Integrated Math 3
Finals Review # 2

Name _____
Per ____ Date _____

** Use a Separate Sheet of Paper For This Assignment **

Factor each of the following

1) x^2 - 13x+12

2) $x^2 - 25$

3) $2x^2 11x+12$

4) $6x^2 + 7x - 5$

5) $8x^3 - 64x^2$

6) $5x^2 - 3x + 7$

Find each quotient

7) $(6x^3 - 17x^2 + 14x + 4) \div (2x - 3)$

8) $\dfrac{-10x^2 + 8x^3 + 14y}{4x + 3}$

Write the equation of the polynomial function with the following characteristics

9) 6th degree polynomial
Single roots: $0, \sqrt{10}, -\sqrt{10}, \frac{4}{3}$
Double root: -5
Passes through the point (1,9)

10) 5th degree polynomial
Single Roots: $\frac{1}{2}, 2i\sqrt{3}, -2i\sqrt{3}$
Double Root: -1
Passes through the point $(1, -4)$

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11) Consider the function $f(x) = 3x^3 - 5x^2 - 88x + 60$. -5 is a root of $f(x)$. Find all of the roots of $f(x)$.

12) Consider the function $g(x) = 2x^3 + 7x^2 + x - 10$. $-\frac{5}{2}$ is a root of $g(x)$. Find all of the roots of $g(x)$.

13) Consider the function $y = 2x^3 - 5x^2 - x + 6$

a) List all of the possible roots of the function.
b) Find all of the actual roots of the function
c) Rewrite the original function in factored form

For problems 14 and 15, do each of the following

- State the x-intercepts
- State the y-intercept
- State the degree
- Identify the Roots
- Describe the end behavior
- Draw a sketch of the funtion

14) $y = \frac{1}{30}(x+5)(2x-3)(x-4)^2$

15) $y = -\frac{1}{26}x(x+2)^2(x^2-13)$

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16) Consider the function: $y = -\frac{1}{18}(x^2-9)(x^2+12)$

a) Find all the roots of the function
b) Find all the x-intercepts of the graph of the function

17) Alexis buys a BMW for $40,000. The value of the car depreciates at a rate of 14% per year.

a) Write an equation that can be used to model the value of the car as time passes.
b) How much will the car be worth in 2 years?
c) When will the car be worth half of its purchase price?

18) Kyle is a famous artist. Nadia buys a drawing from Kyle for $200. The price of the drawing increases at a rate of 9% per year.

a) Write an equation that can be used to model the worth of the drawing as time passes.
b) How much will the drawing be worth after 4 years?
c) When will the painting be worth $500?

19) Bart is a basketball player that makes 50% of his free throws.

a) Describe how you could design a simulation of Bart taking 20 free throws using a coin.
b) Describe how you could design a simulation of Bart taking 20 free throws using a die.
c) Describe how you could design a simulation of Bart taking 20 free throws using a random number generator.

20) a) Create a table and a graph for the function $f(x) = 3^x$

b) Create a table and a graph for the function $g(x) = \log_3 x$

c) Use your graph in part (b) to create a sketch of $y = \log_3(x-4) - 6$

Integrated Math 3
Finals Review # 5

Name _____
Per ___ Date _____

** Use a Separate Sheet of Paper For This Assignment **

Factor each of the following

1) $x^3 - 125$

$(x-5)(x^2+5x+25)$

2) $x^2 - 25$

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

3) $1000x^3 + 27$

$(10x+3)(100x^2-30x+9)$

4) $64x^3 - 27y^3$

$(4x-3y)(16x^2+12xy+9y^2)$

5) $8x^3 - 64x^2$

$8x^2(x-8)$

6) $27x^6 - 125y^{15}$
$(3x^2)^3 - (5y^5)^3$
$(3x^2-5y^5)(9x^4+15x^2y^5+25y^{10})$

Find each quotient

7) $(6x^3 - 17x^2 + 14x + 4) \div (2x - 3)$

$3x^2 - 4x + 1 + \frac{7}{2x-3}$

8) $\frac{-10x^2 + 8x^3 + 14}{4x+3}$

$2x^2 - 4x + 3 + \frac{5}{4x+3}$

Write the equation of the polynomial function with the following characteristics

9) 6th degree polynomial
Single roots: $0, \sqrt{10}, -\sqrt{10}, \frac{4}{3}$
Double root: -5
Passes through the point $(1,9)$

$y = \frac{1}{36}x(x^2-10)(3x-4)(x+5)^2$

10) 5th degree polynomial
Single Roots: $\frac{1}{2}, 2i\sqrt{3}, -2i\sqrt{3}$
Double Root: -1
Passes through the point $(1,-4)$

$y = -\frac{1}{13}(2x-1)(x^2+12)(x+1)^2$

11) Consider the function $f(x) = 3x^3 - 5x^2 - 88x + 60$. -5 is a root of $f(x)$. Find all of the roots of $f(x)$.

$x = -5 \qquad x = \frac{2}{3} \qquad x = 6$

12) Consider the function $g(x) = 2x^3 + 7x^2 + x - 10$. $-\frac{5}{2}$ is a root of $g(x)$. Find all of the roots of $g(x)$.

$x = -\frac{5}{2} \qquad x = -2 \qquad x = 1$

13) Consider the function $y = 2x^3 - 5x^2 - x + 6$

a) List all of the possible roots of the function.

Possible roots: $\pm\frac{1}{2}, \pm 1, \pm\frac{3}{2}, \pm 2, \pm 3, \pm 6$

b) Find all of the actual roots of the function

$x = -1 \qquad x = \frac{3}{2} \qquad x = 2$

c) Rewrite the original function in factored form

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

For problems 14 and 15, do each of the following

- State the x-intercepts
- State the y-intercept
- State the degree
- Identify the Roots
- Describe the end behavior
- Draw a sketch of the funtion

14) $y = \frac{1}{30}(x + 5)(2x - 3)(x - 4)^2$

x-intercepts: $(-5,0), \left(\frac{3}{2}, 0\right), (4,0)$

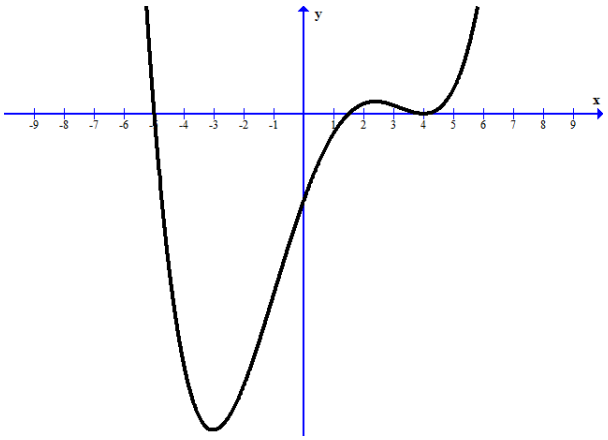
y-intercepts: $(0, -8)$

degree: 4

roots: $-5, \frac{3}{2}, 4$

As x approaches $-\infty$, y approaches ∞

As x approaches ∞, approaches ∞



15) $y = -\frac{1}{26}x(x + 2)^2(x^2 - 13)$

x-intercepts: $(0,0), (-2,0), \left(\sqrt{13}, 0\right), (-\sqrt{13}, 0)$

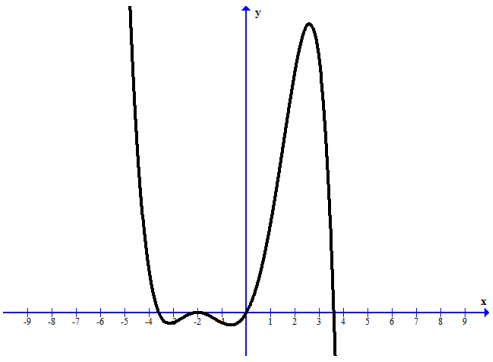
y-intercept: $(0,0)$

degree: 5

roots: $0, -2, \sqrt{13}, -\sqrt{13}$

As x approaches $-\infty$, y approaches ∞

As x approaches ∞, y approaches $-\infty$



16) Consider the function: $y = -\frac{1}{18}(x^2 - 9)(x^2 + 12)$

a) Find all the roots of the function

$x = 3 \qquad x = -3 \qquad x = 2i\sqrt{3} \qquad x = -2i\sqrt{3}$

b) Find all the x-intercepts of the graph of the function

$(3,0)$ and $(-3,0)$

17) Alexis buys a BMW for \$40,000. The value of the car depreciates at a rate of 14% per year.

a) Write an equation that can be used to model the value of the car as time passes.

$C(t) = 40{,}000(0.86)^t$

b) How much will the car be worth in 2 years?

$C(2) = 40{,}000(0.86)^2$

$C(2) = \$29{,}584.00$

c) When will the car be worth half of its purchase price?

$20{,}000 = 40{,}000(0.86)^t$

$\frac{1}{2} = 0.86^t$

$t = \log_{0.86}\left(\frac{1}{2}\right)$

$t = 4.6$ years

18) Kyle is a famous artist. Nadia buys a drawing from Kyle for \$200. The price of the drawing increases at a rate of 9% per year.

a) Write an equation that can be used to model the worth of the drawing as time passes.

$D(t) = 200(1.09)^t$

b) How much will the drawing be worth after 4 years?

$D(4) = 200(1.09)^4$

$D(4) = \$282.32$

c) When will the painting be worth \$500?

$500 = 200(1.09)^t$

$\frac{5}{2} = (1.09)^t$

$t = \log_{1.09}\left(\frac{5}{2}\right)$

$t = 10.6$ years

19) Bart is a basketball player that makes 50% of his free throws.

a) Describe how you could design a simulation of Bart taking 20 free throws using a coin.

Let HEADS represent making a free throw
Let TAILS represent missing a free throw
Flip the coin 20 times and record the number of "makes" and the number of "misses"

b) Describe how you could design a simulation of Bart taking 20 free throws using a die.
Let the numbers 1, 2, and 3 represent making a free throw.
Let the numbers 4, 5, and 6 represent missing a free throw.
Roll the die 20 times and record the number of "makes" and the number of "misses"

c) Describe how you could design a simulation of Bart taking 20 free throws using a random number generator.
Use a random number to generate 20 numbers that are all in between 1 and 100.
Let the numbers 1-50 represent making a free throw.
Let the numbers 51 through 100 represent missing a free throw.
Record the number of "makes" and the number of "misses"

20) Michelle is a basketball player that makes $\frac{2}{3}$ of her free throws. Describe how you could design a simulation of Michelle taking 30 free throws using a die.

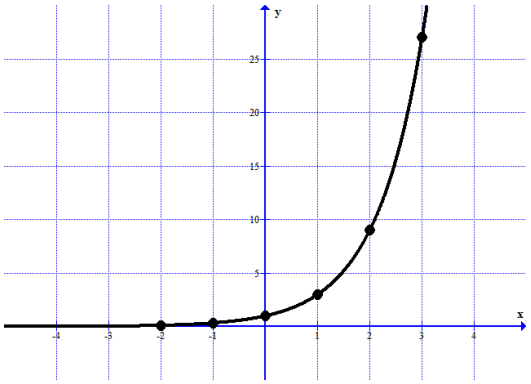
Let the numbers 1,2,3, and 4 represent making a free throw.
Let the numbers 5 and 6 represent missing a free throw.
Roll the die 30 times and record the number of "makes" and the number of "misses"

21) Janel is a softball player that gets on base 75% of the time. Describe how you could design a simulation of Janel going to bat 50 times.

Use a random number generator to generate 50 numbers that are all in between 1 and 100.
Let the numbers 1 through 75 represent getting on base.
Let the numbers 76 through 100 represent not getting on base
Record the number of times Janel gets on base and the number of times she doesn't get on base.

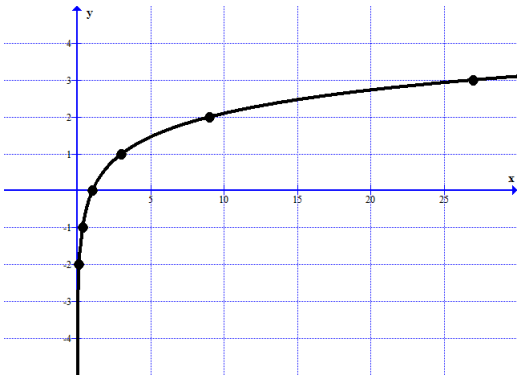
22) a) Create a table and a graph for the function $f(x) = 3^x$

x	$f(x) = 3^x$
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9
3	27



b) Create a table and a graph for the function $g(x) = \log_3 x$

x	$g(x) = \log_3 x$
$\frac{1}{9}$	-2
$\frac{1}{3}$	-1
1	0
3	1
9	2
27	3



c) Use your graph in part (b) to create a sketch of $y = \log_3(x - 4) - 6$

Start with the graph in part (b). Then shift it 4 units right and 6 units down.