HW 1.4

April 1, 2015 9:17 PM

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8) $y = a(x+1)(x-4)$ $\quad y = -2(x+1)(x-4)$ $\quad w = -2(3-\frac{3}{2})^2 + 12.5$

$8 = a(1)(-4)$ $\quad = -2(x^2-3x-4)$ $\quad w = 8$

$a = -2$ $\quad = -2(x-\frac{3}{2})^2 + 12.5$

9) $a(x+\frac{b}{2a})^2 + c - \frac{b^2}{4a}$ $\quad \frac{-b}{2a} + 2 = -\frac{q}{2a}$ $\quad r = -\frac{q^2}{4a} \to r - \frac{(b+4a)^2}{4a} = c - \frac{b^2}{4a}$

$\frac{m+n}{2} = -\frac{b}{2a}$ $\quad \frac{m+n+4}{2} = -\frac{q}{2p}$ $\quad q = b + 4a$ $\quad r = 4a + 2b + c$

$q + r = 8a + 3b + c$

10) $x^2 - 63x + k = (x+12)(x-r)$

$-63x + k = -(R+r)x + Rr$

$63 = R + r$ $\quad$ R and r = roots

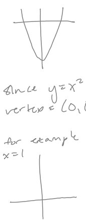
all primes are odd

odd # − odd # = even #

R or r must be even

2 = only even prime

11)



since $y = x^2$ vertex = (0,0)

* for example, $x = 1$

y	# of enclosed grid points
0	1
1	1 *
4	2
9	3
16	4
25	5
36	6
49	7

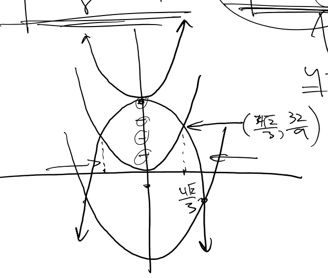
$1 + 3(3)$

$(n) + (n+2)^2 + (n+4)^2 \ldots$

$\hookrightarrow \boxed{485}$

16) $y = -\frac{1}{8}x^2 + 4$ $\quad y = x^2 - k$ $\quad x^2 - 4$ boys

~~$x^2 - 3$ girls~~



$y = x^2 - 0 = -\frac{1}{8}x^2 + 4$

$x^2 = -\frac{1}{8}x^2 + 4$

$\frac{9}{8}x^2 = 4$

$x^2 = \frac{32}{9}$

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

$y = -\frac{1}{8}\left(\frac{32}{9}\right) + 4$

$y = -\frac{4}{9} + \frac{36}{9} = \frac{32}{9}$

ALTERNATE SOLUTION:

① $y = -\frac{1}{8}x^2 + 4$.

• FIND THE x-intercepts

$0 = -\frac{1}{8}x^2 + 4$

$32 = x^2$

$\boxed{\pm 4\sqrt{2} = x}$

• ANY INTERSECTION TO THE RIGHT OF $4\sqrt{2}$ OR LEFT OF $-4\sqrt{2}$ WILL BE UNDER THE x-AXIS.

② $y = -\frac{x^2}{8} + 4$ $\quad y = x^2 - k$.

FIND THE INTERSECTION IN TERMS OF "k"

$-\frac{x^2}{8} + 4 = x^2 - k$

$k = \frac{9x^2}{8} - 4$ $\quad [x = 4\sqrt{2}]$

$k = \frac{9(32)}{8} - 4$

$k < 32$ ← THE GREATEST VALUE FOR "k" IS 31 B/C AT $4\sqrt{2}$, THE INTERSECTION IS ON THE x-axis

③ SO RANGE OF VALUES FOR "k" IS FROM $-4 \to 31$.

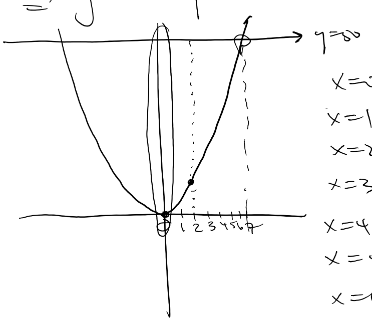
∴ THERE ARE

$31 - (-4) + 1$

$= 36$

36 VALUES FOR k

11) $y = x^2$ $\quad y = 50$.



$x = 0$, $\quad 0 - 50$ (51 pts)

$x = 1$ $\quad 1 - 50$ (50 pts)

$x = 2$ $\quad 4 - 50$ (47)

$x = 3$ $\quad 9 - 50$ (42)

$x = 4$ $\quad 16 - 50$ (35)

$x = 5$ $\quad 25 - 50$ (26)

$x = 6$ $\quad 36 - 50$ (15)

$x = 7$ $\quad 49 - 50$ (2)

$\text{Total} = 2(50 + 47 + 42 + 35 + 26 + 15 + 2) + 51$

$= 485$

19) $x^2 - 4x - c - \sqrt{8x^2 - 32x - 8c} = 0$

$k - \sqrt{8k} = 0$

$k = \sqrt{8k}$

$k^2 = 8k$

① $x^2 - 4x - c = 0$

$a = 1 \quad b = -4 \quad c = -c$

$16 - 4(-c) > 0$

② $x^2 - 4x - c = 8$

$x^2 - 4x - c - 8 = 0$

$a = 1 \quad b = -4 \quad c = -c - 8$

$16 - 4(-c-8) > 0$

$K = \sqrt{8K}$

$K^2 = 8K$

$K^2 - 8K = 0$

$K(K-8) = 0$

$K = 0 \qquad K = 8$

$a=1 \quad b=-4 \quad c=-c$

$16 - 4(-c) > 0$

$16 + 4c > 0$

$4c > -16$

$\boxed{c > -4}$

$x^2 - 4x - c - 8 = 0$

$a=1 \quad b=-4 \quad c=-c-8$

$16 - 4(-c-8) > 0$

$16 + 4c + 32 > 0$

$4c > -48$

$\boxed{c > -12}$

0 0 1root 2 roots

−12 −4

0 1 2 2 2

$\boxed{-12 < c < -4}$