Review for Fall Final

1. A baseball is hit at a point 3 feet above the ground at a velocity of 100 feet per second and at an angle of 45° with respect to the ground. The path of the baseball is given by the function f(x) = $\frac{-1}{100}x^2 + x + 3$, where f(x) is the height of the baseball (in feet) and x is the horizontal distance from home plate (in feet).

A. What is the initial height of the ball when the bat hits it?

B. What is the maximum height of the ball?

C. If the outfield wall is 390 feet away from the batter, will it clear the outfield wall?

2. Due to strong evaporation from hot summer temperatures, the water level in Lake Mead is going down. If the level drops 2 feet per month for the first 2 months of summer, then drops 3.5 feet per month for the next three months write a piecewise function that models the depth of the lake each month. The initial depth of Lake Mead was 532 feet.

3. Perform the operation and simplify:

A. $\left(x^2+4\right)-\left[3x-\left(5-x^2\right)\right]$

B. $(2x-6)^2$

C. $8y-\left[2y^2-(3y-8)\right]$

D. $\left(\sqrt{5}-3\right)^2$

4. Is the expression a polynomial? If so, write the polynomial in standard form and find the degree and leading coefficient.

A. $3x^3-5x^5+x-4$

B. $12x-\frac{7}{x^2}+6$

5. Factor each completely.

A. $f(x)=9x^4-64x^2$

B. $f(x)=x^3+2x^2-5x-10$

C. $f(x)=2x^2-x-15$

D. $f(x)=3x^5-15x^3+12x$

6. Solve each for x.

A. $x^2=x+30$

B. $2x^2=-23x-11$

C. $4(x+3)-3=2(4-3x)-4$

D. $\frac{1}{2}(x-3)-2(x+1)=5$

E. $(x+4)^2=20$

F. $16x^2=49$

G. $\sqrt{x-2}-11=0$

H. $(x+2)^{\frac{3}{4}}=64$

7. Solve by completing the square

A. $2x^2+8x-7=0$

B. $x^2+8x+10=0$

8. Solve each for x.

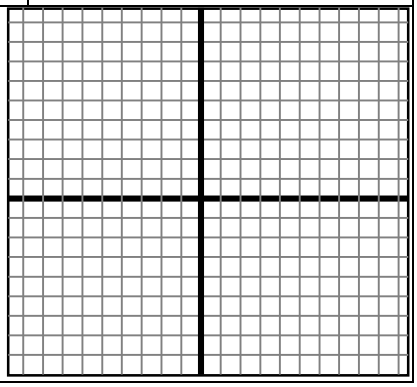
A. $\frac{1}{x-3}-\frac{2}{x+3}=\frac{2x}{x^2-9}$

B. $\sqrt{x-1}+3=x$

C. $|7x-5|=51$

9. Complete the table. Use the resulting solution points to sketch the graph of the equation. $y=x^2+2x-1$

x	–3	$\frac{-3}{2}$	–1	1	$\frac{3}{2}$
y					



10. Find the x and y- intercepts

A. $y = 4 - \frac{3}{4}x$

B. $y = x^3 + x^2 - 9x - 9$

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

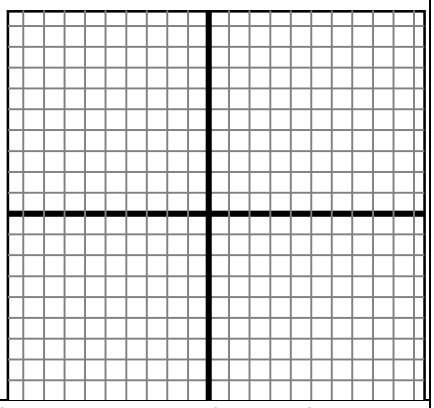
11. Find the center and radius of the circle

$(x+2)^2 + (y-4)^2 = 36$

Center: _____

Radius: _____

12. Graph the circle in #11.



13. Find the standard form of the equation of the circle that has the given endpoints of a diameter:
(–5, 3), (11, 11)

14. Find the equation of the line through (–24, 15) which is perpendicular to the line
$3x + 7y - 2 = 0$

15. Find the domain of each function.

A. $f(x) = \frac{3}{x-7}$

B. $g(x) = \sqrt{x+4}$

C. $h(x) = 3 - 2x^2$

16. Evaluate the functions at each specified value of the independent variable and simplify.
$h(x) = 3 - 2x^2$

A. $h(-5) =$

B. $h\left(\frac{3}{8}\right) =$

C. $h(x-4) =$

17. Find the zeros
$f(x) = x^3 + 4x^2 - 12x$

18. Write the linear function that has the indicated function values.
f(3) = 9 and f(–1) = –19

19. Identify the transformation of the graph.

A. $f(x) = x^2 - 5$

B. $f(x) = \sqrt{x-5}$

C. $f(x) = |x-3| - 2$

D. $f(x) = -(x+1)^2 + 2$

E. $f(x) = -\sqrt{x+2} + 11$

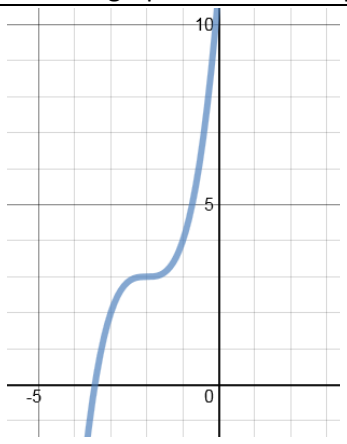
F. $f(x) = (-x-3)^3 - 8$

G. $f(x) = (-x+2)^2 + 1$

H. $f(x) = -\sqrt{-x-4} + 3$

20. Use the graph to write an equation for each function shown.

A



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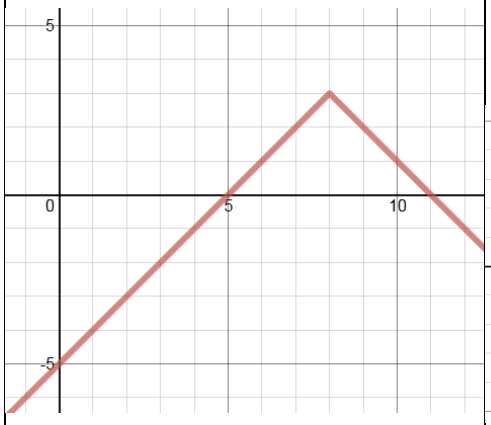

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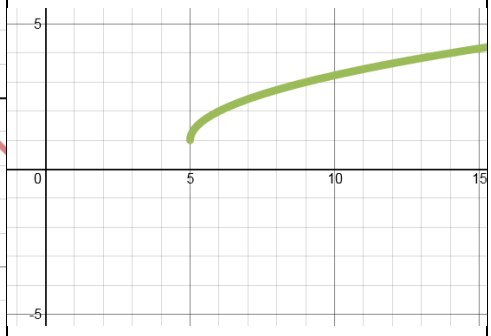


Use the following functions for #21-26.

$f(x)=6-2x$ $j(x)=x^2-3$ $g(x)=4x-12$ $h(x)=\sqrt{x-4}$

21. Combinations of functions.

A. Find $f(x)+g(x)$.	B. Find $f(x)-g(x)$.	C. Find $f(x)*g(x)$.	D. Find $f(x)/g(x)$. What is the domain?

22. Composition of functions.

A. Find $(f\circ g)(x)=$ What is the domain?	B. Find $(j\circ h)(x)=$ What is the domain?	C. Find $(g\circ g)(x)=$ What is the domain?

23. Evaluate the indicated function.

A. (f +g)(–3)	B. (f – g)(2)	C. (fg)(–4)	D. $\left(\frac{h}{j}\right)(20)=$

24. Find each inverse algebraically

A. $f^{-1}(x)=$	B. $h^{-1}(x)=$	C. What is the domain of h(x)?

25. For what x values does f(x) = j(x)?

26. For what values does f(x) = g(x)?

27. Find the x-intercepts.

$f(x)=\frac{3}{5}(x+3)^2-60$

28. Find the quadratic function that has the indicated vertex and whose graph passes through the given point.

Vertex: (6, –1); Point: (–2, 4)

29. What is the end behavior of each polynomial?

A. $f(x)=x^3-x^5+6x^2$	B. $f(x)=-\frac{2}{5}x^7+x^4-x^2+2$	C. $f(x)=-5(x+3)^2(x-5)(x)(x+1)^3$

30. Use synthetic or long division to divide the polynomials, then state whether the divisor is a factor of the polynomial.

A. $(10x^3+27x^2+14x+5)\div(x^2+2x)$	B. $(3x^2-10x)\div(x-6)$

C. $(x^4-6x^3-40x+33)\div(x-7)$	D. $(x^2+3)\div(x+3)$

31. Show that (x – 2) and (x + 3) are factors of $f(x)=2x^4+7x^3-4x^2-27x-18$

32. Find the remaining factors in #31 and sketch a graph of the polynomial.

33. Find the domain of the function. $f(x)=\dfrac{x^2+3x-18}{2x^3-10x^2+12x}$

34. Use the quadratic formula to solve the quadratic equation and state what the solution means about the graph

A. $-x^2+2x-5=0$

B. $3x^2+4x-8=0$

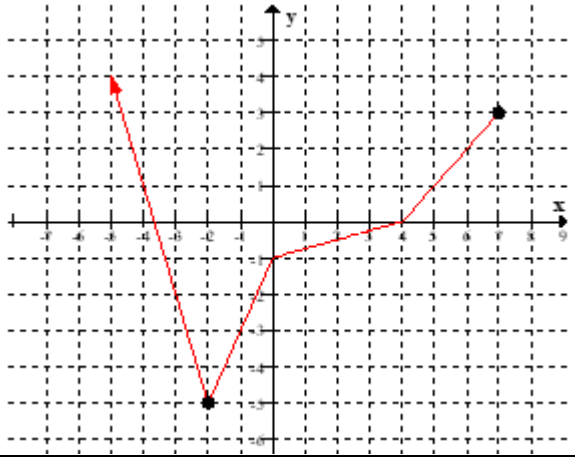
35. Sketch a graph with the given zeros and multiplicities

A. Lead Coefficient: negative
x = –3 with multiplicity 2
x = –1 with multiplicity 3
x = 1 with multiplicity 1

B. Lead Coefficient: positive
x = –4 with multiplicity 1
x = 3 with multiplicity 1
x = 1 with multiplicity 2

36. Give the domain and range of the following functions. Indicate the intervals on which each function is increasing, decreasing or constant.

A.



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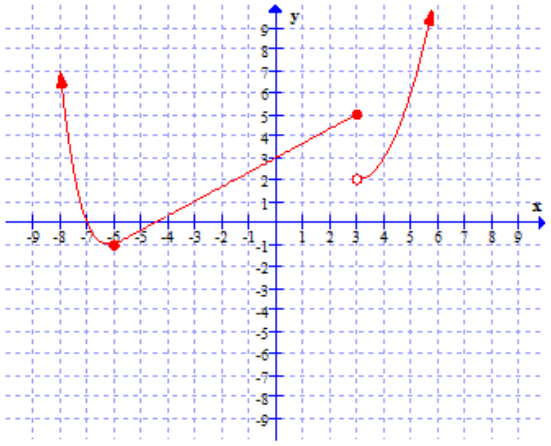
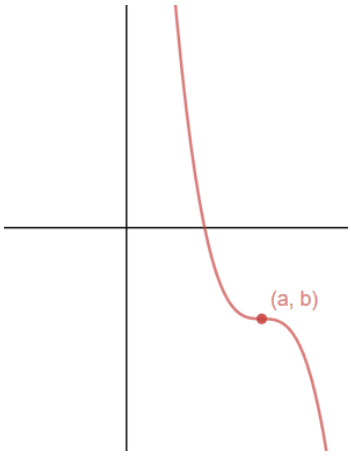
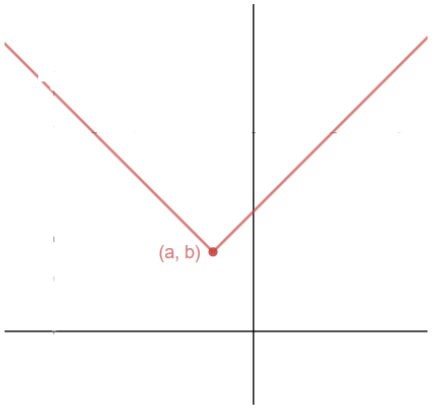


37. Write the equation of the graph.



38. Write the equation of the graph.



39. Use completing the square to write the function in standard form for a parabola.

$f(x)=3x^2+12x-5$

40. Find the slope-intercept form of the equation of the line passing through the points.

$f(10)=-6,\quad f(-1)=-10$

41.