

1. Use synthetic substitution to evaluate $f(x) = 7x^3 + 3x^2 - 7x + 3$ when $x = 3$.

a. $f(x) = 216$

b. $f(x) = 63$

c. $f(x) = 195$

d. $f(x) = 198$

Complete the statement to describe the end behavior of the graph of the function.

2. $f(x) = -x^3 + 7x + 4$  neg/odd

$f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$ and $f(x) \rightarrow -\infty$ as $x \rightarrow +\infty$.

Decide whether the function is a polynomial function. If so, state its degree, ~~type~~, and symmetry.

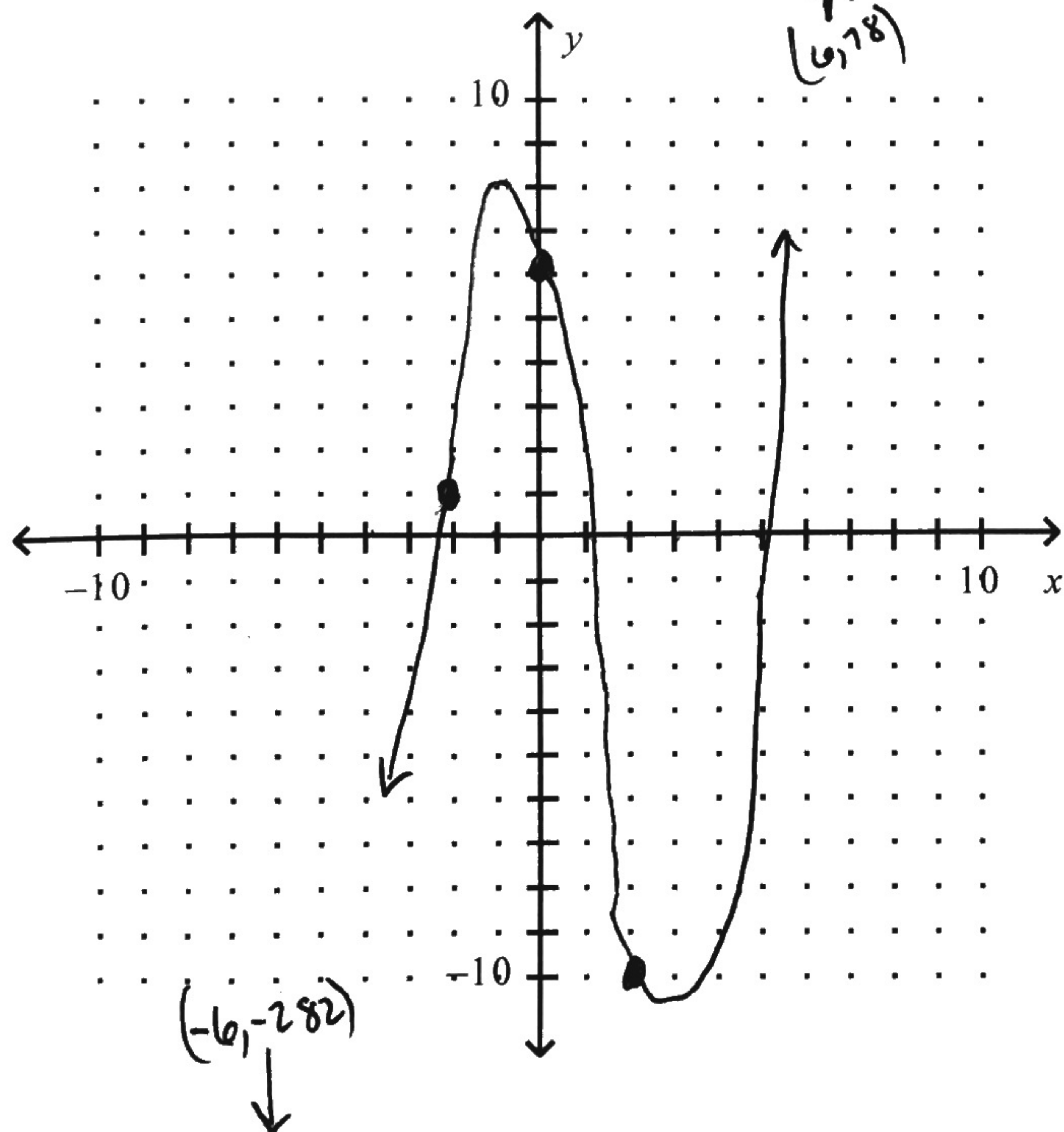
3. $g(x) = 4x^2 - x - 1$ yes polynomial, neither, 4

Complete the table and graph the polynomial function.

4. $h(x) = x^3 - 3x^2 - 6x + 6$ pos/odd

x	-6	-2	0	2	6
y	-282	-2	6	-10	78

~~$x^2(x-3) = 6(x+1)$~~



Factor the polynomial completely.

5. $9y^2 - 64$ ← Difference of Squares

a. $(9y+1)(y-64)$

b. $(3y-8)(3y-8)$

c. $(3y+8)(3y-8)$

d. $(3y+8)(3y+8)$

6. $125 - t^6$ $(5-t^2)(25+5t^2+t^4)$ * $(a-b)(a^2+ab+b^2)$

$a = \sqrt[3]{125} = 5$

$b = \sqrt[3]{t^6} = t^{6/3} = t^2$ or $(t^2)(t^2)(t^2) = t^6$

Real-number solutions

7. $2z^8 - 6z^6 - 80z^4$

$2z^4(z^4 - 3z^2 - 40)$

$2z^4(z^2 - 8)(z^2 + 5)$

8. $4x^3 - 8x^2 + 3x - 6$

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

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

6. $5 - t^2 = 0$

$5 = t^2$

$\pm\sqrt{5} = t$

*the other part is Imaginary

7. $2z^4 = 0$

$z = 0$

$z^2 - 8 = 0$

$z^2 = 8$

$z = \pm 2\sqrt{2}$

$z^2 + 5 \rightarrow$ Imag.

8. $4x^2 + 3 = 0$

$4x^2 = -3$

Imag.

$x - 2 = 0$

$x = 2$

Find the real-number solutions of the equation.

Do this for 6-8

9. ~~$x^3 - 5x^2 + 8x - 4 = 0$~~

10. State the transformations from the parent function $f(x) = x^2$ to $g(x) = -2(x+5)^2 - 7$

Left 5
down 7
Vert. Stretch by a factor of 2
reflect over x-axis

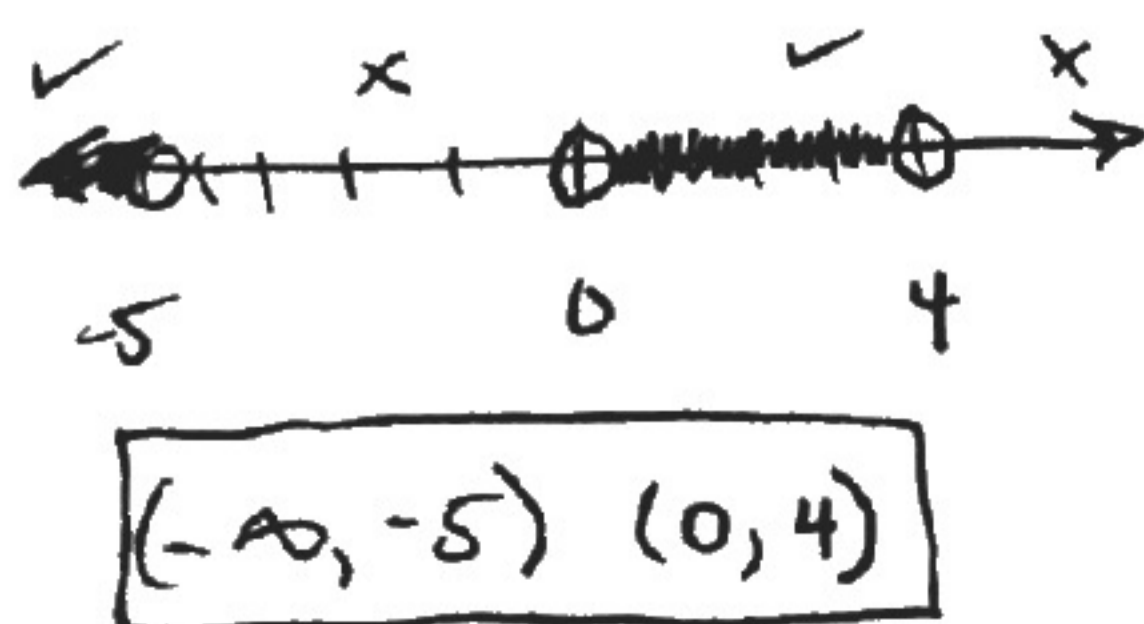
11. Solve the inequality algebraically.

$f(x) = x^3 + x^2 - 20x < 0$

$x(x^2 + x - 20) < 0$

$x(x-4)(x+5) < 0$

$x < 0$ $x = 4$ $x = -5$




$x = 1 \quad | -1 | -20(1) < 0$

$2 - 20 = -18 < 0$ True

$5^3 + 5^2 - 20(5) < 0$
F

Solve the inequality using a graph.

12. $x^4 - 11x^2 + 18 \leq 0$

pos/EVEN 

$$(x^2 - 9)(x^2 - 2) \leq 0$$

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

$$x = 3$$

$$x = -3$$

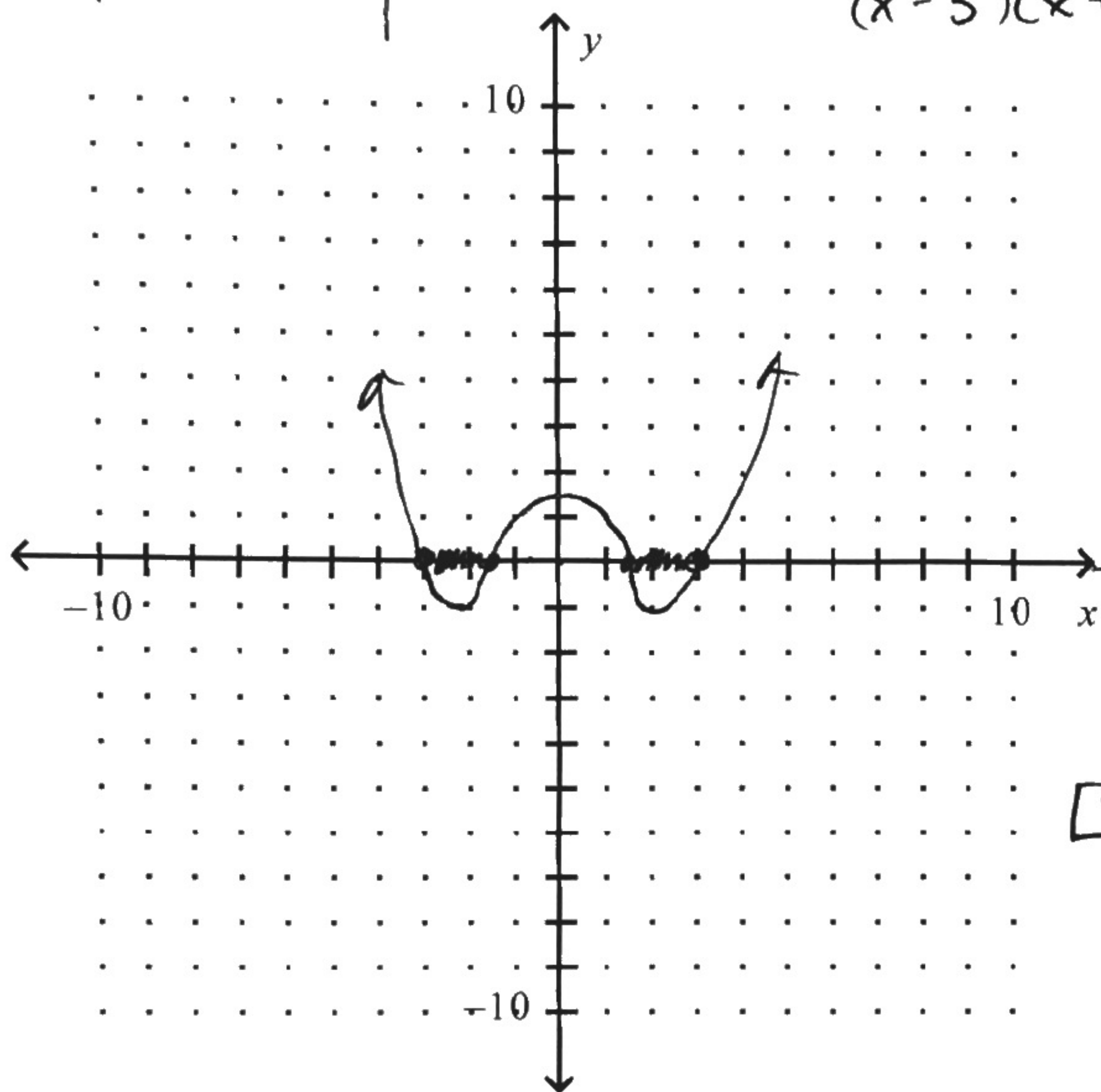
$$x = 1.4$$

$$x = -1.4$$

$$x^2 = 2$$

$$\sqrt{x^2} = \sqrt{2}$$

$$x = \pm\sqrt{2} = \pm 1.4$$



Less than zero

↓ "Below x-axis"

$$[-3; 1.4], [1.4, 3]$$

13. Graph the following: $f(x) = (x + 5)^3(x + 1)^4(x - 3)(x - 4)^2(x - 6)$ 3+4+1+2+1

Degree: 11 Roots/Multiplicity $x = -5/3$ $x = -1/4$ $x = 3/1$ $x = 4/2$ $x = 6/1$
pass Bounce pass Bounce pass

$f(x) \rightarrow -\infty$ $f(x) \rightarrow \infty$
 $x \rightarrow -\infty$ $x \rightarrow \infty$

degree: 11 pos/odd
 L.C.: 1 