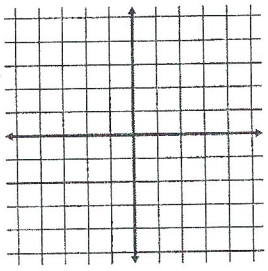
Name _____

Period#_____

Pre-Calculus: Ch#3 Review

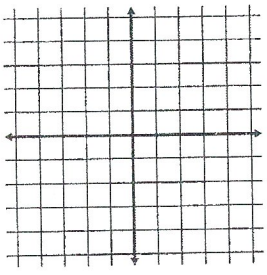
1. Sketch the graph of the function.

$f(x)=(x+1)(x+4)(x-3)$



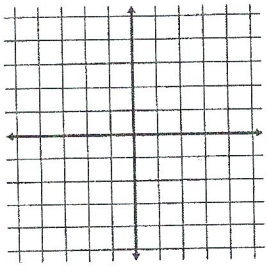
2. Sketch the graph of the function.

$f(x)=x^2-x-6$



3. Sketch the graph of the function.

$P(x)=(x-1)^2(x-4)$



4. Determine the left and right behavior of the graph $y=3x^2+2x+1$

(a) Up to the left, down to the right

(b) Down to the left, up to the right

(c) Up to the left, up to the right

(d) Down to the left, down to the right

5. Find the quotient and remainder of

$(10x^3+37x^2+37x+6)\div(5x+1)$

6. Find the quotient and remainder of

$$\frac{3x^3-12x^2-9x+1}{x-5}$$

7. Find the quotient and remainder of

$$\frac{x^4+3x^3-7x^2-15x+18}{x+2}$$

8. Find all the rational zeros of

$P(x)=x^3-7x^2+14x-8$

9. Find all the rational zeros of

$P(x)=x^3+4x^2+3x-2$

Simplify

10. $(2-5i)+(3+4i)$

11. $(-12+8i)-(7+4i)$

12. $(3-4i)(5-12i)$

13. $\dfrac{2-3i}{1-2i}$

14. If $f(x)=x^3-7x^2+17x-15$ has a zero at 3, find the other zeros.

(a) $-2\pm 2i$

(b) $-3,2$

(c) $2\pm i$

(d) $\dfrac{2\pm i}{2}$

15. Simplify i^{53}

(a) 1

(b) -1

(c) $-i$

(d) i

16. Write in standard form: $3-\sqrt{-12}$

(a) $3+i\sqrt{3}$

(b) $3-2i\sqrt{3}$

(c) $7i$

(d) $3+2i\sqrt{3}$

17. Solve: $x^2-2x+2=0$

18. Factor completely: x^3+5x^2+x+5

(a) $(x+5)(x-i)(x-i)$

(b) $(x-5)(x+i)(x+i)$

(c) $(x-5)(x-i)(x+i)$

(d) $(x+5)(x-i)(x+i)$

19. Factor completely: x^4-16

20. Which of the following fourth degree polynomial has zeros $-3,2,i$?

(a) $x^4+x^3+5x^2+x+6$

(b) $x^4-x^3-5x^2-x-6$

(c) $x^4-x^3+5x^2-x-6$

(d) $x^4+x^3-5x^2+x-6$

21. Factor: $P(x)=x^4-2x^3-16x^2+2x+15$

(a) $(x+1)(x-1)(x+3)(x-5)$

(b) $(x+1)(x+1)(x+3)(x+5)$

(c) $(x+1)(x-1)(x-3)(x-5)$

(d) $(x+1)(x-1)(x-3)(x+5)$

22. Find the intercepts and asymptotes.

$$f(x)=\frac{x^2-18x+81}{x^2+6x+9}$$

(a) Determine the x-intercepts

(b) Determine the y-intercepts

(c) Determine the vertical asymptote

(d) Determine the horizontal asymptote

(e) Hole??

23. Find the intercepts and asymptotes.

$$f(x)=\frac{x^2-x-2}{x-6}$$

(a) Determine the x-intercepts

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(e) Hole??

24. Find the intercepts and asymptotes.

$$f(x)=\frac{x-1}{x+4}$$

(a) Determine the x-intercepts

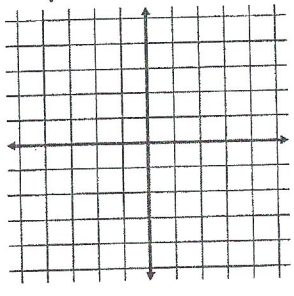
(b) Determine the y-intercepts

(c) Determine the vertical asymptote

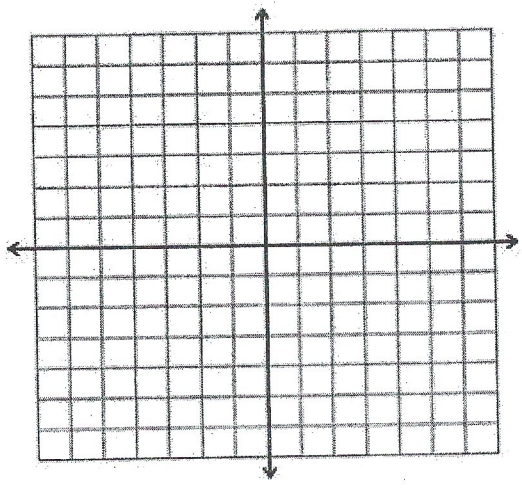
(d) Determine the horizontal asymptote

(e) Hole??

(f) Graph



25. $y = \dfrac{-2x^2 + 4x + 30}{x^2 + 2x - 3}$



x-intercepts: **y-intercept:**

vertical asymptotes: **horizontal asymptotes:**

Hole:

Name Answer Key (11)

Period#_____

Pre-Calculus: Ch#3 Review

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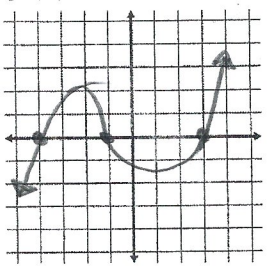
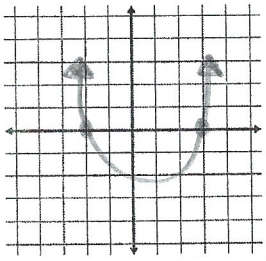
$f(x)=(x+1)(x+4)(x-3)$



$X=1$
$X=-4$
$X=3$

2. Sketch the graph of the function.

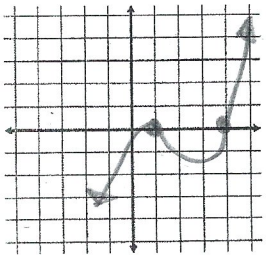
$f(x)=x^2-x-6$



-6
$-3 \quad 2$
-1
$(X-3)(X+2)=0$
$X=3 \quad X=-2$

3. Sketch the graph of the function.

$P(x)=(x-1)^2(x-4)$



$X=1$ double
$X=4$

4. Determine the left and right behavior of the graph $y=3x^2+2x+1$

(a) Up to the left, down to the right
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(c) Up to the left, up to the right
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5. Find the quotient and remainder of

$(10x^3+37x^2+37x+6)\div(5x+1)$

$2X^2+7X+0$
$5X+1 \overline{)\ 10X^3+37X^2+37X+6}$
$-10X^3+2X^2$
$35X^2+37X+6$
$-35X^2+7X$
$30X+6$
$-30X+6$

6. Find the quotient and remainder of

$\dfrac{3x^3-12x^2-9x+1}{x-5}$

$3X^2+3X+6+\frac{31}{X-5}$

$5 \mid 3 \quad -12 \quad -9 \quad 1$
$\quad\quad\ 15 \quad 15 \quad 30$
$3X^2 \ 3X \ \ 6 \ \ 31_R$

7. Find the quotient and remainder of

$\dfrac{x^4+3x^3-7x^2-15x+18}{x+2}$

$-2 \mid 1 \quad 3 \quad -7 \quad -15 \quad 18$
$\quad\quad\ -2 \quad -2 \quad 18 \quad -6$
$1X^3 \ 1X^2 \ -9X \ \ 3 \ \ 12_R$

$X^3+X^2-9X+3+\frac{12}{X+2}$

8. Find all the rational zeros of

$P(x)=x^3-7x^2+14x-8$

$p=-8$ Factors: $\pm1, \pm2, \pm4, \pm8$
$q=1$ Factors: ±1
$\frac{p}{q}=\pm1, \pm2, \pm4, \pm8$

$1 \mid 1 \quad -7 \quad 14 \quad -8$
$\quad\quad\ 1 \quad -6 \quad 8$
$1X^2-6X+8 \ \ 0_R$

Zeros: 1, 2, 4

$X^2-6X+8=0$

8
$-4 \quad -2$
-6
$(X-4)(X-2)=0$
$X=4, 2$

9. Find all the rational zeros of

$P(x)=x^3+4x^2+3x-2$

Zeros: -2, $-1\pm\sqrt{2}$

$p=-2$ Factors: $\pm1, \pm2$
$q=1$ Factors: ±1
$\frac{p}{q}=\pm1, \pm2$

$-2 \mid 1 \quad 4 \quad 3 \quad -2$
$\quad\quad\ -2 \quad -4 \quad 2$
$1X^2+2X-1 \ \ 0_R$

$X^2+2X-1=0$

-1
2

$\frac{-2\pm\sqrt{2^2-4(1)(-1)}}{2(1)}$

$\frac{-2\pm\sqrt{4+4}}{2}$

$\frac{-2\pm\sqrt{8}}{2}$

$\frac{-2\pm2\sqrt{2}}{2}$

$-1+\sqrt{2}$

Simplify

10. $(2-5i)+(3+4i)$ $5-i$

11. $(-12+8i)-(7+4i)$ $-19+4i$

12. $(3-4i)(5-12i)$ $-33-56i$

13. $\dfrac{2-3i}{1-2i}$ $\dfrac{(1+2i)}{(1+2i)}$ $\dfrac{8+i}{5}$

14. If $f(x)=x^3-7x^2+17x-15$ has a zero at 3, find the other zeros.

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17. Solve: $x^2-2x+2=0$ $1\pm i$

18. Factor completely: x^3+5x^2+x+5

(a) $(x+5)(x-i)(x-i)$

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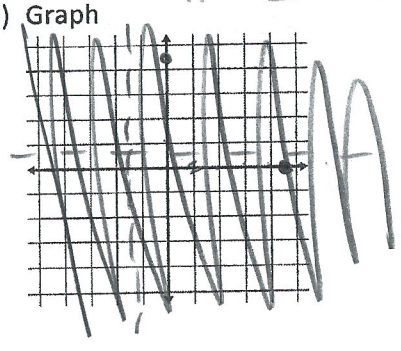
(e) Graph



23. Find the intercepts and asymptotes.

$f(x)=\dfrac{x^2-x-2}{x-6}$ $\dfrac{(x-2)(x+1)}{(x-6)}$

(a) Determine the x-intercepts

$x-2=0$ $x+1=0$

$x=2$ $x=-1$

(b) Determine the y-intercepts

$y=\frac{-2}{-6}$ $y=\frac{1}{3}$

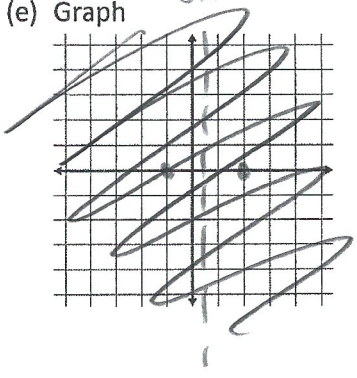
(c) Determine the vertical asymptote

$x-6=0$ $x=6$

(d) Determine the horizontal asymptote

$y=\frac{1x^2}{0x^2}$ none

(e) Graph



f) hole?

24. Find the intercepts and asymptotes.

$f(x)=\dfrac{x-1}{x+4}$

(a) Determine the x-intercepts

$x-1=0$ $x=1$

(b) Determine the y-intercepts

$y=\frac{-1}{4}$

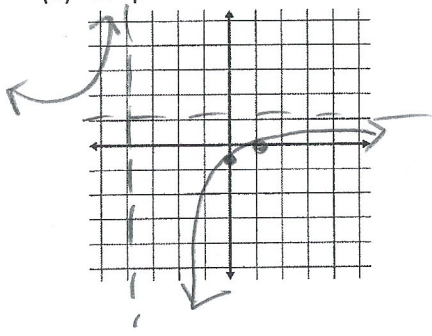
(c) Determine the vertical asymptote

$x+4=0$ $x=-4$

(d) Determine the horizontal asymptote

$y=\frac{1x}{1x}$ $y=1$

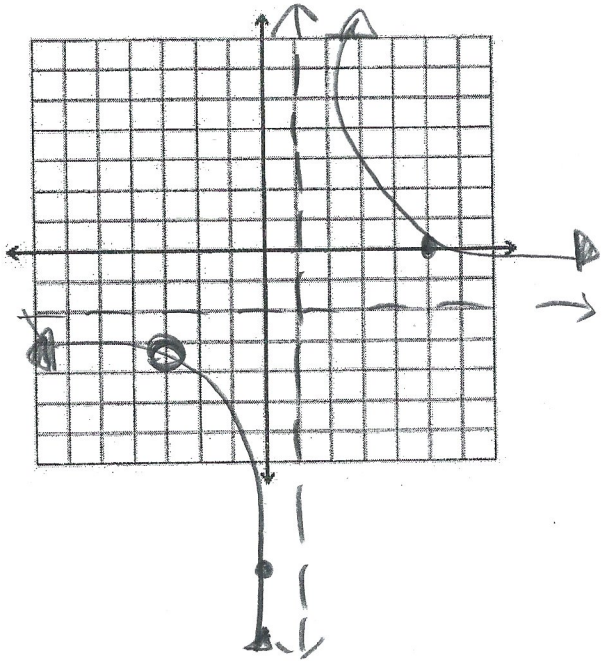
(e) Graph



25. $y = \dfrac{-2x^2+4x+30}{x^2+2x-3}$

$\dfrac{-2(x^2-2x-15)}{x^2+2x-3}$

-15
-5 3
-2



-3
3 -1
2

$\dfrac{-2(x-5)(x+3)}{(x+3)(x-1)}$ hole

$y = \dfrac{-2(x-5)}{x-1}$

x-intercepts:

top = 0

$\frac{-2}{-2}(x-5) = \frac{0}{-2}$

$x-5=0$ $\boxed{x=5}$

y-intercept:

Let $x=0$, solve for y

$y = \dfrac{-2(0-5)}{0-1} = \dfrac{10}{-1} = \boxed{-10}$

vertical asymptotes:

bottom = 0

$x-1=0$

$\boxed{x=1}$

horizontal asymptotes:

highest power

$y = \dfrac{-2x}{x}$

$\boxed{y=-2}$

$\dfrac{-2x+10}{x-1}$

Hole: $x+3=0$

$\boxed{x=-3}$

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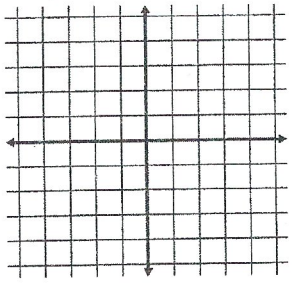
(f) Graph