MAC1105 Test 4 Name Key

(D. Howard 3-16)

3.3 each

1.) Given the polynomial $f(x) = x^4 + 8x^3 + 22x^2 + 24x + 9$

a.) Find the y-intercept. $f(0) = 0^4 + 8(0)^3 + 22(0)^2 + 24(0) + 9 = 9$

(0, 9)

b.) State the degree of the polynomial. $n = 4$

c.) State the leading coefficient. $a = 1$

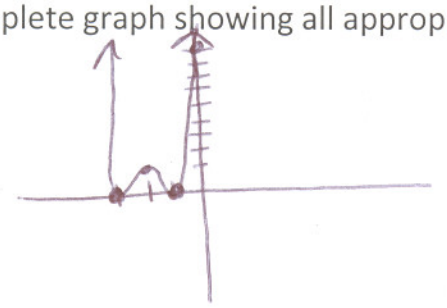
d.) Determine the end behavior (Tails Test). ↑ ↑

n = even
a > 0

e.) Determine any local minimum points. (-3, 0) (-1, 0) use CALC #3

f.) Determine any local maximum points. (-2, 1) use CALC #4

g.) Sketch a complete graph showing all appropriate behavior.



h.) Solve for when $f(x) = 0$. $x = -3, -1$

i.) Rewrite f(x) in factored form. $y = (x+3)^2(x+1)^2$

3.3 each

2. Given the polynomial $f(x) = -2x(x+3)^2(x-4)^3$

a.) Find the *x*-intercepts. State the multiplicity of each x-intercept.

$0 = -2x(x+3)^2(x-4)^3$

$-2x=0 \quad (x+3)^2=0 \quad (x-4)^3=0$

$x=0$ mult 1 | $x=-3$ mult 2 | $x=4$ mult 3

b.) Find the y-intercept.

$f(0) = -2(0)(0+3)^2(0-4)^3 = 0$ → (0,0)

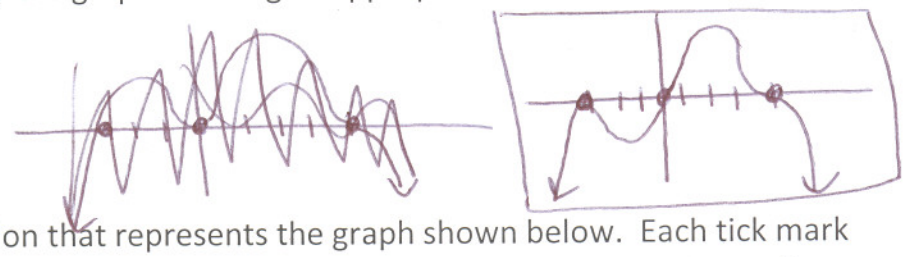
c.) State the degree of the polynomial. $n=6$

d.) State the leading coefficient. $a=-2$

e.) Determine the end behavior (Tails Test). ↙ ↘

n = even
$a < 0$

f.) Sketch a complete graph showing all appropriate behavior.



3. Find an equation that represents the graph shown below. Each tick mark represents one unit.

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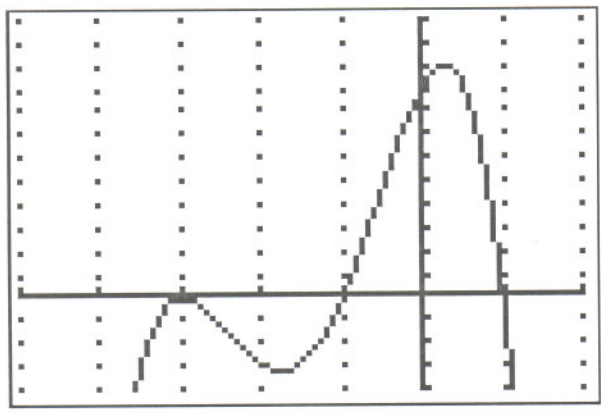


$x=-3$ mult 2 | $x=-1$ mult 1 | $x=1$ mult 1

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

"a" must be negative for these tails.

4.) Given $f(x) = \frac{3x+3}{6x-1}$

3, 3 each

a.) Find any vertical asymptotes. If none, say "none".

$6x - 1 \neq 0$

$6x \neq 1$

$x \neq 1/6$

b.) Find any horizontal asymptotes. If none, say "none".

$n = m \Rightarrow y \neq a/b$

$y \neq 3/6$ $\quad y \neq 1/2$

c.) Find any x-intercepts.

$3x + 3 = 0$

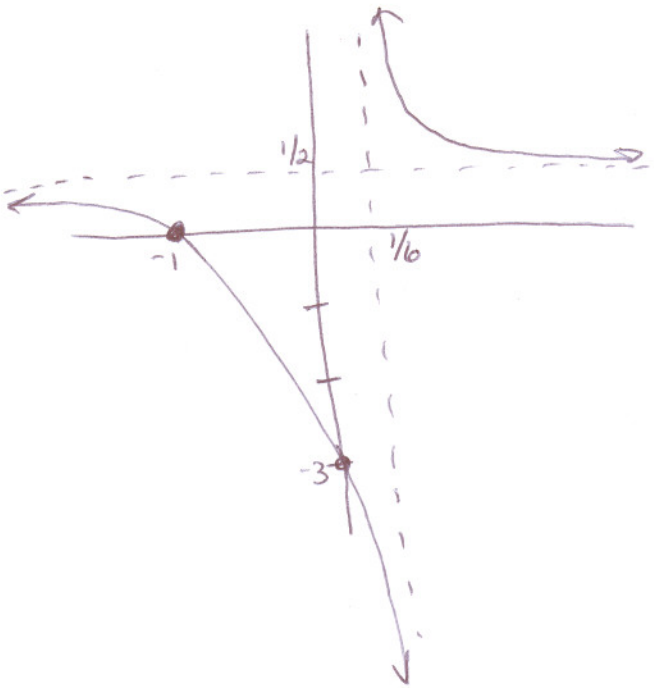
$3x = -3$ $\quad (-1, 0)$

$x = -1$

d.) Find the y-intercept.

$f(0) = \frac{3(0)+3}{6(0)-1} = \frac{3}{-1} = -3$ $\quad (0, -3)$

e.) Sketch a complete graph showing all appropriate behavior.



5.) Given $f(x) = \frac{x-8}{x^2-4}$ Enter $y = (x-8)/(x^2-4)$

3.3 each

a.) Find any vertical asymptotes. If none, say "none".

$x^2 - 4 \neq 0$

$(x+2)(x-2) \neq 0$

$\boxed{x \neq \pm 2}$

b.) Find any horizontal asymptotes. If none, say "none".

$m > n \Rightarrow \boxed{y \neq 0}$

c.) Find any x-intercepts.

$x - 8 = 0$

$x = 8$

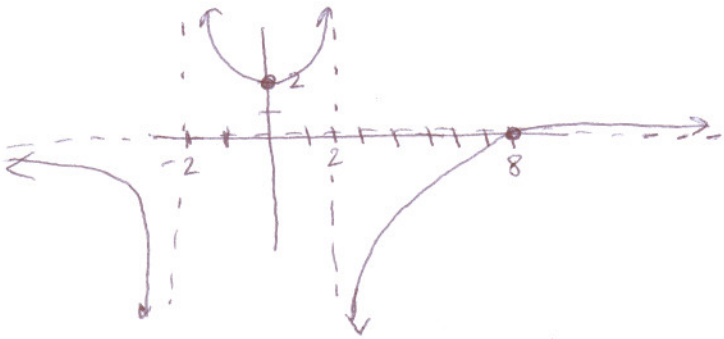
$\boxed{(8,0)}$

d.) Find the y-intercept.

$f(0) = \frac{0-8}{0^2-4} = \frac{-8}{-4} = 2$ $\boxed{(0,2)}$

e.) Sketch a complete graph showing all appropriate behavior.

6.)



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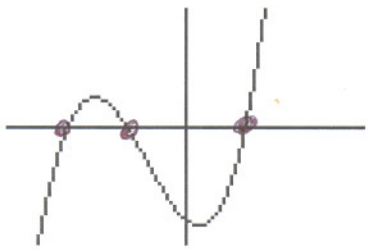

Use the graph of $f(x)$ above to determine how many real solutions to $f(x) = 0$ exist.

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