

Algebra 2 TEST 3.1 Review

Name _____ Per _____

Given $g(x) = -x^2 + 2x + 8$, find each of the following...

Graph: show at least 3 points	1(a). the vertex $-(-1)^2 + 2(-1) + 8$ $-1+2 = 1+8 = 9$ $(-1, 9)$	1(b). Is the vertex a maximum or minimum? What is the maximum or minimum value? 9
	1(c). the axis of symmetry (equation) $\frac{-b}{2a} = \frac{-2}{2(-1)} = \frac{2}{2}$ $x = 1$	1(d). the roots $-1(x^2 - 2x - 8) = 0$ $(x-4)(x+2) = 0$ $x = -2 \text{ or } 4$
	1(e). the y-intercept $(0, 8)$	1(f) Domain: \mathbb{R} Range: $y \leq 9$

Factor Each:

2. $5x^3 - 15x^2$ $5x^2(x-3)$	3. $6x^2 - 18x + 4$ $2(3x^2 - 9x + 2)$	4. $x^2 - 25$ $(x+5)(x-5)$	5. $36x^2 - 49y^2$ $(6x+7y)(6x-7y)$
6. $8x^3 - 50x$ $2x(4x^2 - 25)$	7. $x^2 + 4x - 12$ $(x+6)(x-2)$	8. $x^2 - 13x + 40$ $(x-5)(x-8)$	9. Hint: GCF 1 st $2x^2 - 4x - 96$ $2(x^2 - 2x - 48)$ $2(x-8)(x+6)$
10. $2x^2 + x - 21$ $(7x+2)(x-3)$	11. $6x^2 - 17x + 5$ $(3x-1)(2x-5)$		
Find the zeroes (roots) by factoring.			

12. $x^2 - 2x - 15 = 0$ $(x-5)(x+3)$ $x = 5 \quad x = -3$	13. $x^2 = 8x$ $x^2 - 8x = 0$ $x(x-8) = 0$ $x = 0 \quad x = 8$	14. $x^2 - 7x + 12 = 0$ $(x-3)(x-4) = 0$ $x = 3 \text{ or } x = 4$
15. $3x^2 = 8x - 5$ $3x^2 - 8x + 5 = 0$ $3 \cdot 5 = 15$ $-3 \quad -5$ $3 \quad 5$ -8 $-1 \quad -5$ $(x-1)(3x-5) = 0$ $x = 1 \quad x = \frac{5}{3}$	16. $4x^2 = 4x + 15$ $4x^2 - 4x - 15 = 0$ $4 \cdot -15 = -60$ $-10 \quad +6$ $4 \quad 4$ -5 $\frac{3}{2}$ $(2x-5)(2x+3) = 0$ $x = \frac{5}{2} \text{ or } x = -\frac{3}{2}$	

Complete the SQUARE trinomial and factor.

17. $x^2 - 20x + \underline{100}$
 $(x - 10)^2$

18. $x^2 + 40x + \underline{400}$
 $(x + 20)^2$

Solve by completing the square:

19. $x^2 - 12x + 33 = 0$
 $x^2 - 12x = -33 + 36$
 $\sqrt{(x-6)^2} = \sqrt{3}$
 $x - 6 = \pm\sqrt{3}$
 $x = 6 \pm \sqrt{3}$

20. $\frac{x^2 - 16x}{2} = -40 + 64$
 $\sqrt{(x-8)^2} = \sqrt{24}$
 $x - 8 = \pm\sqrt{24}$
 $x = 8 \pm \sqrt{24}$

Quadratic Formula

21. State the Quadratic Formula

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

22. State the discriminant

$b^2 - 4ac$

Standard form. Put in standard form and state a, b, and c

23. $x^2 - 3x = 5$ a= 1 b= -3 c= -5
 $x^2 - 3x - 5$

24. $3x^2 - 7 = -5x$ a= 3 b= 5 c= -7
 $3x^2 + 5x - 7$

25. $3x - 4x^2 = 0$ a= -4 b= 3 c= 0
 $-4x^2 + 3x = 0$

26. $x^2 - 6x = -9$ a= 1 b= -6 c= 9
 $x^2 - 6x + 9 = 0$

Solve by using the quadratic formula. SHOW ALL WORK.

27. $x^2 + 7x + 15 = 0$

$x = \frac{-7 \pm \sqrt{7^2 - 4 \cdot 1 \cdot 15}}{2 \cdot 1} = \frac{-7 \pm \sqrt{11}}{2}$

28. $2x^2 - 5x = -3$

$2x^2 - 5x + 3 = 0$

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

$x = \frac{5 \pm 1}{4} = \frac{4}{4} \text{ or } \frac{6}{4}$

State the discriminant. Then state how many roots there are: 1 real, 2 real, or 2 complex.

29. $x^2 - 6x = -7$ $x^2 - 6x + 7 = 0$
 $6^2 - 4 \cdot 1 \cdot 7$
 $36 - 28 = \boxed{8}$
 2 Real

30. $x^2 - 6x + 9 = 0$

$6^2 - 4 \cdot 1 \cdot 9$

$36 - 36 = 0$

1 Real

31. $x^2 = 6x - 11$

$x^2 - 6x + 11 = 0$

$6^2 - 4 \cdot 1 \cdot 11$

$36 - 44 = -8$ 2 complex

State how many times the parabola will cross the x-axis by the description of the discriminant.

32. the discriminant is < 0

 none 1U

33. the discriminant is > 0

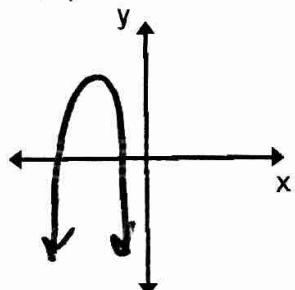
 2 times 1U

34. the discriminant = 0

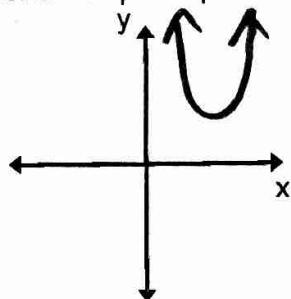
 1 time 1U

Sketch a graph of a quadratic with the given information.

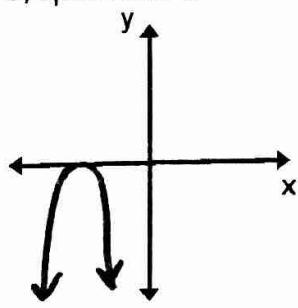
35. $D=25$, opens downward



36. $D=-5$ opens upward



37. $D=0$, opens downward



Algebra 2 TEST 3.1 Review ANSWERS

- 1 a. $(1, 9)$ b. max 9 c. $x=1$ d. $x=-2, 4$ e. $(0, 8)$ or 8 f. D: \mathbb{R} ; R: $(-\infty, 9]$

2. $5x^2(x-3)$	3. $2(x^2 - 9x + 2)$	4. $(x+5)(x-5)$	5. $(6x+7y)(6x-7y)$	6. $2x(2x-5)(2x+5)$
7. $(x-2)(x+6)$	8. $(x-8)(x-5)$	9. $2(x+6)(x-8)$	10. $(x+3)(x-7)$	11. $(3x-1)(2x-5)$
12. $(2x+7)(2x+7)$	13. $(x-8)(x-8)$	14. $x = -3, 5$	15. $x = 0, 8$	16. $x = 3, 4$