

Name: Key

Date: \_\_\_\_\_

1. The graph of the equation  $y = x^2 + 6x - 72$  crosses the x-axis at:

- a)  $x = 6$  and  $x = 12$     **b)  $x = 6$  and  $x = -12$**   
 c)  $x = -6$  and  $x = -12$     d) none of these

$0 = x^2 + 6x - 72$

~~$\begin{matrix} -72 & & \\ 12 & \times & -6 \\ & 6 & \end{matrix}$~~

	$x$	$12x$	
$x$	$x^2$	$12x$	
$-6$	$-6x$	$-72$	

$(x+12)(x-6) = 0$   
 $x+12=0 \Rightarrow x=-12$      $x-6=0 \Rightarrow x=6$

2. Solve:  $3x^2 + 6x = 10$

- a)  $\frac{-1 \pm \sqrt{39}}{3}$     b)  $\frac{-1 \pm \sqrt{19}}{3}$   
**c)  $\frac{-3 \pm \sqrt{39}}{3}$**     d) none of these

$3x^2 + 6x - 10 = 0$

$a=3$   
 $b=6$   
 $c=-10$

$x = \frac{-6 \pm \sqrt{(6)^2 - 4(3)(-10)}}{2(3)}$

$x = \frac{-6 \pm 2\sqrt{39}}{6}$      $\sqrt{36+120}$   
 $x = \frac{-3 \pm \sqrt{39}}{3}$      $= 2\sqrt{39}$      $\sqrt{156}$

\* 3. Solve:  $x^2 - 8x + 1 = 0$

- a) no real roots    b)  $x = -11, 19$   
 c)  $x = 4 \pm \sqrt{17}$     d)  $x = \pm\sqrt{15}$

~~$\begin{matrix} -8 & & \\ & \times & \\ 1 & & \end{matrix}$~~  not factorable  $\rightarrow$  try different method

$x^2 - 8x + 16 = -1 + 16$

$-\frac{8}{2} = -4$      $(-4)^2 = 16$

$(x-4)^2 = 15$

$x-4 = \pm\sqrt{15}$

$x = 4 \pm \sqrt{15}$

4. The roots of  $3x^2 - 2x - 1 = 0$  are

- a)  $-\frac{1}{3}, 1$**     b)  $-\frac{1}{3} \pm (\frac{4}{3})\sqrt{2}i$   
 c)  $-\frac{1}{3}, -1$     d)  $\frac{1}{3}, 1$

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

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

$x = \frac{2 \pm 4}{6}$      $\sqrt{4+12} = \sqrt{16} = 4$

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

5. The roots of  $x^2 + x + 1 = 0$  are

- a)  $\pm 1$     b)  $\frac{1}{2} \pm \frac{\sqrt{3}}{2}$   
 c) 1, 1    **d) none of these**

$a=1$   
 $b=1$   
 $c=1$

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

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

6. One root of the equation  $2x^2 - x - 15 = 0$  is

- a)  $\frac{5}{2}$     b)  $\frac{3}{2}$     **c) 3**    d)  $-3$

$a=2$   
 $b=-1$   
 $c=-15$

~~$\begin{matrix} -30 & & \\ -6 & \times & 5 \\ & -1 & \end{matrix}$~~

	$x-3$	
$2x$	$2x^2$	$-6x$
$+5$	$5x$	$-15$

$(x-3)(2x+5) = 0$   
 $x-3=0 \Rightarrow x=3$   
 $2x+5=0 \Rightarrow x=-\frac{5}{2}$

7. The larger root of the equation  $(x+4)(x-3) = 0$  is

- a) -4      b) -3      **c) 3**      d) 4

$$\begin{aligned} x+4 &= 0 \\ x &= -4 \end{aligned}$$

$$\begin{aligned} x-3 &= 0 \\ x &= 3 \end{aligned}$$

8. What is the solution set of the equation  $x^2 - 4x - 1 = 0$ ?

- a)  $\{2 \pm \sqrt{3}\}$       **b)  $\{2 \pm \sqrt{5}\}$**   
 c)  $\{4 \pm \sqrt{12}\}$       d)  $\{4 \pm \sqrt{5}\}$

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

$$\frac{-4}{2} = -2 \quad (-2)^2 = 4$$

$$(x-2)^2 = 5$$

$$x-2 = \pm\sqrt{5}$$

$$x = 2 \pm \sqrt{5}$$

9. If  $(x-3)^2 = 5$ , then  $x$  is equal to

- a)  $3 \pm \sqrt{5}$**       b)  $-3 \pm \sqrt{5}$   
 c)  $-\sqrt{5} \pm 3$       d)  $\frac{\pm\sqrt{5}}{3}$

$$\begin{aligned} x-3 &= \pm\sqrt{5} \\ +3 &+3 \\ \hline x &= 3 \pm \sqrt{5} \end{aligned}$$

10. The solution of the quadratic equation  $x^2 + 3x - 5 = 0$  is

- a)  $\frac{3 \pm \sqrt{11}}{2}$       b)  $\frac{-3 \pm \sqrt{11}}{2}$   
 c)  $\frac{3 \pm \sqrt{29}}{2}$       **d)  $\frac{-3 \pm \sqrt{29}}{2}$**

$$\begin{aligned} a &= 1 \\ b &= 3 \\ c &= -5 \end{aligned}$$

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(-5)}}{2(1)}$$

$$\sqrt{9 + 20} = \sqrt{29}$$

$$x = \frac{-3 \pm \sqrt{29}}{2}$$

11. The expression  $9x^2 + 6x + 1 = 0$  has how many real roots?

- a) 0      **b) 1**      c) 2  
 d) none of these

$$\begin{array}{c} 9 \\ 3 \times 3 \\ \hline 6 \end{array}$$

	$3x$	$1$
$3x$	$9x^2$	$3x$
$1$	$3x$	$1$

$$\begin{aligned} (3x+1)(3x+1) &= 0 \\ x &= -1/3 \end{aligned}$$

$$\begin{aligned} b^2 - 4ac &= \sqrt{(6)^2 - 4(9)(1)} \\ &= \sqrt{36 - 36} = \sqrt{0} = 1 \text{ real root} \end{aligned}$$

12. The solution set of the equation  $x^2 - 4x = 0$  is

- a)  $\{0, 4\}$**       b)  $\{4, -4\}$   
 c)  $\{-4\}$       d)  $\{4\}$

$$x(x-4) = 0$$

$$x = 0$$

$$x = 4$$

13. Jenny is solving the equation  $x^2 - 8x = 9$  by completing the square. What number should be added to both sides of the equation to complete the square?

- a) 2      b) 4      c) 8      **d) 16**

$$x^2 - 8x + \square = 9 + \square$$

$$-\frac{8}{2} = -4 \quad (-4)^2 = 16$$

14. Which step can be used when solving  $x^2 - 6x - 25 = 0$  by completing the square?

- a)  $x^2 - 6x + 9 = 25 + 9$**   
 b)  $x^2 - 6x - 9 = 25 - 9$   
 c)  $x^2 - 6x + 36 = 25 + 36$   
 d)  $x^2 - 6x - 36 = 25 - 36$

$$x^2 - 6x + \square = 25 + \square$$

15. The solution set of  $x^2 - 64 = 0$  is

- a) {8, -8}**      b) {-8}  
 c) {8}      d) {16, -4}

$$x^2 = 64$$

$$x = \pm 8$$

16. If  $3x^2 = 48$ , what is the value of  $x$ ?

- a)  $\pm 4$**       b)  $\pm 8$       c)  $\pm 16$       d) 0 or 4

$$x^2 = 16$$

$$x = \pm 4$$

17. The solution to the quadratic equation  $2x^2 + 5x - 1 = 0$  is

- a)  $\frac{5 \pm \sqrt{17}}{4}$       b)  $\frac{-5 \pm \sqrt{17}}{4}$   
 c)  $\frac{5 \pm \sqrt{33}}{4}$       **d)  $\frac{-5 \pm \sqrt{33}}{4}$**

$$a = 2$$

$$b = 5$$

$$c = -1$$

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

$$x = \frac{-5 \pm \sqrt{25 + 8}}{4}$$

$$x = \frac{-5 \pm \sqrt{33}}{4}$$

18. The solution set of  $x^2 - 36 = 0$  is

- a) {-6}      **b) {-6, 6}**  
 c) {9, -4}      d) {6}

$$x^2 = 36$$

$$x = \pm 6$$



19. What are the solutions of the equation below?

$$2n(3n - 12) = 0$$

- a) 0 and 4                      b) 0 and 12  
c) 2 and 4                      d) 2 and 12

$$\begin{aligned} 2n &= 0 & 3n - 12 &= 0 \\ n &= 0 & n &= \frac{12}{3} = 4 \end{aligned}$$

20. What is the solution set of the equation  $x^2 - 5x = 0$ ?

- a) {0, -5}                      b) {0, 5}  
c) {0}                              d) {5}

$$\begin{aligned} x(x - 5) &= 0 \\ x &= 0 & x &= 5 \end{aligned}$$

21. What is the solution set of the equation  $3x^2 = 48$ ?

- a) {-2, -8}                      b) {2, 8}  
c) {4, -4}                        d) {4, 4}

$$\begin{aligned} x^2 &= 16 \\ x &= \pm 4 \end{aligned}$$

22. Leanne correctly solved the equation  $x^2 + 4x = 6$  by completing the square. Which equation is part of her solution?

- a)  $(x + 2)^2 = 8$               b)  $(x + 2)^2 = 10$   
c)  $(x + 4)^2 = 10$               d)  $(x + 4)^2 = 22$

$$\begin{aligned} x^2 + 4x + \boxed{4} &= 6 + \boxed{4} \\ \frac{4}{2} = 2 & \quad 2^2 = 4 \\ (x + 2)^2 &= 10 \end{aligned}$$

23. The solution set of  $x^2 - 2x - 8 = 0$  is

- a) {4, -2}                        b) {-4, 2}  
c) {-2, 8}                        d) {6, 2}

$$\begin{aligned} &\begin{array}{c} -8 \\ -4 \quad \times \quad 2 \\ -2 \end{array} & (x - 4)(x + 2) \\ & & x = 4 \quad x = -2 \end{aligned}$$

24. What is the solution set for  $(x - 2)^2 = 64$ ?

- a) {-6}                              b) {10}  
c) {-6, 10}                        d) {6, -10}

$$\begin{aligned} x - 2 &= 8 & x - 2 &= -8 \\ \frac{x - 2}{+2} &= \frac{8}{+2} & \frac{x - 2}{+2} &= \frac{-8}{+2} \\ x &= 10 & x &= -6 \end{aligned}$$

25. The quadratic equation  $x^2 + x + 3 = 0$  has:

- a) two distinct real roots  
b) no real root  
c) equal roots  
d) none of these

$$\begin{aligned} (1)^2 - 4(1)(3) & \\ | -12 & \\ -11 & \end{aligned}$$