Solving Quadratics

Factoring

1) Set the problem equal to **ZERO**
2) Factor
3) **SOLVE**

EX: $2x^2 - 16x = -30$

$2x^2 - 16x + 30 = 0$

$2(x^2 - 8x + 15) = 0$

$2(x-3)(x-5) = 0$

$x - 3 = 0 \qquad x - 5 = 0$

$\boxed{x = 3, 5}$

EX: $6x^2 - 5x - 4 = 0$

-24

$(6x^2 - 8x) + (3x - 4) = 0$

$2x(3x - 4) \; 1(3x - 4) = 0$

$(2x + 1)(3x - 4) = 0$

$\boxed{x = -\frac{1}{2}, \frac{4}{3}}$

Square Roots

1) Get x^2 by itself
2) Take the sq. rt of each side
3) $\pm$ in the answer

EX: $5x^2 - 10 = 170$

$\frac{5x^2}{5} = \frac{180}{5}$

$\sqrt{x^2} = \sqrt{36}$

$\boxed{x = \pm 6}$

Quadratic Formula

1) Set the problem equal to **ZERO**
2) Plug #'s (a, b, c) into **Quadratic formula**
3) Simplify & write answer

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

EX: $2x^2 - 10x = -4$

$2x^2 - 10x + 4 = 0$

$x = \frac{10 \pm \sqrt{(-10)^2 - 4(2)(4)}}{2(2)}$

$x = \frac{10 \pm \sqrt{68}}{4} \rightarrow \sqrt{4 \cdot 17}$

$x = \frac{\cancel{10}^{5} \pm \cancel{2}^{1}\sqrt{17}}{\cancel{4}_{2}}$

$\boxed{x = \frac{5 \pm \sqrt{17}}{2}}$

Completing the $\square$

1) Move constants to the right side of =
2) Complete the $\square$
3) **Factor** the left/ **Simplify** the right
4) Take the $\sqrt{}$ of both sides
5) **SOLVE** for x

$$\left(\frac{b}{2}\right)^2$$

EX: $x^2 + 6x + 1 = 92$

$\quad -1 \quad -1$

$\left(\frac{6}{2}\right)^2$

$x^2 + 6x + 9 = 91 + 9$

$\sqrt{(x+3)^2} = \sqrt{100}$

$x + 3 = \pm 10$

$x = -3 \pm 10$

$\boxed{x = 7, -13}$

Algebra 1 Name_____ ID: 1

Unit 3B Test Review

Date_____ Period____

Factor the common factor out of each expression.

1) $5r^4 - 50r^3 - 50r^2$

$5r^2(r^2 - 10r - 10)$

2) $-28b^6 - 20b^4 - 16b^3$

$-4b^3(7b^3 + 5b + 4)$

Solve each equation by factoring.

3) $r^2 + 2r - 3 = 0$

$(r+3)(r-1) = 0$

$\boxed{r = -3, 1}$

4) $n^2 + 4n = 0$

$n(n+4) = 0$

$\boxed{n = -4, 0}$

5) $x^2 + 4x - 26 = -5$

$x^2 + 4x - 21 = 0$

$(x+7)(x-3) = 0$

$\boxed{x = -7, 3}$

6) $r^2 - 3r = -2$

$r^2 - 3r + 2 = 0$

$(r-2)(r-1) = 0$

$\boxed{r = 1, 2}$

7) $7a^2 + 22a + 3 = 0$

$1 \times 21 = 21$

$- + - = -22$

$(7a^2 + 21a) + (a + 3) = 0$

$7a(a+3) + 1(a+3) = 0$

$(7a+1)(a+3) = 0$

$\boxed{a = -1/7, -3}$

8) $2x^2 - 5x - 3 = 0$

$-6 \times 1 = -6$

$-6 + 1 = -5$

$(2x^2 - 6x) + (x - 3) = 0$

$2x(x-3) + 1(x-3) = 0$

$(2x+1)(x-3) = 0$

$\boxed{x = -\frac{1}{2}, 3}$

9-20

Solve each equation by taking square roots.

9) $9v^2 = 81$

$\sqrt{v^2} = \sqrt{9}$

$\boxed{v = \pm 3}$

10) $v^2 + 1 = 101$

$\sqrt{v^2} = \sqrt{100}$

$\boxed{v = \pm 10}$

7

11) $8x^2 + 4 = 84$

$8x^2 = 80$

$\sqrt{x^2} = \sqrt{10}$

$\boxed{x = \pm\sqrt{10}}$

12) $5n^2 + 1 = 96$

$5n^2 = 95$

$\sqrt{n^2} = \sqrt{19}$

$\boxed{n = \pm\sqrt{19}}$

13) $81b^2 + 1 = 2$

$81b^2 = 1$

$\sqrt{b^2} = \sqrt{\frac{1}{81}}$

$b = \pm\frac{\sqrt{1}}{\sqrt{81}} = \boxed{\pm\frac{1}{9}}$

14) $10b^2 - 4 = 476$

$10b^2 = 480$

$\sqrt{b^2} = \sqrt{48} \rightarrow \sqrt{16 \cdot 3}$

$\boxed{b = \pm 4\sqrt{3}}$

Solve each equation by completing the square.

15) $m^2 - 8m - 84 = 0$

$\left(\frac{-8}{2}\right)^2$ $m^2 - 8m + \underline{16} = 84 + \underline{16}$

$\sqrt{(m-4)^2} = \sqrt{100}$

$m - 4 = \pm 10$ $\boxed{m = -6, 14}$

$m = 4 \pm 10$

16) $n^2 - 6n - 24 = 0$

$\left(\frac{-6}{2}\right)^2$ $n^2 - 6n + \underline{9} = 24 + \underline{9}$

$\sqrt{(n-3)^2} = \sqrt{33}$

$n - 3 = \pm\sqrt{33}$

$\boxed{n = 3 \pm \sqrt{33}}$

17) $r^2 - 20r + 89 = -10$

$\left(\frac{-20}{2}\right)^2$ $r^2 - 20r + \underline{100} = -99 + \underline{100}$

$\sqrt{(r-10)^2} = \sqrt{1}$

$r - 10 = \pm 1$ $\boxed{r = 9, 11}$

$r = 10 \pm 1$

18) $x^2 - 8x - 87 = -7$

$x^2 - 8x + \underline{16} = 80 + \underline{16}$

$\left(\frac{-8}{2}\right)^2$ $\sqrt{(x-4)^2} = \sqrt{96} \rightarrow \sqrt{16 \cdot 6}$

$x - 4 = \pm 4\sqrt{6}$

$\boxed{x = 4 \pm 4\sqrt{6}}$

19) $a^2 - 20a + 59 = 8$

$a^2 - 20a + \underline{100} = -51 + \underline{100}$

$\sqrt{(x-10)^2} = \sqrt{49}$

$x - 10 = \pm 7$

$x = 10 \pm 7$

$\boxed{x = 3, 17}$

20) $b^2 - 4b - 53 = -4$

$b^2 - 4b + \underline{4} = 49 + \underline{4}$

$\left(\frac{-4}{2}\right)^2$ $\sqrt{(b-2)^2} = \sqrt{53}$

$\boxed{b = 2 \pm \sqrt{53}}$

8