Bellwork: Complete the square

$x^2-14x+\_\_49$

$(x-7)^2$

Homework 3.4.5 Solutions

1) $4n^2 - 4n + 1$

$(2n - 1)^2$

2) $4x^2 + 20x + 25$

$(2x + 5)^2$

3) $16v^2 - 40v + 25$

$(4v - 5)^2$

4) $v^2 - 8v + 16$

$(v - 4)^2$

5) $20n^2 + 60n + 45$

$5(2n + 3)^2$

6) $27r^2 - 18r + 3$

$3(3r - 1)^2$

7) $(7r - 5)^2$

$49r^2 - 70r + 25$

8) $(5x - 4)^2$

$25x^2 - 40x + 16$

9) $(5x + 2)^2$

$25x^2 + 20x + 4$

10) $(3m - 6)^2$

$9m^2 - 36m + 36$

11) $(8x + 1)^2$

$64x^2 + 16x + 1$

12) $(7a + 4)^2$

$49a^2 + 56a + 16$

13) $p^2 - 17p + \_\_$

$\frac{289}{4}; \left(p - \frac{17}{2}\right)^2$

14) $p^2 - 30p + \_\_$

$225; (p - 15)^2$

15) $x^2 + 34x + \_\_$

$289; (x + 17)^2$

16) $p^2 - 7p + \_\_$

$\frac{49}{4}; \left(p - \frac{7}{2}\right)^2$

17) $p^2 - \frac{34}{21}p + \_\_$

$\frac{289}{441}; \left(p - \frac{17}{21}\right)^2$

18) $x^2 - 19x + \_\_$

$\frac{361}{4}; \left(x - \frac{19}{2}\right)^2$

5, 16, 12

5) $20n^2 + 60n + 45$

$5(4n^2 + 12n + 9)$

$5(2n+3)^2$

$2n+3$

$2n$	$6n$
$+3$	$6n$

12) $(7a+4)^2$

$49a^2 + 56a + 16$

$7a+4$

$7a$	$49a^2$	$28a$
$+4$	$28a$	16

16) $p^2 - 7p + \underline{\quad 49/4 \quad}$

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

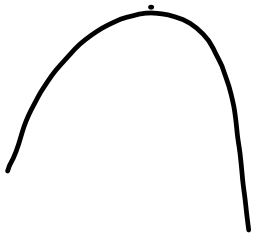
Lesson 3.5 Objectives

I can convert a function in standard form to vertex form.

Vertex Form of a Quadratic Function

$f(x) = a(x-h)^2 + k$ with vertex at (h,k)

$-16(t-.25)+51$ $(.25, 51)$



Completing the Square – Step by Step

Given Example: $f(x) = 3x^2 + 24x + 7$

Step 1: Factor a out of first 2 terms. Make fraction if necessary. If $a = 1$, skip this step. $3(x^2+8x)+7$

Step 2: Within parentheses, add & subtract $\left(\frac{b}{2}\right)^2$ (The new b, not the original.) $3(x^2+8x+16-16)+7$

Step 3: Distribute a just to $-\left(\frac{b}{2}\right)^2$ to get it out of parentheses. If $a = 1$, skip this step. $3(x+4)^2-48+7$

Step 4: Make the perfect square and combine the outside constants. $3(x+4)^2-41$

$2+7+3-3$

1. $f(x)=x^2-12x+20$

$x^2-12x+36-36+20$

$(x-6)^2-16$

v: (6, -16)

2. $f(x)=5x^2+10x-3$

$5(x^2+2x+1-1)-3$

$5(x+1)^2-5-3$

$5(x+1)^2-8$ v: (-1, -8)

3. $f(x)=x^2+7x+8$

$x^2+7x+\frac{49}{4}-\frac{49}{4}+8$

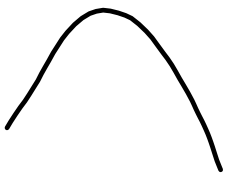
$\left(x+\frac{7}{2}\right)^2-\frac{17}{4}$ V: $(-7/2, -17/4)$

4. $f(x)=-2x^2+28x-11$

$-2(x^2-14x+49-49)-11$

$-2(x-7)^2+98-11$

$-2(x-7)^2+87$ V: $(7, 87)$



5. Write in standard form: $f(x) = -3(x-4)^2 + 30$

$-3(x^2 - 8x + 16) + 30$

$-3x^2 + 24x - 48 + 30$

$-3x^2 + 24x - 18$

$ax^2 + bx + c$

$(a+b)^2$

$a^2 + 2ab + b^2$