

Algebra II - Semester I Review:

Name: Key

Review Chapter 1, Chapter 4, Polynomials, Chapter 9, and Chapter 6

Chapter 4 - Quadratic Functions & Factoring

1. Solve $x^2 - 9x + 8 = 0$

$$x = 8, 1$$

2. Solve $x^2 = 100$

$$x = \pm 10$$

3. Solve $2(x - 5)^2 = 128$

$$x = 13, -3$$

4. Solve $3x^2 - 48 = 0$

$$x = \pm 4$$

5. Factor $81x^2 - 36$

$$9(3x+2)(3x-2)$$

6. Factor $2x^3 - 10x^2 + 12x$

$$2x(x^2 - 5x + 6)$$
$$\boxed{2x(x-3)(x-2)}$$

(7-9) Write the expression as a complex number in standard form.

7. $-5i(8 + 7i)$

$$35 - 40i$$

8. $(2 - 12i) + (8 + 9i)$

$$10 - 3i$$

9. $(3 + i)(10 + 7i)$

$$23 + 31i$$

10. In the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, $b^2 - 4ac$ is called the discriminant

remember: $\left\{ \begin{array}{l} \text{pos} \rightarrow 2 \text{ real solutions} \\ \text{neg} \rightarrow 2 \text{ imaginary solutions} \\ \text{zero} \rightarrow 1 \text{ real solution} \end{array} \right.$

11. What are all solutions of $x^2 + 8x - 4 = 0$?

$$x = -4 \pm 2\sqrt{5}$$

12. Graph the function.

- What form is the equation in?
- Identify the Vertex
- Make a Table
- Write an equation for the axis of symmetry.

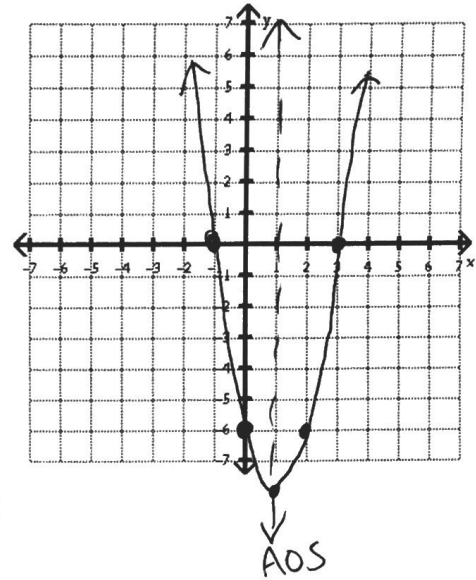
$$y = 2(x - 3)(x + 1)$$

a.) intercept form

b.) $\frac{p+q}{2}$ $x = \frac{3+(-1)}{2} \Rightarrow x = 1$ (1, -8)
 $y = 2(1-3)(1+1)$ $y = -8$

c.)

d.) $x = 1$



x	-1	0	1	2	3
y	0	-6	-8	-6	0

Polynomials & Polynomial Functions

13. Simplify $\frac{4x^{-5}y^8}{16x^4y^{-5}}$

$$\frac{y^{13}}{4x^9}$$

14. Simplify $\left(\frac{x^4}{y^{-4}}\right)^{-3}$

$$\frac{1}{x^{12}y^{12}}$$

15. Perform the indicated operation.

$$(3x^3 + 7x^2 - 2x) - (2x^3 + 6x^2 - 1)$$

$$x^3 + x^2 - 2x + 1$$

16. Perform the indicated operation.

$$(2x - 1)^3$$

$$8x^3 - 12x^2 + 6x - 1$$

17. Given polynomial $f(x)$ and a factor of $f(x)$, factor $f(x)$ completely. $f(x) = x^3 + 6x^2 + 5x - 12$; $x - 1$

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

18. Simplify $\frac{x^8 y^5}{x^5 y^{-5}}$

$$x^3 y^{10}$$

19. Find all real zeros of the function $x^3 + 9x^2 + 6x - 56$.

hint: use graph on calc to find first zero
 $x = -7, -4, 2$

20. How many turning points does the function $y = 7x^3 + 3x^2 - 1$ have?

2

21. Simplify the expression $(-7a^2 b^5 c^3)^4$

$$2401 a^8 b^{20} c^{12}$$

22. Use synthetic division to evaluate $f(k) = 2k^3 + 5k^2 - 3k + 4$ divided by $(k+2)$

~~XXXXXXXXXX~~

$$\begin{array}{r|rrrr} -2 & 2 & 5 & -3 & 4 \\ & \downarrow & -4 & -2 & 10 \\ \hline & 2 & 1 & -5 & 14 \end{array}$$

$$\boxed{2x^2 + x - 5 + \frac{14}{k+2}}$$

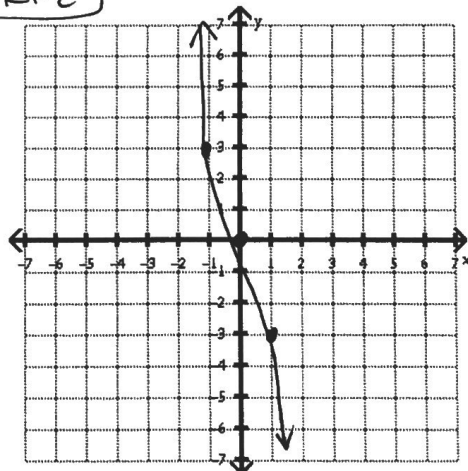
23. Graph the following function: $f(x) = -x^3 - 2x$

odd/neg.

end behavior:

as $x \rightarrow \infty$, $f(x) \rightarrow \infty$

as $x \rightarrow -\infty$, $f(x) \rightarrow +\infty$



24. Write the polynomial function that has the zeros 2, -2, and 1, that has a leading coefficient of 1.

$$f(x) = x^3 - x^2 - 4x + 4$$

Chapter 6 - Rational Exponents & Radical Functions

(25-34), evaluate/simplify.

25. $16^{3/2}$

64

26. $(\sqrt[3]{8})^{-2}$

$\frac{1}{4}$

27. $\frac{1}{64^{-2/3}}$

16

28. $(5^{1/2} \cdot 7^{1/4})^4$

$5 \cdot 7^{3/4}$

29. $\frac{6xy^{3/4}}{3x^{1/2}y^{1/2}}$

$2x^{1/2}y^{1/4}$

30. $\sqrt[4]{256}$

$2 \cdot (\sqrt[4]{4}) \rightarrow \left(\frac{2^2}{2^3}\right)^{1/4}$
 $2 \cdot \sqrt[3]{2}$

31. $\sqrt[4]{12x^2y^6z^{12}}$

$y z^3 \cdot \sqrt[4]{12x^2y^2}$

32. $-7\sqrt[3]{y} + 16\sqrt[3]{y}$

$9 \cdot \sqrt[3]{y}$

33. $\sqrt{75} + \sqrt{108}$

$11\sqrt{3}$

34. $\frac{2}{(3+\sqrt{5})} \cdot \frac{(3-\sqrt{5})}{(3-\sqrt{5})}$

$\frac{6-2\sqrt{5}}{9-5}$

$\frac{6-2\sqrt{5}}{4} = \boxed{\frac{3-\sqrt{5}}{2}}$

(35-38), let $f(x) = 2x + 12$ and $g(x) = x^2 - 1$. Perform the indicated operation.

35. $f(x) + g(x)$

$x^2 + 2x + 11$
 \mathbb{R}

36. $f(x) \cdot g(x)$

$2x^3 + 12x^2 - 2x - 12$
 \mathbb{R}

37. $f(g(x))$

$2x^2 + 10$
 \mathbb{R}

38. $g(g(-1))$

$\boxed{-1}$

(39-42), solve the equation.

39. $\sqrt{3x+10} = 8$

$x = 18$

40. $3(16x)^{1/3} - 7 = 17$

$x = 32$

41. $-4\sqrt[3]{x+10}+3=15$

$x = -37$

42. $x = \sqrt{4x-3}$

$x = 3, 1$

43. Graph the following functions:

a. $f(x) = \sqrt{x-1} + 3$

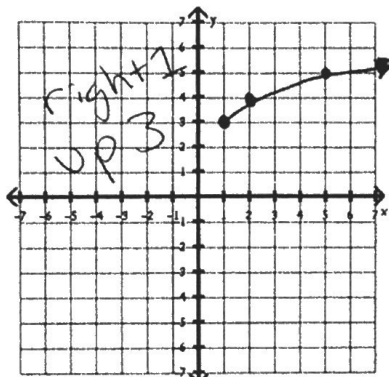
b. $f(x) = \sqrt[3]{x+3} - 2$

(h, k)

$(1, 3)$

D: $x \geq 1$

R: $y \geq 3$



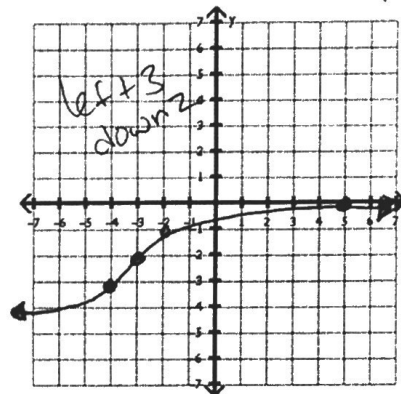
x	y
1	3
2	4
5	5
10	6

$f(x) = \sqrt{x}$

x	0	1	4	9
y	0	1	2	3

← add 2
← add 3

D: \mathbb{R}
R: \mathbb{R}



x	y
-11	-4
-4	-3
-3	-2
-2	-1
5	0

$f(x) = \sqrt[3]{x}$

x	-8	-1	0	1	8
y	-2	-1	0	1	2

sub 3
sub 2

Chapter 9 - Conics: Circles and Parabolas

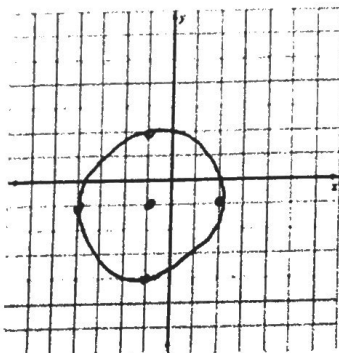
(44-47) Classify the conic section and write its equation in standard form. Then graph the equation and label key characteristics of the graph.

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

$(x+1)^2 + (y+1)^2 = 9$

$(-1, -1) \quad r=3$

circle

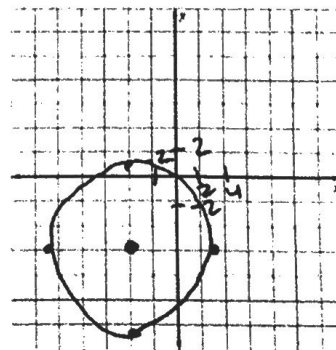


45. $x^2 + y^2 + 8x + 12y + 3 = 0$

$(x+4)^2 + (y+6)^2 = 49$

$(-4, -6) \quad r=7$

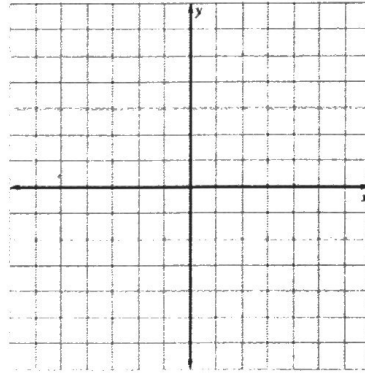
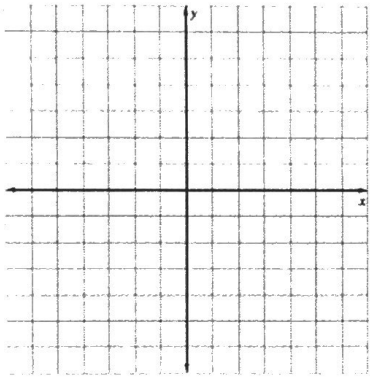
circle



46. $y^2 + 8y + 4x = 0$

47. $x^2 - 6x - 4y + 17 = 0$

Skip
46 & 47



48. Write the equation of a parabola with directrix $x=4$ and vertex $(0,0)$

49. Write the equation of a circle with center $(-3, 5)$ and radius 5.

$$y^2 = -16x$$

$$(x+3)^2 + (y-5)^2 = 25$$

(50-51), solve the system using substitution or elimination.

50. $x^2 + y^2 - 13 = 0$
 $y - x^2 + 1 = 0$

51. $y^2 = -2x$
 $y = x + 4$

$$(\pm 2, 3)$$

$$(-2, 2) + (-8, -4)$$

52. This is not your only study tool! Go through past study guides of each chapter. You can find copies of each study guide at msklug.weebly.com under "Alg 2 Exam 1 Prep". Happy Studying! ☺