}$; $x+4 \geq 0 \Rightarrow \underline{x \geq -4}$
(don't take $\sqrt{\ }$ of negatives)

on a number line, 

Since $x \geq -4$, $x = -8$ is already excluded, so $\boxed{\text{DOMAIN } [-4,\infty)}$

17. Another $\sqrt{\ }$; For $\sqrt{4-x}$, $\begin{array}{r} 4 - x \geq 0 \\ -4 \quad\; -4 \end{array} \Rightarrow \begin{array}{r} -x \geq -4 \\ \div -1 \quad \div -1 \end{array}$

$\Rightarrow x \leq 4$ $\boxed{\text{DOM } (-\infty,4]}$

18.  This graph does NOT pass the vertical line test, so it is $\boxed{\text{NOT A FUNCTION}}$

19. When the relation is in point form, we need to check that each X value is assigned only one y valeue.
The first x value $x=2$ is assigned $y=6$. The second X value is $x=2$ and it is assigned $y=-8$. So this X value is assigned 2 y values, & so this relation is $\boxed{\text{NOT a function.}}$

20. To find x-intercepts, set $y=0$

$$0=(x-2)^2-1 \Rightarrow \pm\sqrt{1}=\sqrt{(x-2)^2} \Rightarrow x-2=\pm 1$$
$$+1 \qquad +1 \qquad\qquad +2 \quad +2$$

$$x=2\pm 1 = 2+1, 2-1 \quad \text{so } x=3,1 \quad \boxed{(3,0),(1,0)}$$

To find y-intercepts, set $x=0$

$$y=(0-2)^2-1 = (-2)^2-1 = 4-1=3, \text{ so } \boxed{(0,3)}$$

21. To get y-axis symmetry, change x to $-x$,
so instead of $(5,-6)$ we get $\boxed{(-5,-6)}$