Graphing Polynomials Worksheet Name/Period____________________

Long Division:

A. $2\sqrt{782}$ — 391 need

-6, 18, -18, 02, -2, 0 ✓

$391 \times 2 = 782$ ✓

B. $4\sqrt{8764}$ — 2191

-8, 0764, -4, 364

$2191 \times 4 = 8764$ ✓

C. $3\sqrt{3341}$ — 1113 R $\frac{2}{3}$

-3, 341, -3, 4.1, -3, 11

1. a. $f(x) = x^2 + 7x + 12$

$(x+4)(x+3)$

-4, -3

12, 4, 3, 7

b. $x+3\,\sqrt{x^2 + 7x + 12}$ — $x+4$

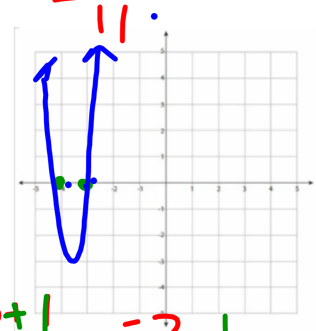
$-(x^2+3x)$

$4x+12$

$-(4x+12)$

0

$(x+3)(x+1)$



c. $f(x) = 1x^2 + 7x + 12$ — $49-48$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{-7 \pm \sqrt{7^2 - 4(1)(12)}}{2(1)} = \frac{-7 \pm \sqrt{1}}{2} \rightarrow \frac{-7+1}{2}, \frac{-7-1}{2}$

$-3, -4$

2. x^2+5x+4

$(x+4)(x+1)$

$\boxed{x = -4, -1}$

4, 4, 1, 5

3. $x+1\,\sqrt{x^2 + 5x + 4}$ — have, $x+4$, need, want

$-(x^2+x)$

$4x+4$

$-(4x+4)$

0 ✓

Long Division Polynomials:

You are given a polynomial $f(x) = qx^n + ax^{n-1} \ldots + bx + p$. Find all the factors of the constant (p). Find all the factors of your leading coefficient (q). All of the possible zeros are $\pm\frac{p}{q}$.

4. $x^2 + x - 6$

x+1 $\sqrt{x^3 + 2x^2 - 5x - 6}$

$-x^3 + x^2$

$1x^2 - 5x - 6$

$-x^2 + x$

$-6x - 6$

$-+6x + 6$

0

5. x+3 $\sqrt{x^3 - 27x - 54}$

x+3 $\sqrt{x^3 \; 0x^2 \; 27x \; -54}$

6. x+4 $\sqrt{2x^3 + 11x^2 + 7x - 20}$

7. $f(x) = 3x^3 + 12x^2 + 12x$

$3x$

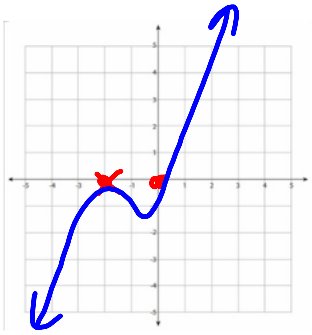
$3x(x^2 + 4x + 4)$

$4 = 2 \cdot 2$

$3x(x+2)(x+2)$

$3x(x+2)^2$ ↑bounce

$0 \quad -2$



8. $f(x) = x^3 + x^2 - 9x - 9$; (x+3)

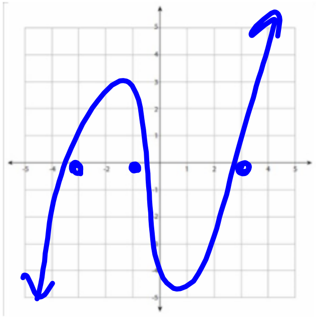
$$\begin{array}{r} x^2 - 2x - 3 \\ x+3 \overline{)\, x^3 + x^2 - 9x - 9} \\ -x^3 - 3x^2 \quad\quad\quad \\ \hline -2x^2 - 9x - 9 \\ +2x^2 + 6x \quad \\ \hline -3x - 9 \\ +3x + 9 \\ \hline 0 \end{array}$$

$\to x^2 - 2x - 3$

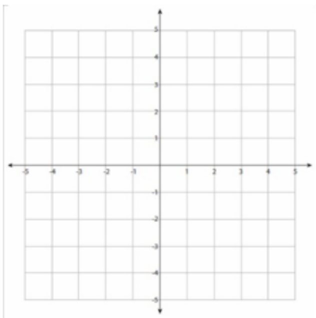
$-2 = 1 + -3$

$\boxed{(x+3)(x+1)(x-3)}$

$-3 \quad -1 \quad 3$



9. $f(x) = x^3 + x^2 - 14x - 24$; (x+3)



10. $f(x) = x^3 - 7x - 6$; (x+2)

$$\begin{array}{r} x^2 - 2x - 3 \\ x+2 \,\big)\, \overline{x^3 + 0x^2 - 7x - 6} \\ -x^3 - 2x^2 \quad\quad\quad\quad \\ \hline -2x^2 - 7x - 6 \\ +2x^2 + 4x \quad\; \\ \hline -3x - 6 \\ +3x + 6 \\ \hline 0 \end{array}$$

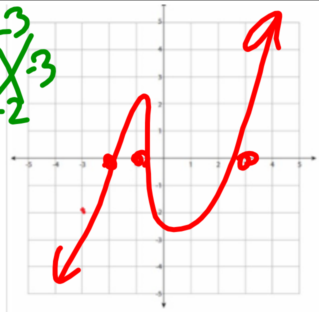
$\rightarrow x^2 - 2x - 3$

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

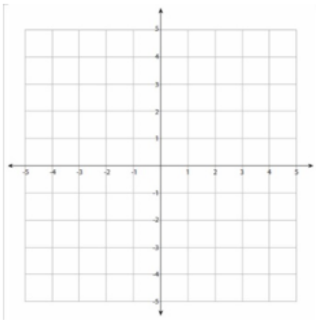
-3, 1, -3, -2

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

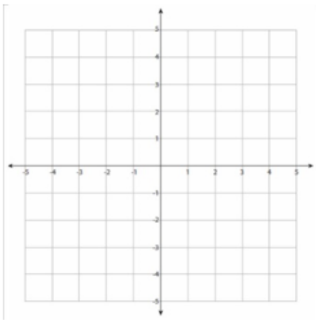
$x = -2, -1, 3$



11. $f(x) = x^3 - 5x^2 - 16x + 80$; (x-4)



12. $f(x) = x^3 - 2x^2 - 19x + 20$; (x-1)



Lesson 3.6: graph 2-3

For each function, identify the end behavior and roots (including the multiplicity) of the function.

2. Equation: $f(x) = -x(x-2)(x-4)$

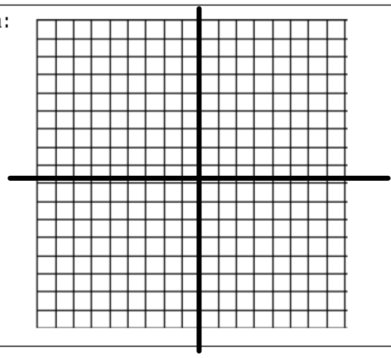
Intercepts:

End behavior:

$as \quad x \to -\infty, \qquad f(x) \to$ ____

$as \quad x \to \infty, \qquad f(x) \to$ ____

Graph:



3. Equation: $f(x) = x(x^2 + 4x + 4)$

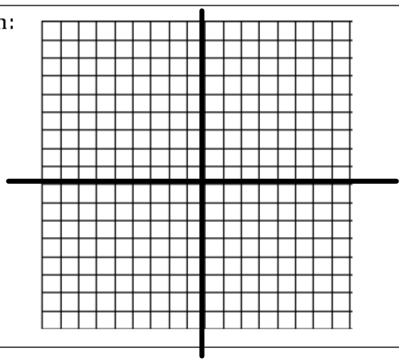
Intercepts:

End behavior:

$as \quad x \to -\infty, \qquad f(x) \to$ ____

$as \quad x \to \infty, \qquad f(x) \to$ ____

Graph:



Lesson 3.6: graph 2-6

For each function, identify the end behavior and roots (including the multiplicity) of the function.

2. Equation: $f(x) = -x(x-2)(x-4) = 0$

$-x^3$

Intercepts:

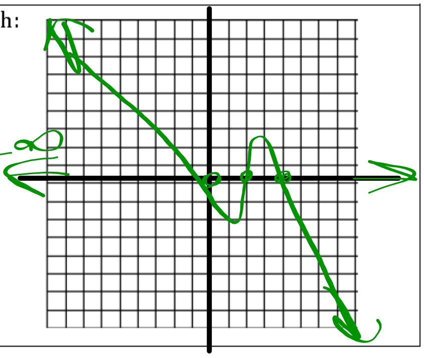
$x = 0, 2, 4$ passes

End behavior:

as $x \to -\infty$, $f(x) \to \underline{\infty}$

as $x \to \infty$, $f(x) \to \underline{-\infty}$

Graph:



3. Equation: $f(x) = x(x^2 + 4x + 4)$

~~$4 = 1 + 4$~~

$4 = 2 + 2$

Intercepts:

$x^3 =$

$= x(x+2)(x+2)$

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

End behavior:

$x = 0, -2$ bounce

pass

as $x \to -\infty$, $f(x) \to \underline{-\infty}$

as $x \to \infty$, $f(x) \to \underline{\infty}$

Graph:

$y = 0$