Spring 2014

Geometry CC Midterm Exam REVIEW

Name: KEY

Simplify each of the following:

1. $\sqrt{-16}$

$\boxed{4i}$

2. $3\sqrt{-20}$

$\boxed{6i\sqrt{5}}$

3. $5i^7$

$5i \cdot i^6 \rightarrow (i^2)^3 = (-1)^3 = -1$

$5i(-1) = \boxed{-5i}$

4. $(2-8i)+(3+5i)$

$\boxed{5-3i}$

5. $(2i-3)-(2+6i)$

$2i-3-2-6i$

$\boxed{-5-4i}$

6. $(3i+7)-(6-5i)$

$3i+7-6+5i$

$\boxed{1+8i}$

7. $3i(4-5i)$

$12i-15i^2+15$

$\boxed{15+12i}$

8. $(3-i)(2+4i)$ FOIL

$6+12i-2i-4i^2+4$

$\boxed{10+10i}$

9. $(3+2i)^2 = (3+2i)(3+2i)$ FOIL

$9+6i+6i+4i^2-4$

$\boxed{5+12i}$

10. $\frac{3i}{-4-6i} \cdot \frac{-4+6i}{-4+6i}$

$= \frac{-12i+18i^2-18}{16-24i+24i-36i^2+36}$

$= \frac{-18-12i}{52} = \boxed{-\frac{9}{26}-\frac{3}{13}i}$

11. $\frac{5-7i}{2i} \cdot \frac{-2i}{-2i}$

$= \frac{-10i+14i^2}{-4i^2+4}$ -14

$= \frac{-14-10i}{4} = \boxed{\frac{-7-5i}{2}}$

12. $\frac{2-i}{3+2i} \cdot \frac{3-2i}{3-2i}$

$= \frac{6-4i-3i+2i^2-2}{9-6i+6i-4i^2+4}$

$= \boxed{\frac{4-7i}{13}}$

13. What is "standard form" of a complex number? Given an example.

$a+bi$

real, imaginary

Ex: $-10+7i$ or $4-3i$ } Real 1st, Imaginary 2nd

14. Explain and give examples of how to find the conjugate of a complex number.

To find the conjugate you ONLY change the imaginary part!

Ex: $9-2i \rightarrow 9+2i$

$-7+4i \rightarrow -7-4i$

Factor each of the following:

15. $x^2 - 6x + 5$ (add, mult.)

$(x-5)(x-1)$

16. $x^2 + 10x + 21$ (add, mult.)

$(x+7)(x+3)$

17. $2x^2 - 6x - 20$

$2(x^2 - 3x - 10)$ (add, mult.)

$2(x-5)(x+2)$

18. $x^2 - 49$

Difference of Two Squares

$(x+7)(x-7)$

19. $x^2 - 6x + 5$ (add, mult.)

$(x-5)(x-1)$

20. $2x^2 - 13x - 7$ (add, -14, mult.)

$2x^2 + x - 14x - 7$

$x(2x+1) - 7(2x+1)$

$(2x+1)(x-7)$

21. $3x^2 + 13x - 10$ (add, -30, mult.)

$3x^2 + 15x - 2x - 10$

$3x(x+5) - 2(x+5)$

$(x+5)(3x-2)$

22. $5x^2 + 15x$

$5x(x+3)$

23. $3x^2 + 11x - 4$ (add, -12, mult.)

$3x^2 + 12x - x - 4$

$3x(x+4) - 1(x+4)$

$(x+4)(3x-1)$

24. Given a quadratic function, like $f(x) = 3x^2 - 6x + 1$, describe how to know:

(a) whether it opens up or down (give examples)

look at the coefficient of x^2 → Ex: $3x^2 - 6x + 1$

positive; opens up

(b) whether it has a maximum or minimum value at the vertex:

opens up: minimum (min)

opens down: maximum (max)

(c) how to find the actual "maximum value" or "minimum value"

*Find the vertex: $x = \frac{-b}{2a}$

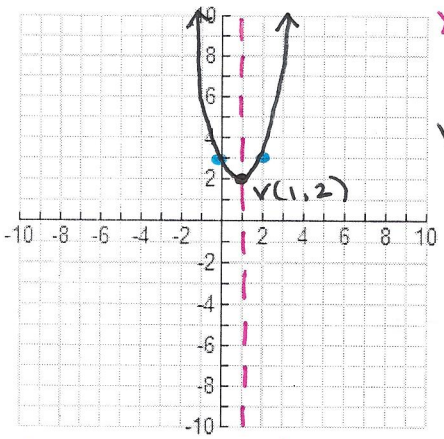
$V(\quad , \quad)$

min or max

*plug in x to get y.

Graph each of the following. Use a table to find the zeros:

25. $f(x) = x^2 - 2x + 3$ y-int.

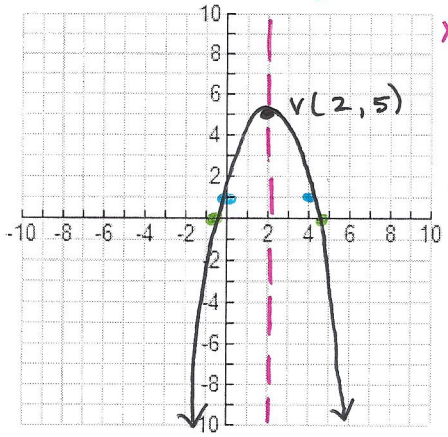


$x = \frac{-b}{2a} = \frac{-(-2)}{2(1)} = 1$

V(1 , 2)

*NO zeros! (doesn't cross the x-axis!)

26. $f(x) = -x^2 + 4x + 1$ y-int.



$x = \frac{-b}{2a} = \frac{-(4)}{2(-1)} = 2$

V(2 , 5)

Zeros: (4.2, 0)
(-.2, 0)

Match the four graphs to the functions they depict: Draw the AOS on all graphs below.

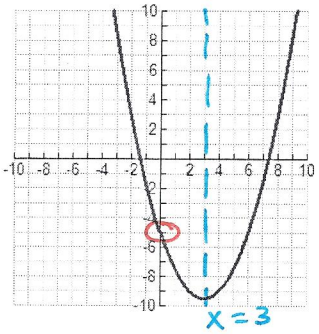
27. $y = -2x^2 + 7x$ +0

28. $y = -\frac{1}{3}x^2 + x + 5$

29. $y = \frac{1}{2}x^2 + 4x - 5$

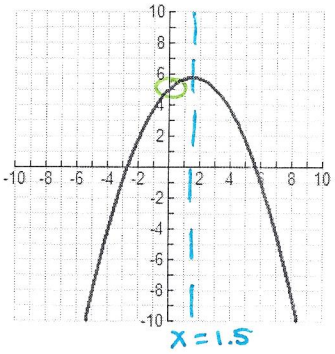
30. $y = 2x^2 - 5x + 2$

#29



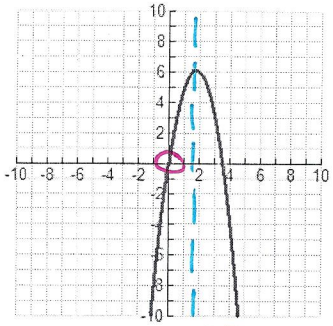
x = 3

#28



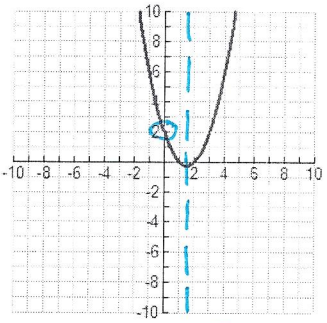
x = 1.5

#27



x = 1.5

#30



x = 1.5

Find the vertex and axis of symmetry (AOS) for each of the following:

32. $y = -3x^2 - 24x + 2$

$x = \frac{-b}{2a} = \frac{-(-24)}{2(-3)} = -4$

V(-4 , 50)

AOS: x = -4

33. $y = 2x^2 - 4x + 5$

$x = \frac{-b}{2a} = \frac{-(-4)}{2(2)} = 1$

V(1 , 3)

AOS: x =

34. $y = 2(x - 7)^2 - 3$

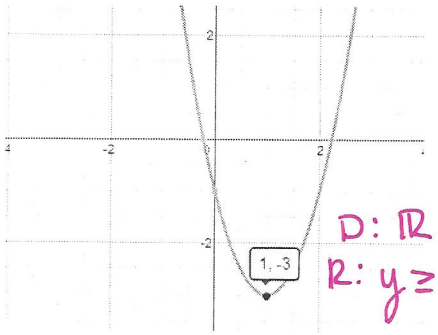
opp keep

V(7 , -3)

AOS: x = 7

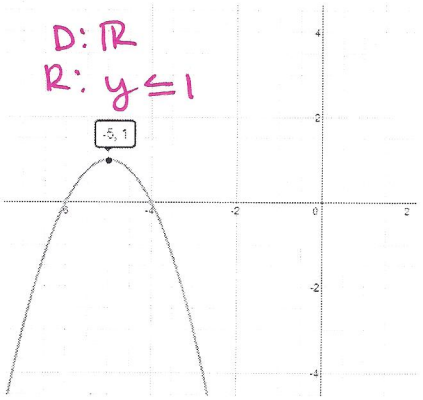
State the domain and range of each of the graphs below:

35.



D: ℝ
R: $y \geq -3$

36.



D: ℝ
R: $y \leq 1$

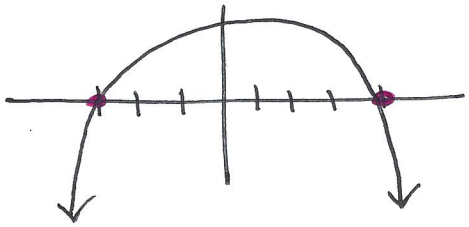
37. Describe the transformations from the parent function for $g(x) = -2(x-1)^2 + 4$.

reflection x-axis, V.S. by 2, H.T. right 1, V.T. up 4

38. Write the equation for a quadratic function created by reflecting the parent function across the x-axis, vertically shrinking it by a factor of ½, and horizontally shifting it to the right 2 units.

$y = -\frac{1}{2}(x-2)^2$

40. Sketch the graph of a quadratic function with zeros @ -3 and 4 which opens downward.



Simplify each of the following:

41. $(3x^2y^3)^2$

$3^2x^4y^6$

$9x^4y^6$

42. $3x^2y * 2x^{-3}$

$6x^{-1}y$

$\frac{6y}{x}$

43. $\frac{6x^5}{-2x^2}$

$-3x^3$

power

44. Write $x^{5/2}$ in radical form.

root

$\sqrt[2]{x^5}$

root power

45. Write $(\sqrt[3]{m})^4$ with a fractional radical.

$m^{4/3}$