

Semester Exam Review Packet

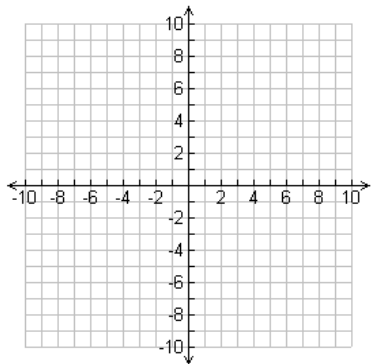
*This packet is not necessarily comprehensive. In other words, this packet is not a promise in terms of level of difficulty or full scope of material.

Polynomials

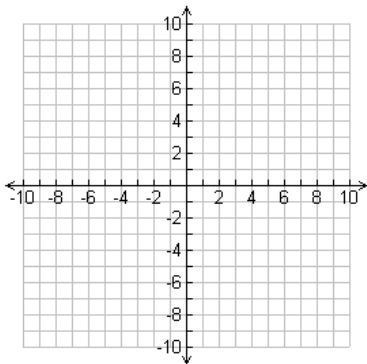
1. Classify by degree and number of terms:
 $7x^2 - 5x^3y^3$
2. Which is the correct classification of $25xyz + 6x^2 + 1$?
 - A. binomial with a degree of 2
 - B. binomial with a degree of 3
 - C. trinomial with a degree of 2
 - D. trinomial with a degree of 3
3. Add. $(3x^4 - 9x^3 + 5x^2 - x + 7) + (3 + 4x^4 + 3x - x^3 + 3x^2)$
4. Subtract. $(7x^3 - 4x - x^2 + 2 - 20x^5 - 6x^4) - (8 + 3x^3 - 2x - 12x^5 + 7x^2 - 8x^4)$
5. Simplify: $3(x - 1)^3$
6. Simplify: $(x^5 - 2)(x^5 + 5)$
7. Simplify: $(x + 5)(x + 7)$
8. Simplify: $(x^3y + 5)^2$

Transformations of Functions

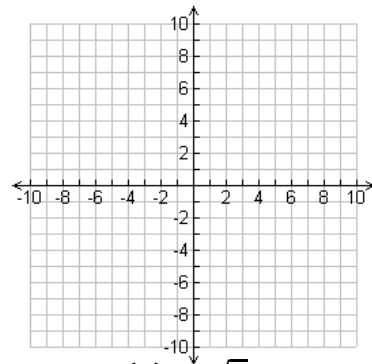
Graph the following transformations:



9. $f(x) = x^2$
 $f(x + 2)$

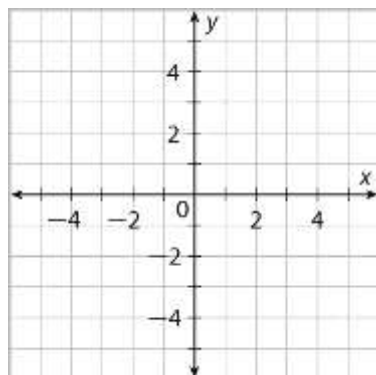


10. $f(x) = |x|$
 $f(x - 5) + 3$



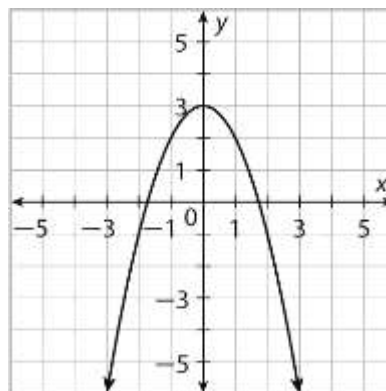
11. $f(x) = \sqrt{x}$
 $-f(x - 4)$

12.



Graph the function
 $g(x) = -2x + 1$
with domain
 $[-3, 5]$

13.

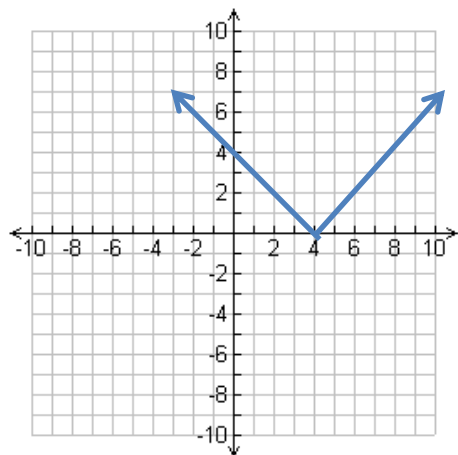


Domain:

Range:

Maximum:

14.

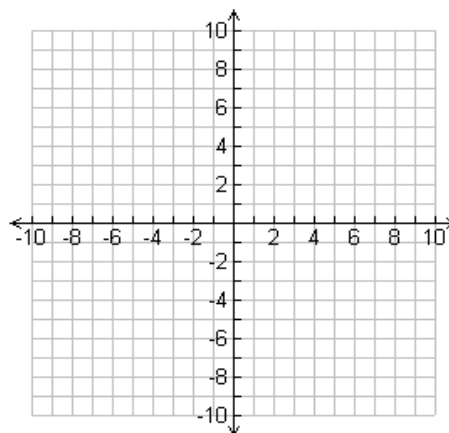


Domain:

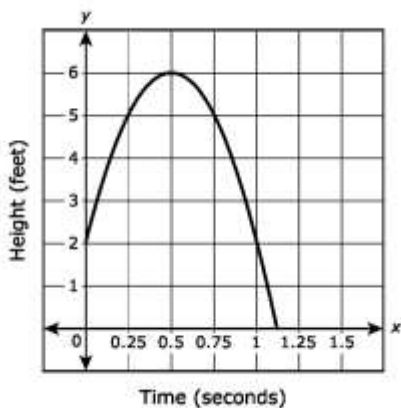
Range:

Minimum:

15. Draw a graph that is increasing then decreasing then increasing then decreasing and has a domain of all real numbers and a range of $(-\infty, 3]$



16.



Use the graph to estimate the average rate of change of the height of the ball for the first 0.25 seconds after being hit.

- A. 0.75 feet per second
- B. 3.0 feet per second
- C. 12 feet per second
- D. 20 feet per second.

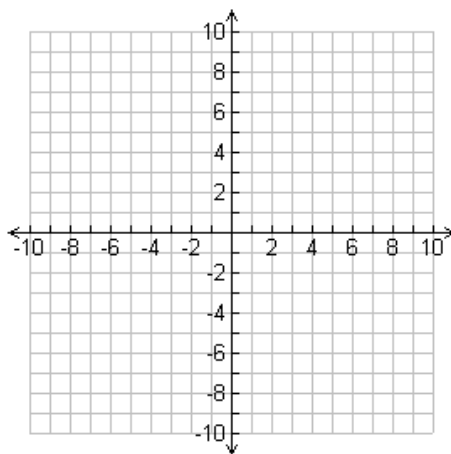
17. For the following piecewise function:

$$f(x) = \begin{cases} -\frac{1}{3}x + 1, & x \leq 0 \\ (x - 5)^2, & x > 0 \end{cases}$$

Evaluate: $f(3) = \underline{\hspace{1cm}}$ $f(0) = \underline{\hspace{1cm}}$ $f(-6) = \underline{\hspace{1cm}}$ $f(8) = \underline{\hspace{1cm}}$

18. Graph the piecewise function

$$f(x) = \begin{cases} -\frac{3}{2}x + 1, & x < -8 \\ \frac{2}{3}x, & -8 \leq x \leq 2 \\ 1 - 2x, & x > 2 \end{cases}$$



Exponents

19. $\frac{60b^0b^3a^6e^2}{4a^6e^{-2}}$

20. $\left(\frac{2c^{-3}a^4}{a^{10}}\right)^{-2}$

21. $-6^2 \cdot 2^{-2} \cdot 8^{\frac{2}{3}}$

22. $\sqrt[3]{(27y^3)^4}$

23. $\left(x^{\frac{1}{2}}\right)^4 \sqrt{x^6} \frac{\left(x^{\frac{1}{4}}\right)^8}{\sqrt[3]{x^3}}$

24. $25^{\frac{5}{2}} + 32^{\frac{1}{5}} - (20)^0$

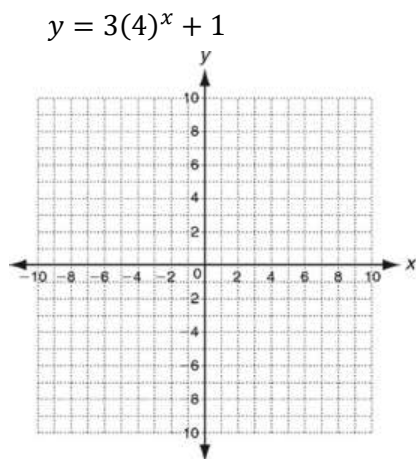
$$25. 4^{2x+3} = 256$$

$$26. 3^{-2x+1} \cdot 3^{-2x-3} = 3^{-x}$$

Exponentials

27. What values of b in the form $y = ab^x$ will give an equation for exponential growth?
What about exponential decay?

28. Graph the Exponential Function and describe its key features.



Growth or Decay?	
Domain	
Range	
y - intercept	
Asymptote	
End Behavior	

29. The value of a car can be modeled by the function $g(t) = 22500(0.554)^t$, where t is the number of years. Describe what is happening with the value of the car, using both numbers from the function in your explanation.

30. Suppose 6,700,000 people watch the first episode of “Keeping Up with the Kardashians”, but the number of viewers decreases by 3.5% each week.

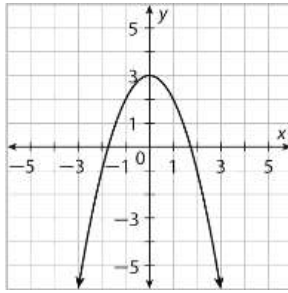
a. Write an exponential function to model the situation.

b. If the pattern continues, how many will watch the season finale, which is ten weeks later?

31. Jane’s credit card company charges 20% interest per year, compounded quarterly. If Jane’s credit card bill was originally \$775, how much will the bill be after 4 years if she doesn’t pay it off?
Round your answer to the nearest cent.

Quadratics

32. Label the vertex, zeros, and axis of symmetry on the graph.



33. Change from vertex form to standard form. What is the vertex of the function? What is the axis of symmetry?
(remember $x = -\frac{b}{2a}$ to find the x coordinate of the vertex from standard form)

$$y = -3(x + 1)^2 - 4$$

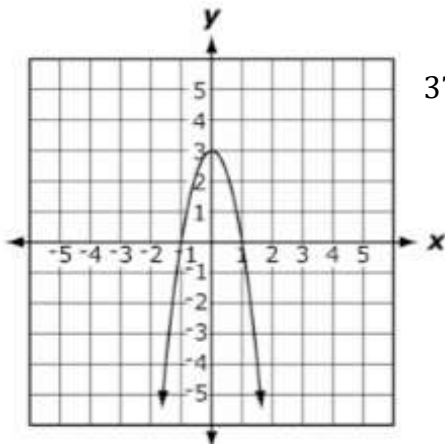
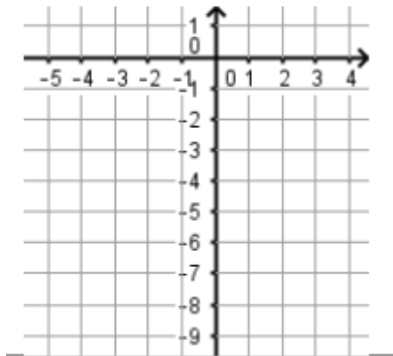
34. Change from standard form to vertex form. What is the vertex of the function? What is the axis of symmetry?
(remember $x = -\frac{b}{2a}$ to find the x coordinate of the vertex from standard form)

$$y = 4x^2 - 8x + 9$$

35. Change from intercept form to standard form. How would you find the vertex using intercept form?

$$y = -(x + 1)(x - 5)$$

36. Graph $y = 2(x + 2)(x - 2)$



37. Write the equation in intercept form, vertex form and standard form.

38. Solve this equation using the methods listed below: $x^2 - 15x = -50$

Factoring	Complete the Square
Quadratic Formula	Graphing (SKETCH)

Solve using the method of your choice:

39. $3n^2 - 8n = -4$

40. $-9x^2 = 66x + 21$

41. $-2n^2 + 3 = 53$

42. $5x^2 - 18x = 9$

43. What is the Discriminant and what does it tell us about how many solutions there are?

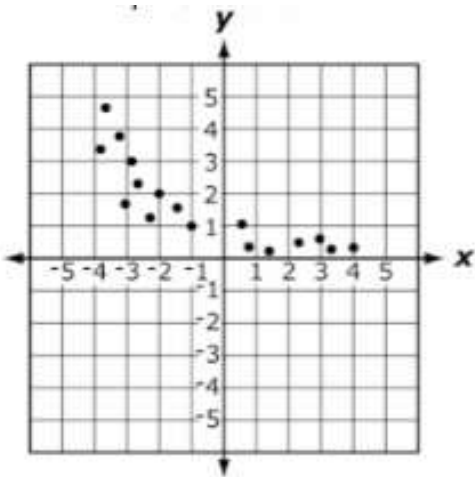
44. $\frac{(1-2i)(1-2i)}{7i}$

45. $\frac{(6+i)(6-i)}{1+3i}$

46. $i^{600} + i^{602}$

47. $i^{24} - i^2$

48. Which equation best fits the data below?



- A $y = 5 \cdot 3^x$
- B $y = 0.5 \cdot 3^x$
- C $y = 5 \cdot 0.5^x$
- D $y = 0.5 \cdot 5^x$

50. Fill in the table.
What type of function is described by the table?

x	f(x)	First Difference	Second Difference	Ratio
1	-4			
4	11			
7	44			
10	95			
13	164			

49. a. Find the Line of best fit.
b. Complete the table.
c. Graph the residuals?
d. Is the data a good fit?

x	f(x)	Predicted	Residuals
7	1		
9	5		
13	10		
22	18		

Residual Graph:

