Algebra 2
Unit 3 Characteristics of Graphs

Name: KEY

State the maximum number of turns in the graph of the function. State also the end behaviors of the functions.

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

Turns: 3

$x \to -\infty$, $f(x) \to \infty$

$x \to \infty$, $f(x) \to \infty$

2. $g(x) = 5x^6 - 2x^2 + 4$

Turns = 5

as $x \to -\infty$, $f(x) \to \infty$

as $x \to \infty$, $f(x) \to \infty$

3. $h(x) = -3x^9 + 2x^2 + 2x - 5$

Turns: 8

$x \to -\infty$, $f(x) \to \infty$

$x \to \infty$, $f(x) \to -\infty$

4. $f(x) = -6x^5 + 3x - 11$

Turns: 4

as $x \to -\infty$, $f(x) \to \infty$

as $x \to \infty$, $f(x) \to -\infty$

5. $f(x) = -3x^4 + 2x^2 - 1$

Turns: 3

$x \to -\infty$, $f(x) \to -\infty$

$x \to \infty$, $f(x) \to -\infty$

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

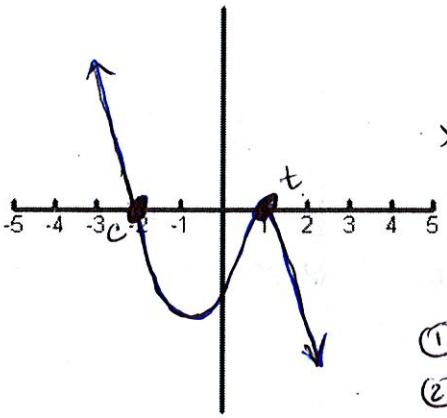
Turns: 2

as $x \to -\infty$, $f(x) \to -\infty$

as $x \to \infty$, $f(x) \to \infty$

Sketch the graph without a calculator. State the degree and end behaviors of the graphs.

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



$x+2=0$

$x=-2$

$x-1=0$

$x=1$

① x-value

② EB

Degree: 5 (odd)

Max # of turns: 4

Zeros and their multiplicity

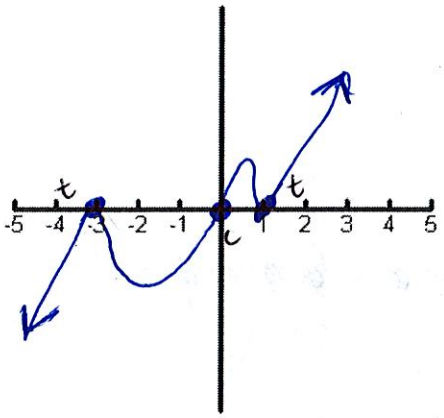
$x=-2\,(\mu=1)^c$ $x=1\,(\mu=4)^t$

End Behavior:

$x \to -\infty$, $f(x) \to \infty$

$x \to \infty$, $f(x) \to -\infty$

8. $g(x) = x^1(x+3)^2(x-1)^2$



Degree: 5

Max # of turns: 4

Zeros and their multiplicity

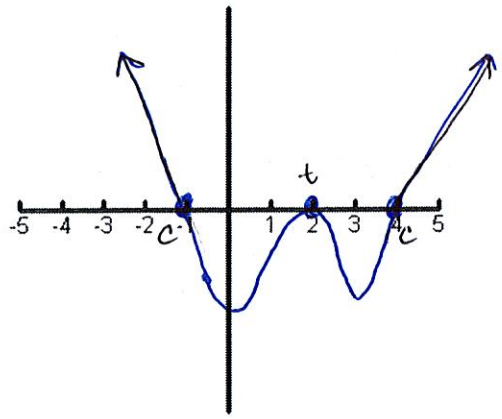
$x=0\,(\mu=1)^c$, $x=-3\,(\mu=2)^t$, $x=1\,(\mu=2)^t$

End Behavior:

$x \to -\infty$, $f(x) \to -\infty$

$x \to \infty$, $f(x) \to \infty$

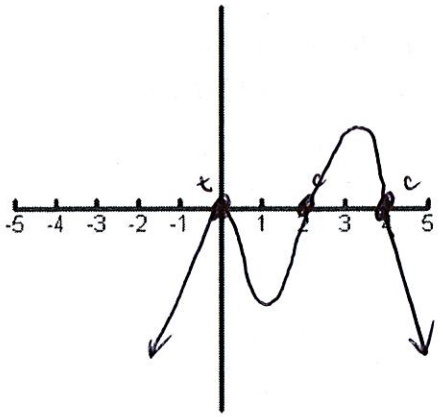
9. $h(x) = (x - 4)(x + 1)^3(x - 2)^2$



$x - 4 = 0$
$x = 4$
$x + 1 = 0$
$x = -1$
$x - 2 = 0$
$x = 2$

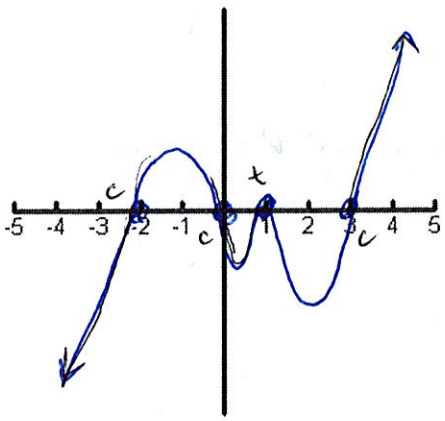
Degree: 6 (Even) LC: Pos.
Max # of turns: 5
Zeros and their multiplicity
$x = 4\ (\mu = 1)^c$ $x = -1\ (\mu = 3)^c$ $x = 2\ (\mu = 2)^t$
End Behavior:
$x \to -\infty$, $f(x) \to \infty$
$x \to \infty$, $f(x) \to \infty$

10. $f(x) = -x^2(x - 4)(x - 2)^3$



Degree: 6 (Even) LC: Neg.
Max # of turns: 5
Zeros and their multiplicity
$x = 0\ (\mu = 2)^t$ $x = 4\ (\mu = 1)^c$ $x = 2\ (\mu = 3)^c$
End Behavior: as $x \to -\infty$, $f(x) \to -\infty$
as $x \to \infty$, $f(x) \to -\infty$

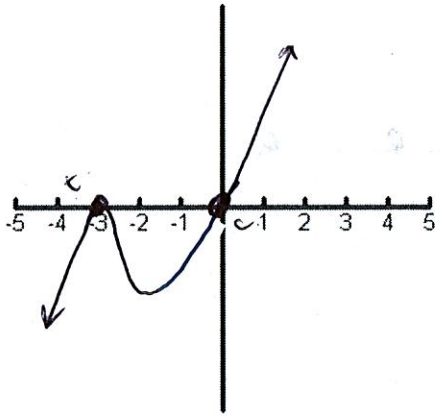
11. $g(x) = x(x + 2)(x - 1)^4(x - 3)^3$



$x = 0$
$x + 2 = 0$
$x = -2$
$x - 1 = 0$
$x = 1$
$x - 3 = 0$
$x = 3$

Degree: 9 (odd) LC: Pos
Max # of turns: 8
Zeros and their multiplicity
$x = 0\ (\mu = 1)^c$, $x = -2\ (\mu = 1)^c$, $x = 1\ (\mu = 4)^t$, $x = 3\ (\mu = 3)^c$
End Behavior:
$x \to -\infty$, $f(x) \to -\infty$
$x \to \infty$, $f(x) \to \infty$

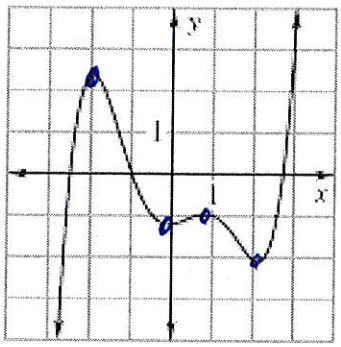
12. $h(x) = x^5(x + 3)^4$



Degree: 9 (odd) LC: Pos
Max # of turns: 8
Zeros and their multiplicity
$x = 0\ (\mu = 5)^c$ $x = -3\ (\mu = 4)^t$
End Behavior:
as $x \to -\infty$, $f(x) \to -\infty$
as $x \to \infty$, $f(x) \to \infty$

What is the minimum degree of each of the polynomials based on vertices?

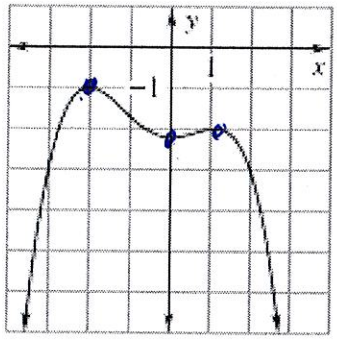
11.



Turns = 4

Min. Deg = 5

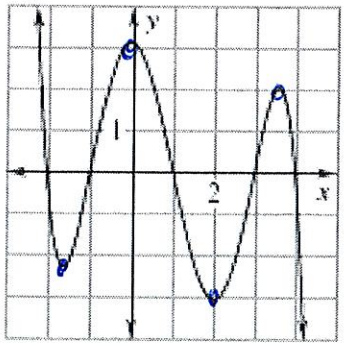
12.



Turns: 3

Min Deg: 4

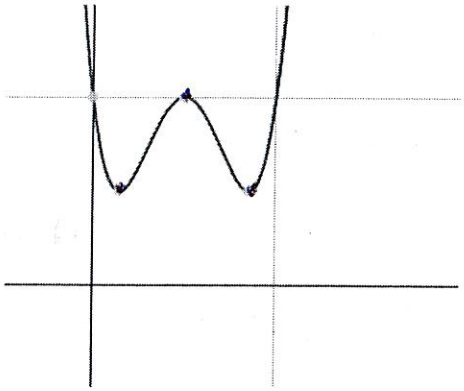
13.



Turns = 4

Min. Degree: 5

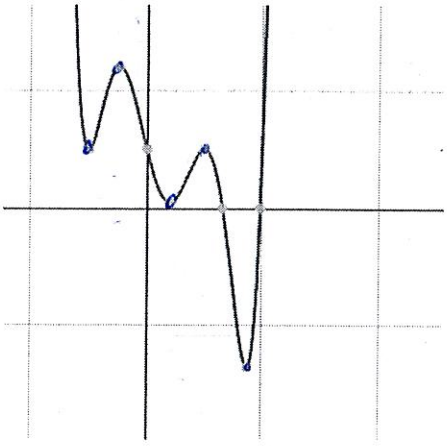
14.



Turns = 3

Min Deg = 4

15.



Turns = 5

Min Deg = 6