Name Key (1)

Hour _____

Final Exam Review

Polynomials

1. Simplify

$(4x^2-5x)+2x(2x^2-3x+3)$

$4x^2-5x-4x^3+6x^2-6x$

$-4x^3+10x^2-11x$

2. Simplify

$(3p-7)(3p+4)$

FOIL or BOX Method

	3p	4
3p	$9p^2$	$12p$
-7	$-21p$	-28

$9p^2-9p-28$

3. Simplify

$(6-3x^2)+(x^3-x+5)$

x^3-3x^2-x+11

4. Simplify

$-2n^3(n^2-3n+4)$

$-2n^5+6n^4-8n^3$

5. Simplify

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

$9x^2-6xy-6xy+4y^2$

$9x^2-12xy+4y^2$

6. Simplify

$(n^4+2n-1)+(5n-n^4-4)$

$n^4+2n-1+5n-n^4-4$

$7n-5$

(2)

7. Simplify
$(4x+3)(2x+1)$

$8x^2+4x+6x+3$

$8x^2+10x+3$

8. Simplify
$(4h^2-5)(5h^2-6)$

$20h^4-24h^2-25h^2+30$

$20h^4-49h^2+30$

9. Simplify
$(2x^3+4x^2+1)(x-4)$

	x	-4
$2x^3$	$2x^4$	$-8x^3$
$4x^2$	$4x^3$	$-16x^2$
1	x	-4

$2x^4-4x^3-16x^2+x-4$

10. Simplify
$(-4x^2+5x-8)-(x^2-3x-6)$

Distribute negative to second parentheses

$-3x^2+2x-14$

11. Simplify
$(2x^2-3x-3)-(6x^2-3x-8)$

Distribute negative

$8x^2-6x-11$

12. Simplify
$(2x^3+4x^2+1)(x-4)$

	$2x^3$	$4x^2$	1
x	$2x^4$	$4x^3$	x
-4	$-8x^3$	$-16x^2$	-4

$2x^4-4x^3-16x^2+x-4$

Find the Sum, Difference, or Product of each:

45. $(3a + 3b)^2$ $(3a+3b)(3a+3b)$ $9a^2+9ab+9ab+9b^2 = \boxed{9a^2+18ab+9b^2}$

46. $(2mr + 2r)^2$ $(2mr+2r)(2mr+r)$ $4m^2r^2+2mr^2+2mr^2+2r^2 = \boxed{4m^2r^2+4mr^2+2r^2}$

47. $(-x^4+13x^5+6x^3)+(6x^3+5x^5+7x^4)$

$18x^5+6x^4+12x^3$

48. $(4n-3n^3)+(3n^3+4n)$

$-6n^3$

49. $(3-6n^5-8n^4)+(6n^4+3n+8n^5)$

$2n^5-2n^4+3n+3$

50. $3x+(2x^2+3x^3+8x)$

$-3x^3-2x^2+11x$

51. $(6a+3ab)^2$ $(6a+3ab)(6a+3ab)$ $36a^2+18a^2b+18a^2b+9a^2b^2 = \boxed{3a^2+36a^2b+9a^2b^2}$

52. $(4x^2-8)(2x^2-3)$ $8x^4-12x^2-16x^2+24$ $\boxed{8x^4-28x^2+24}$

53. $5x+(3x^3+2x^2+4x+9)$

$-3x^3-2x^2+9x+9$

54. Simplify the expression $(3x^2y^{-4})^3$

$3^3x^6y^{-12}$

$\boxed{\dfrac{27x^6}{y^{12}}}$

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Name_____

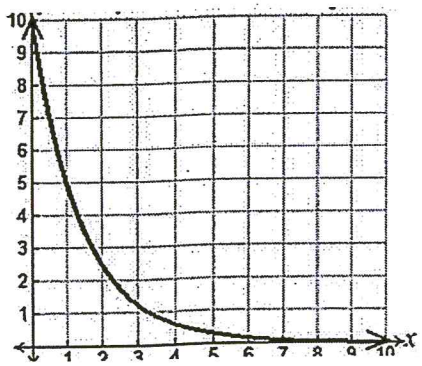
Hour_____

Final Exam Review

Exponential Functions

Identify the graph as exponential growth or exponential decay. Then find the domain and range.

1.

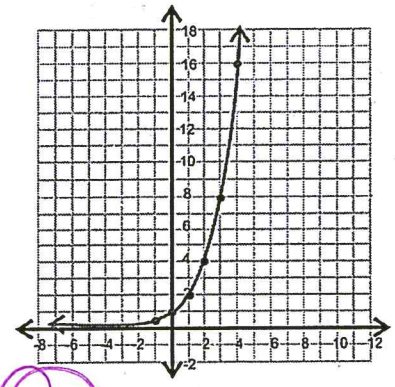


Growth or Decay (Circle one)

Domain: $(-\infty, +\infty)$

Range: $(0, +\infty)$

2.



Growth or Decay (Circle one)

Domain: $(-\infty, +\infty)$

Range: $(0, +\infty)$

Graphing Exponential Functions

3. $y = 35\,(.57)^x$

Growth or Decay (Circle one)

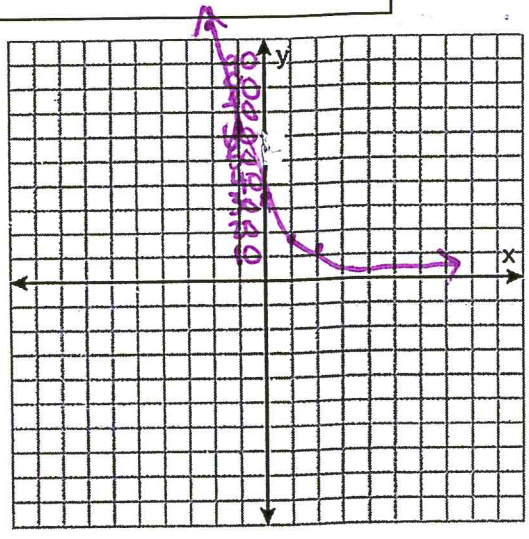
Growth or decay factor: .57

Initial Value: 35

Domain: $(-\infty, +\infty)$

Range: $(0, +\infty)$

x	y
-2	107.7
-1	61
0	35
1	19.95
2	11



4. $y = 8\,(3)^x$

Growth or Decay (Circle one)

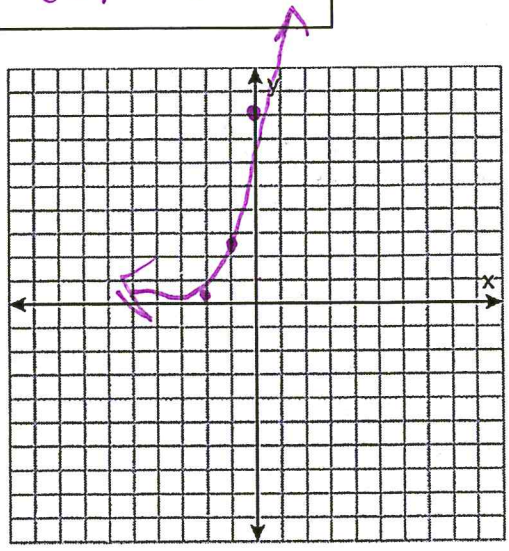
Growth or decay factor: 3

Initial Value: 8

Domain: $(-\infty, +\infty)$

Range: $(0, +\infty)$

x	y
-2	0.88
-1	2.67
0	8
1	24
2	72



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5. $y = 4.5\ (.95)^x$

Growth or Decay (Circle one) Decay

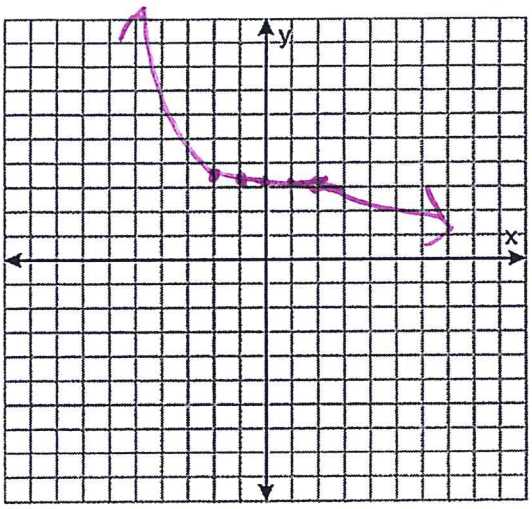
Growth or decay factor: .95

Initial Value: 4.5

Domain: $(-\infty, +\infty)$

Range: $(0, +\infty)$

x	y
-2	4.98
-1	4.75
0	4.5
1	4.28
2	4.06



6. $y = 1.3^x$

Growth or Decay (Circle one) Growth

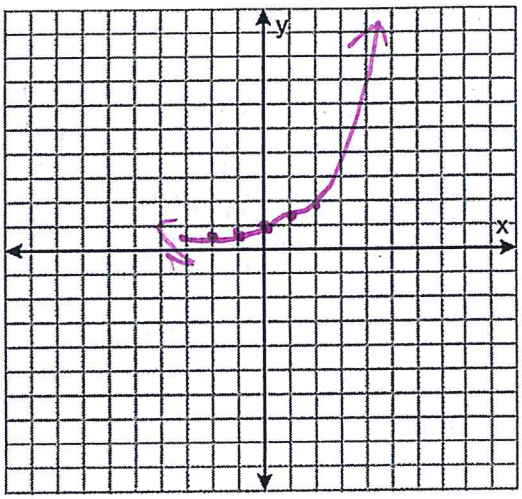
Growth or decay factor: 1.3

Initial Value: 1

Domain: $(-\infty, +\infty)$

Range: $(0, +\infty)$

x	y
-2	.59
-1	.76
0	1
1	1.3
2	1.69



7. Looking at the equations in # 3-6, which equation shows the greatest growth? Explain.

#4 has the greatest growth rate of 3 which is larger than the other rates

8. The population in 2012, of a small Upper Peninsula town was approximately 2,500. The following equation can be used to model the change, $g(t)$, over time, t, in years: $g(t) = 2500(1.15)^t$

a. What does 2500 represent in this situation? The starting population

b. What does 1.15 represent in this situation? The growth rate

c. Is the population increasing or decreasing? Increasing because $1.5 > 1$

d. What will be the predicted population in 2020?

$2020 - 2012 = 8$

$g(t) = 2500(1.15)^8$

$g(t) = 7647.56$

In 2020, the population will be about 7648 people

(6)

9. A certain stock is worth $42 at the beginning of the day. Every hour the stock goes down by 5%.

a) Can this information be represented by exponential growth or decay? Explain.

Decay because it says stock goes down

b) What is the growth or decay factor for this information? Explain how you found it.

$\frac{5}{100} = .05$ $\quad 1 - .05 = .95$

c) Write an equation to model this information. Explain what each part means.

$y = 42(.95)^x$

y: stock worth; 42: starting amount; .95: decay factor; x: hours

d) How much will the stock be worth in 8 hours? Show work.

$y = 42(.95)^8$

$y = 27.86$

The stock will be worth $27.86 in 8 hours

10. A dust bunny gathers dust at a rate of 11% per week. The dust bunny originally weighs 0.7 oz.

a) Write a function that represents the weight of the dust bunny at a given time. Use x for weeks and y for the weight of the dust bunny.

$\frac{11}{100} = .11$

$1 + .11 = 1.11$

$y = .7(1.11)^x$

b) Find the weight of the dust bunny after 7 weeks.

$y = .7(1.11)^7$

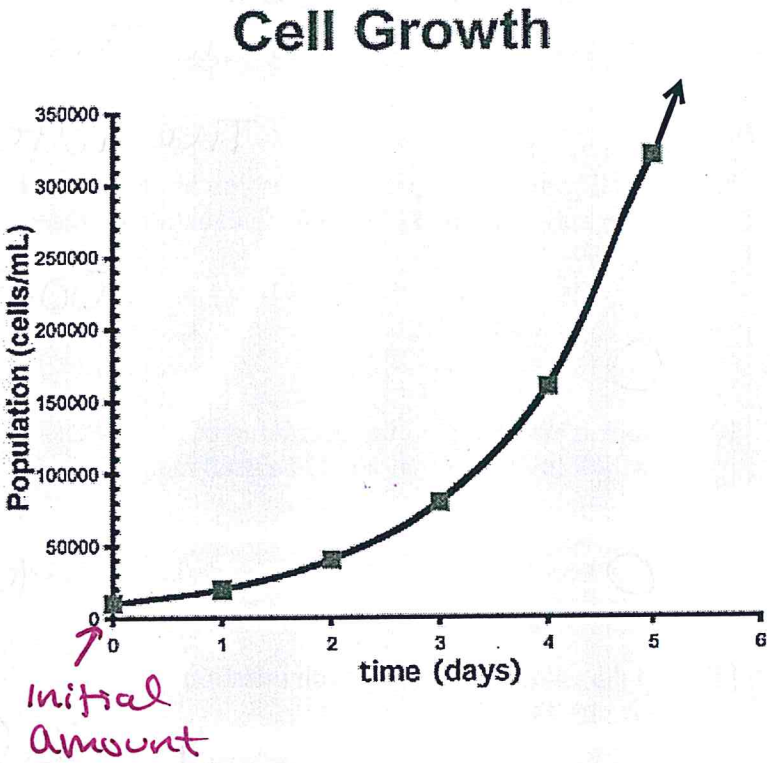
$y = 1.45$

The dust bunny will weigh about 1.45 oz

Name: _____ Date: _____ Hour: _____ Score: _____ / 7

Final Exam Practice Test #1

Use the graph of cell growth to answer questions 1 – 4



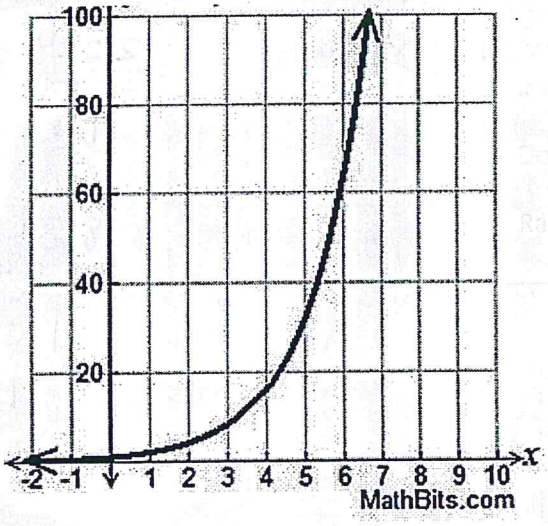
1. The graph represents a…
   a. Linear equation
   b. Exponential growth equation
   c. Quadratic equation
   d. Exponential decay equation

2. Identify the domain of the graph:
   a. (0, ∞)
   b. (10000, ∞)
   c. (-∞, ∞)
   d. (0, 5)

3. Identify the range of the graph:
   a. (0, ∞)
   b. (10000, ∞)
   c. (-∞, ∞)
   d. (0, 5)

4. What is the initial population of cells?
   a. 0 cells
   b. 10,000 cells
   c. 350,000 cells
   d. Cannot be determined from looking at the graph.

Use the graph of cell growth to answer questions 5 – 6



5. Identify the domain of the graph:
   a. (0, ∞)
   b. (-∞, ∞)
   c. (∞, -∞)
   d. (-2, 7)

6. Identify the range of the graph:
   a. (0, ∞)
   b. (∞, -∞)
   c. (-∞, ∞)
   d. (0, 100)

7. Which of the following equations represent exponential growth?
   a. $f(x) = 3.2\ (.8)^x$ because .8 is less than 1.
   b. $f(x) = 3.2\ (.8)^x$ because 3.2 is greater than 1.
   c. $y = 1400(1.05)^x$ because 1.05 is greater than 1.
   d. $y = 1400\ (1.05)^x$ because 1400 is greater than 1.

8. In the exponential equation, $y = 3800(1 - 0.12)^x$ identify the following:
   a. Growth/Decay factor = .88
   b. % of Growth/Decay = 12%
   c. Initial amount = 3800
   d. Value for y when x = 10, y = 1058.3
   e. What does 0.12 represent in the equation?
      The rate of decay converted to decimal.

9. Your allowance your parents gives you increases at a rate of 10% per week for 8 weeks. You started with an allowance of $15.50, which equation represents this situation?
   a. $y = 15.50(10)^8$
   b. $y = 15.50\ (0.90)^8$
   c. $y = 15.50\ (.10)^8$
   d. $y = 15.50\ (1.10)^8$

   $\frac{10}{100} = .10$
   $1 + .10 = 1.10$

10. A stock is worth $40 at the beginning of the day and decreases at a rate of 8% hourly. Identify the growth/decay factor that would be used in an equation.
   a. 40
   b. .08
   c. .92
   d. 1.08

   $\frac{8}{100} = .08$
   $1 - .08 = .92$

11. Find the value of the stock from question #10 after 11 hours.
   a. 15.99
   b. 3.4E-11
   c. 1.7E19
   d. 93.27

   $y = 40(.92)^{11} = 15.99$

12. A population of a town in 2014 was 88,345 people. The town's population increases at a rate of 5% each year. What will be the population of the town in 2024?
   a. 52894
   b. 143901
   c. 4417
   d. 92760

   2024 − 2014 = 10

   $y = 88345(1.05)^{10}$
   $y = 143905$

13. From question 12, identify the…
   a. Initial amount = 88345
   b. Percent growth/decay = 5%
   c. Growth/decay factor = 1.05
   d. Value for time in 2024 = 10

14. The population of various animals can be written in the form of a function to determine increase in population over time. Based on the table, which animal's population increases most rapidly?
   a. Rabbit
   b. Mouse
   c. Bird
   d. Goat

Animal	Function	
Rabbit	$p(t) = 400(1/3)^t$	- Decay
Mouse	$p(t) = 3^t$	- Growth
Bird	$p(t) = 10t$	- Linear
Goat	$p(t) = 2^t$	- Growth

Between mouse & goat, mouse increase faster because $3 > 2$.

Exponent Properties Study Guide

Level 1- Beginning

3^3	a^0	$2x^4 - 5x^4$	$3d^3e^2 + 6d^3e^2$
27	1	$3x^4$	$9d^3e^2$

Level 2- Developing

$3x^2 \cdot 4x^5$	$2m^3n^5 \cdot 7m^6n^8$	$\frac{6j^8}{2j^3}$	$\frac{4f^{10}d^4}{8f^{12}d^4}$
$12x^7$	$14m^9n^{13}$	$3j^5$	$\frac{1f^2}{2}$

Level 3- Proficient

$(-4b^6c^{-2})^4$	$(e^4f^{-1} \cdot -2ef^{-3})^4$	$\frac{3j^8}{2j^3 \cdot 6j^5}$	$\frac{a^{-5}b^{-3}}{5a^{-8}b^4}$
$(-4)^4 b^{24} c^{-8}$ $\frac{256\,b^{24}}{c^8}$	$e^{16}f^{-4} \cdot -2e^4f^{-12}$ $\frac{-2e^{20}}{f^{16}}$	$\frac{1}{4}$	$\frac{1a^3}{5b^7}$

Level 4- Mastery

$\frac{4x^3}{2x} \cdot (3x^{-5}y^0)$	$(3x^{-2}y^4)^{-3} \cdot 4xy^8$	$\left(\frac{x^7y^3}{(5x^2y^{-3})^2}\right)^3$	$\left(\frac{2x^{-3}y^4}{(-4x^3y^2)^{-2}}\right)^{-2}$
$2x^2 \cdot 3x^{-5}y^0$ $\frac{6}{x^3}$	$\frac{1}{27}x^6y^{-12} \cdot 4xy^8$ $\frac{4x^7}{27y^4}$	$\left(\frac{x^7y^3}{25x^4y^{-6}}\right)^3$ $\frac{x^{21}y^9}{25^3x^{12}y^{-18}}$ $\frac{x^9y^{27}}{15625}$	$\left(\frac{2x^{-3}y^4}{-4^{-2}x^{-6}y^{-2}}\right)^{-2}$ $\left(\frac{2^{-2}x^6y^{-8}}{-4^4x^{12}y^4}\right)$ $\frac{1}{1024x^6y^{12}}$