AP Precalc

Write your questions and thoughts here!

1.11A Equivalent Representations & Binomial Theorem

1.11A Notes

Factored Form VS General Form

POLYNOMIAL FUNCTION

Factored Form

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

Standard Form

$f(x) = 3x^4 + 2x^3 - 8x + 5$

RATIONAL FUNCTION

Factored Form

$f(x) = \frac{(x+4)(x-5)}{(x+4)(x-4)}$

General Form

$f(x) = \frac{4x-8}{x^2-2x-2}$

Example #1

$f(x) = 2x^3 - 16x^2 + 32x$

Find…

a. Degree:

b. End Behavior:

c. *y*-intercept:

d. Zero(s):

e. Where is $f(x) \geq 0$?

Example #2

$f(x) = \frac{3x(x-5)}{(x+3)(x-1)}$

Find…

a. Domain:

b. Zero(s):

c. Hole(s):

d. Vertical Asymptote(s):

e. Horizontal Asymptote:

f. *y*-intercept:

Write your questions and thoughts here!

Binomial Theorem

$f(x) = (x+5)^2$

$f(x) = (x+5)^3$

$f(x) = (x+5)^4$

Pascal's Triangle

Example 3:
Expand the following.

$$f(x) = (x-3)^5$$

Example 4:
Find the third term in the expansion.

$$f(x) = (2x+3)^6$$

Binomial Theorem

The expansion of a binomial is…

$$(a+b)^n = C_1 a^n b^0 + C_2 a^{n-1} b^1 + C_3 a^{n-2} b^2 + \cdots + C_{n-1} a^1 b^{n-1} + C_n a^0 b^n$$

Where C is the coefficient given by Pascal's Triangle.

1.11A Equivalent Representations and Binomial Theorem

AP Precalculus

1.11A Practice

The following are in factored form. Convert to standard form and answer the questions.

1. $f(x) = 2(x-4)^2$

   a. Standard Form:

   b. Degree:

   c. End Behavior:

   d. Zero(s):

   e. Where is $f(x) \geq 0$?

   f. *y*-intercept:

2. $h(x) = \frac{2(x+3)(x-3)}{(x+2)(x+3)}$

   a. General Form:

   b. Domain:

   c. Zero(s):

   d. Hole(s):

   e. Vertical Asymptote(s):

   f. Horizontal Asymptote:

   g. *y*-intercept:

The following are in standard form. Convert to factored form and answer the questions.

3. $g(x) = -3x^3 + 27x$

   a. Factored Form:

   b. Degree:

   c. End Behavior:

   d. Zero(s):

   e. Where is $f(x) \geq 0$?

   f. *y*-intercept:

4. $h(t) = \frac{t^3-4t^2}{t^2+2t-15}$

   a. Factored Form:

   b. Domain:

   c. Zero(s):

   d. Hole(s):

   e. Vertical Asymptote(s):

   f. Horizontal Asymptote:

   g. *y*-intercept:

Use the binomial theorem to expand the following.

5. $(x+2)^4$

6. $(x-3)^5$

7. $(2x+1)^3$

8. $(3x-2)^4$

Find the given term in the binomial expansion.

9. $(x+5)^5$

Find the 3rd term.

10. $(x-2)^7$

Find the 4th term.

11. $(3x-1)^8$

Find the 5th term.

12. $(2x+3)^4$

Find the last term.

Multiple Choice

13. What is the leading coefficient of the fourth term when $(x-2)^6$ is expanded?

(A) -160

(B) -120

(C) 120

(D) 160

14. What is the second term when $(2a-b)^4$ is expanded?

(A) $-32a^3b$

(B) $-4a^2b^2$

(C) $-16ab^3$

(D) $-ab^4$

15. In the xy-plane, the graph of a function f has $\lim_{x\to\infty} f(x) = \infty$. Which of the following could be an expression $f(x)$?

(A) $\frac{(x+3)^3}{x(x^3+1)}$

(B) $-2(x-1)^3(x+5)$

(C) $\frac{x(x+3)^3}{x(x^3+1)}$

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