Worksheet #18 **Answers**

1) $f(x) = (x^2 + 18x) - 7$
$f(x) = (x^2 + 18x + 81) - 7 - 81$
$f(x) = (x + 9)^2 - 88$
vertex: $(-9, -88)$. $a = 1$

2) $f(x) = 3(x^2 - 4x) + 11$
$f(x) = 3(x^2 - 4x + 4) + 11 - 12$
$f(x) = 3(x - 2)^2 - 1$
vertex: $(2, -1)$, $a = 3$

3) $f(x) = 4(x^2 + \frac{14}{4}x) - 5$
$f(x) = 4(x^2 + \frac{7}{2}x + \frac{49}{16}) - 5 - \frac{196}{16}$
$f(x) = 4(x + \frac{7}{2})^2 - \frac{80}{16} - \frac{196}{16}$
$f(x) = 4(x + \frac{7}{2})^2 - \frac{276}{16}$
vertex: $(-7/4, -69/4)$, $a = 4$

4) $f(x) = 2(x^2 - 3x) + 8$
$f(x) = 2(x^2 - 3x + \frac{9}{4}) + 8 - \frac{9}{2}$
$f(x) = 2(x - \frac{3}{2})^2 + \frac{16}{2} - \frac{9}{2}$
$f(x) = 2(x - \frac{3}{2}) + \frac{7}{2}$
vertex: $(3/2, 7/2)$, $a = 2$

5) $5 = a(0 - -3)^2 + -2$
$5 = 9a - 2$
$7 = 9a$
$\frac{7}{9} = a$

$f(x) = \frac{7}{9}(x + 3)^2 - 2$
$f(x) = (7/9)(x^2 + 6x + 9) - 2$
$f(x) = \frac{7}{9}x^2 + \frac{6}{9}x + \frac{63}{9} - \frac{18}{9}$

$f(x) = \frac{7}{9}x^2 + \frac{6}{9}x + 5$

6) $-2 = a(1 - -1)^2 + 4$
$-2 = 4a + 4$
$-6 = 4a$
$-\frac{3}{2} = a$

$f(x) = -\frac{3}{2}(x + 1)^2 + 4$
$f(x) = -\frac{3}{2}(x^2 + 2x + 1) + 4$
$f(x) = -\frac{3}{2}x^2 - 3x - \frac{3}{2} + 4$
$f(x) = -\frac{3}{2}x^2 - 3x - \frac{3}{2} + \frac{8}{2}$

$f(x) = -\frac{3}{2}x^2 - 3x + \frac{5}{2}$

7) $5 = a(-2 - 0)^2 + 3$
$5 = 4a + 3$
$2 = 4a$
$\frac{1}{2} = a$

$f(x) = \frac{1}{2}x^2 + 3$

8) $0 = a(-1 - -2)^2 + 2$
$0 = a + 2$
$-2 = a$

$f(x) = -2(x + 2)^2 + 2$
$f(x) = -2(x^2 + 4x + 4) + 2$
$f(x) = -2x^2 - 8x - 8 + 2$

$f(x) = -2x^2 - 8x - 6$

9) $f(-4) = |4(-4) - 7| = |-16 - 7| = 23$
$f(-1) = |4(-1) - 7| = |-4 - 7| = 11$
$f(1) = |4(1) - 7| = |4 - 7| = 3$
$f(3) = 3^3 - 4 = 27 - 4 = 23$
$f(6) = 6^3 - 4 = 216 - 4 = 212$