Name:___________ Date:__________

8A; Algebra 1 Period______

Quadratics II Test Review

1) Solve by completing the square: $x^2 - 14x + 40 = 0$

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2) Solve using The Quadratic Formula: $8x^2 + 6x = -5$

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3) If $x^2 + 2x - 6 = -3$ the solutions are:

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4) Solve using the Quadratic Formula: $2v^2 - 5v + 3 = 0$

5) Find the value of c that will complete the square for this expression: $x^2 - \frac{1}{3}x$

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6) A) What is the value of the discriminant of the equation shown? $2x^2 - 7x - 9 = 0$

B) State the nature of the roots from part a.

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7) State the value of the discriminant of $4x^2 + 12x + 9 = 0$

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8) Use The Quadratic Formula to solve: $x^2 + 2x - 3 = 0$?

(a) $x = \pm 3$
(b) $x = 3$ and $x = -1$
(c) $x = -3$ and $x = 1$
(d) no real solution

9) Find the exact solutions of $(x + 3)^2 + 5 = 8$

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10) What values of a, b, and c should be substituted in the quadratic formula to solve: $6x^2 - 4x + 2 = 0$

(a) $a = 6, b = -4, c = -2$
(b) $a = 6, b = 4, c = -2$
(c) $a = 6, b = -4, c = 2$
(d) $a = 6, b = 4, c = 2$

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11) Use the Quadratic Formula to find the solution (s), round your answer to the nearest tenth:
$x^2 - 10x + 5 = 0$

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12) What is the nature of the roots of $6x^2 - 3x - 12 = 0$

(a) There are two imaginary (complex) roots
(b) There are 2 real roots
(c) There is 1 real root
(d) There is one imaginary (complex) root

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13) What is the nature of the roots of $y = x^2 - 3x + 7$

(a) There are two imaginary (complex) roots
(b) There are 2 real roots
(c) There is 1 real root
(d) There is one imaginary (complex) root

14) What is the nature of the roots of $p^2 + 2p + 1 = 0$

(a) There are two imaginary (complex) roots
(b) There are 2 real roots
(c) There is 1 real root
(d) There is one imaginary (complex) root

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15) Find the value that completes the square for: $a^2 + 16a$

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16) Find the value that completes the square for: $x^2 - 12x$

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17) Find the value that completes the square for: $y^2 + \frac{1}{8}y$

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18) Complete the square to find the solutions: $n^2 = 18n + 40$

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19) Complete the square to solve: $a^2 = -3 + 4a$

Name: Key

8A; Algebra 1

Date:____________

Period________

Quadratics II Test Review

1) Solve by completing the square: $x^2 - 14x + 40 = 0$

must be = constant

$-40 \; -40$

$x^2 - 14x = -40$

$x^2 - 14x + \left(\frac{b}{2}\right)^2 = -40 + \left(\frac{b}{2}\right)^2$

$x^2 - 14x + \left(\frac{-14}{2}\right)^2 = -40 + \left(\frac{14}{2}\right)^2$

$x^2 - 14x + 49 = -40 + 49$

$x^2 - 14x + 49 = 9$

$\sqrt{(x-7)^2} = \sqrt{9}$

$x - 7 = \pm 3$

$x - 7 = 3$	$x - 7 = -3$
$+7 \; +7$	$+7 \; +7$
$\boxed{x = 10}$	$\boxed{x = 4}$

$\{4, 10\}$

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2) Solve using The Quadratic Formula: $8x^2 + 6x = -5$

must be = 0

$+5 \; +5$

$8x^2 + 6x + 5 = 0$

$a = 8 \quad b = 6 \quad c = 5$

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

$x = \frac{-(6) \pm \sqrt{(6)^2 - 4(8)(5)}}{2(8)}$

$x = \frac{-6 \pm \sqrt{36 - 4(8)(5)}}{2(8)}$

$x = \frac{-6 \pm \sqrt{36 - 160}}{16}$

$x = \frac{-6 \pm \sqrt{-124}}{16}$ can't simplify

$x = \frac{-6 + \sqrt{-124}}{16}$	$x = \frac{-6 - \sqrt{-124}}{16}$

$\boxed{x = \frac{-6 \pm \sqrt{-124}}{16}}$

no real roots b/c it's imaginary

2 complex roots

---

3) If $x^2 + 2x - 6 = -3$ the solutions are:

CTS (must be = c)

$+6 \; +6$

$x^2 + 2x = 3$

$b = 2$

$x^2 + 2x + \left(\frac{b}{2}\right)^2 = 3 + \left(\frac{b}{2}\right)^2$

$x^2 + 2x + \left(\frac{2}{2}\right)^2 = 3 + \left(\frac{2}{2}\right)^2$

$x^2 + 2x + 1 = 3 + 1$

$x^2 + 2x + 1 = 4$

$\sqrt{(x+1)^2} = \sqrt{4}$

$x + 1 = \pm 2$

$x + 1 = 2$	$x + 1 = -2$
$-1 \; -1$	$-1 \; -1$
$\boxed{x = 1}$	$\boxed{x = -3}$

$\{-3, 1\}$

---

4) Solve using the Quadratic Formula: $2v^2 - 5v + 3 = 0$

must be = 0

Key: x = v

$a = 2 \quad b = -5 \quad c = 3$

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

$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(3)}}{2(2)}$

$x = \frac{5 \pm \sqrt{25 - 4(2)(3)}}{2(2)}$

$x = \frac{5 \pm \sqrt{25 - 24}}{4}$

$x = \frac{5 \pm \sqrt{1}}{4}$

$x = \frac{5 \pm 1}{4}$

2 real rational roots

$x = \frac{5+1}{4}$	$x = \frac{5-1}{4}$
$x = \frac{6}{4}$	$x = \frac{4}{4}$
$x = \frac{3}{2}$	$\boxed{x = 1}$
$\boxed{x = 1\frac{1}{2}}$	

$\{1, 1\frac{1}{2}\}$

5) Find the value of c that will complete the square for this expression: $x^2 - \frac{1}{3}x + C$

$x^2 - \frac{1}{3}x + \left(\frac{b}{2}\right)^2$ $b = -\frac{1}{3}$

$x^2 - \frac{1}{3}x + \left(\frac{-\frac{1}{3}}{2}\right)^2$ ← put into [Alpha] [y=]

$x^2 - \frac{1}{3}x + \frac{1}{36}$

$\boxed{C = \frac{1}{36}}$

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6) A) What is the value of the discriminant of the equation shown? $2x^2 - 7x - 9 = 0$

must BC=0

$a = 2$ $b = -7$ $c = -9$

$b^2 - 4ac$

$(-7)^2 - 4(2)(-9)$

$49 - 4(2)(-9)$

$49 + 72$

$\boxed{121}$ → perfect square

B) State the nature of the roots from part a.

$\boxed{\text{2 real rational roots/solutions}}$

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7) State the value of the discriminant of $4x^2 + 12x + 9 = 0$

must BC=0

$a = 4$ $b = 12$ $c = 9$

$b^2 - 4ac$

$(12)^2 - 4(4)(9)$

$144 - 4(4)(9)$

$144 - 144$

$\boxed{0}$ → perfect square

$\boxed{\text{1 real rational root/solution}}$

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8) Use The Quadratic Formula to solve: $x^2 + 2x - 3 = 0$?

(a) $x = \pm 3$
(b) $x = 3$ and $x = -1$
(c) $x = -3$ and $x = 1$
(d) no real solution

must BC=0

$a = 1$ $b = 2$ $c = -3$

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

$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(-3)}}{2(1)}$

$x = \frac{-2 \pm \sqrt{4 - 4(1)(-3)}}{2(1)}$

$x = \frac{-2 \pm \sqrt{4 + 12}}{2}$

$x = \frac{-2 \pm \sqrt{16}}{2}$

$x = \frac{-2 \pm 4}{2}$ → can reduce this to: $x = \frac{-1 \pm 2}{1}$ here if you would like

$x = \frac{-2 + 4}{2}$ | $x = \frac{-2 - 4}{2}$

$x = \frac{2}{2}$ | $x = \frac{-6}{2}$

$\boxed{x = 1}$ | $\boxed{x = -3}$

$\{-3, 1\}$

9) Find the exact solutions of $(x + 3)^2 + 5 = 8$

$-5 \quad -5$

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

$x + 3 = \pm\sqrt{3}$

$x+3 = \sqrt{3}$	$x+3 = -\sqrt{3}$
$-3 \quad -3$	$-3 \quad -3$
$\boxed{x = -3+\sqrt{3}}$	$\boxed{x = -3-\sqrt{3}}$

$\boxed{x = -3 \pm \sqrt{3}}$

---

10) What values of a, b, and c should be substituted in the quadratic formula to solve: $6x^2 - 4x + 2 = 0$

must Be $= 0$

$a=6 \quad b=-4 \quad c=2$

(a) a = 6, b = -4, c = -2
(b) a = 6, b = 4, c = -2
(c) a = 6, b = -4, c = 2
(d) a = 6, b = 4, c = 2

---

11) Use the Quadratic Formula to find the solution (s), round your answer to the nearest tenth:
$x^2 - 10x + 5 = 0$ must Be $= 0$

$a = 1 \quad b = -10 \quad c = 5$

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

$x = \frac{-(-10) \pm \sqrt{(-10)^2-4(1)(5)}}{2(1)}$

$x = \frac{10 \pm \sqrt{100-4(1)(5)}}{2(1)}$

$x = \frac{10 \pm \sqrt{100-20}}{2}$

$x = \frac{10 \pm \sqrt{80}}{2}$

$\sqrt{80}$

$\sqrt{16}\,\sqrt{5}$

$4\sqrt{5}$

$x = \frac{10 \pm 4\sqrt{5}}{2}$

can reduce since all 3 number reduce!

$x = \frac{10+4\sqrt{5}}{2}$	$x = \frac{10-4\sqrt{5}}{2}$
$x = \frac{5+2\sqrt{5}}{1}$	$x = \frac{5-2\sqrt{5}}{1}$

put into calc now

$\boxed{x \approx 9.5}$	$\boxed{x \approx 0.5}$

$\{0.5, 9.5\}$

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12) What is the nature of the roots of $6x^2 - 3x - 12 = 0$

→ aka: discriminant

must Be $= 0$

(a) There are two imaginary (complex) roots
(b) There are 2 real roots
(c) There is 1 real root
(d) There is one imaginary (complex) root

no such thing!

$a=6 \quad b=-3 \quad c=-12$

b^2-4ac

$(-3)^2-4(6)(-12)$

$9-4(6)(-12)$

$9+288$

$\boxed{297}$ → non perfect square

2 real irrational roots/solutions

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13) What is the nature of the roots of $y = x^2 - 3x + 7$

→ aka discriminant

must Be $= 0$ or $= y$

(a) There are two imaginary (complex) roots
(b) There are 2 real roots
(c) There is 1 real root
(d) There is one imaginary (complex) root

No such thing

$a=1 \quad b=-3 \quad c=7$

b^2-4ac

$(-3)^2-4(1)(7)$

$9-4(1)(7)$

$9-28$

$\boxed{-19}$

2 complex roots/imaginary/not Real

aka: discriminant

14) What is the nature of the roots of $p^2 + 2p + 1 = 0$

must BC = 0

(a) There are two imaginary (complex) roots
(b) There are 2 real roots
(c) There is 1 real root
(d) There is one imaginary (complex) root

no such thing

$a=1 \quad b=2 \quad c=1$

b^2-4ac

$(2)^2-4(1)(1)$

$4-4(1)(1)$

$4-4$

$\boxed{0}$ → perfect square

1 real rational root

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15) Find the value that completes the square for: $a^2 + 16a + C$

$b=16$

$a^2+16a+\left(\frac{b}{2}\right)^2$

$a^2+16a+\left(\frac{16}{2}\right)^2$

$a^2+16a+64$

$\boxed{C=64}$

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16) Find the value that completes the square for: $x^2 - 12x + C$

$b=-12$

$x^2-12x+\left(\frac{b}{2}\right)^2$

$x^2-12x+\left(\frac{-12}{2}\right)^2$

$x^2-12x+36$

$\boxed{C=36}$

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17) Find the value that completes the square for: $y^2 + \frac{1}{8}y + C$

$b=\frac{1}{8}$

$y^2+\frac{1}{8}y+\left(\frac{b}{2}\right)^2$ ← put in Alpha $\boxed{y=}$ to get

$y^2+\frac{1}{8}y+\left(\frac{\frac{1}{8}}{2}\right)^2$

$y^2+\frac{1}{8}y+\frac{1}{256}$

$\boxed{C=\frac{1}{256}}$

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18) Complete the square to find the solutions: $n^2 = 18n + 40$

must BC = constant

$b=-18$

$-18n \quad -18n$

$n^2-18n=40$

$n^2-18n+\left(\frac{b}{2}\right)^2=40+\left(\frac{b}{2}\right)^2$

$n^2-18n+\left(\frac{-18}{2}\right)^2=40+\left(\frac{-18}{2}\right)^2$

$n^2-18n+81=40+81$

$n^2-18n+81=121$

$\sqrt{(n-9)^2}=\sqrt{121}$

$n-9=\pm 11$

$n-9=11$
$+9 \quad +9$
$\boxed{n=20}$

$n-9=-11$
$+9 \quad +9$
$\boxed{n=-2}$

$\{-2, 20\}$

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19) Complete the square to solve: $a^2 = -3 + 4a$

must BC = constant

$b=-4$

$-4a \quad -4a$

$a^2-4a=-3$

$a^2-4a+\left(\frac{b}{2}\right)^2=-3+\left(\frac{b}{2}\right)^2$

$a^2-4a+\left(\frac{-4}{2}\right)^2=-3+\left(\frac{-4}{2}\right)^2$

$a^2-4a+4=-3+4$

$a^2-4a+4=1$

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

$a-2=\pm 1$

$a-2=1$
$+2 \quad +2$
$\boxed{a=3}$

$a-2=-1$
$+2 \quad +2$
$\boxed{a=1}$

$\{1, 3\}$