Name: Period: Date:

# Practice Worksheet: Synthetic Division

**Complete each statement to make it true.**

1] If $g(-4) = 0$, then _____ is a factor of $g(x)$.

2] $(x^4 - 3x^2 + 2x - 5) \div (x^2 - 2x + 3)$ can NOT be done using _____ division.

3] If $f(5) = 3$, then $f(x) \div (x - 5)$ has a _____ of 3.

**Use the Remainder Theorem to find the remainder when dividing each by $(x - 3)$. Is it a factor?**

4] $f(x) = x^3 - 5x^2 - 3x + 9$ 5] $g(x) = x^3 + 2x^2 - 6x + 12$ 6] $h(x) = x^3 - x^2 - 7x + 3$

**Use the Factor Theorem to determine if the divisor is a zero of the original polynomial. If so, rewrite as a product of two factors.**

7]

| | | | | |
|---|---|---|---|---|
| $-1$ | 1 | 2 | $-1$ | $-2$ |
| | | $-1$ | $-1$ | 2 |
| | 1 | 1 | $-2$ | 0 |

8]

| | | | | |
|---|---|---|---|---|
| 4 | 3 | $-10$ | 0 | $-5$ |
| | | 12 | 8 | 32 |
| | 3 | 2 | 8 | 27 |

9]

| | | | | | |
|---|---|---|---|---|---|
| -2 | 1 | 2 | 1 | 5 | 6 |
| | | -2 | 0 | -2 | -6 |
| | 1 | 0 | 1 | 3 | 0 |

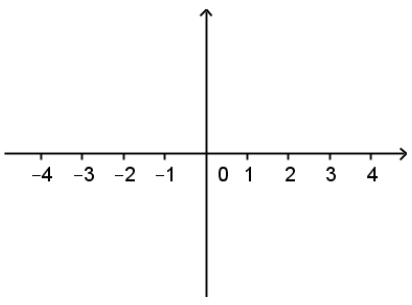
**Using the synthetic division provided, write the original polynomial in both standard form and factored form. Then, sketch the graph.**

10]

| | | | | | |
|---|---|---|---|---|---|
| 4 | -1 | 10 | -24 | -32 | 120 |
| | ↓ | -4 | 24 | 0 | -120 |
| 4 | -1 | 6 | 0 | -32 | |
| | ↓ | -4 | 8 | 32 | |
| -2 | -1 | 2 | 8 | 0 | |
| | ↓ | 2 | -8 | | |
| | -1 | 4 | 0 | | |

Standard Form:

Factored Form:

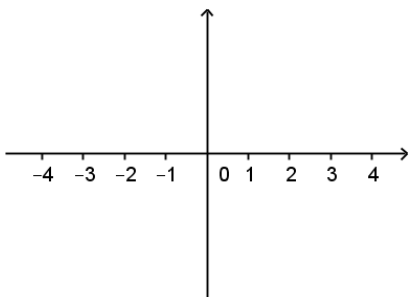



11]

| | | | | | | |
|---|---|---|---|---|---|---|
| -3 | 1 | 3 | -2 | -6 | 1 | 3 |
| | ↓ | -3 | 0 | 6 | 0 | -3 |
| | 1 | 0 | -2 | 0 | 1 | 0 |
| -1 | ↓ | -1 | 1 | 1 | -1 | |
| | 1 | -1 | -1 | 1 | 0 | |
| -1 | ↓ | -1 | 2 | -1 | | |
| | 1 | -2 | 1 | 0 | | |
| 1 | ↓ | 1 | -1 | | | |
| | 1 | -1 | 0 | | | |

Standard Form:

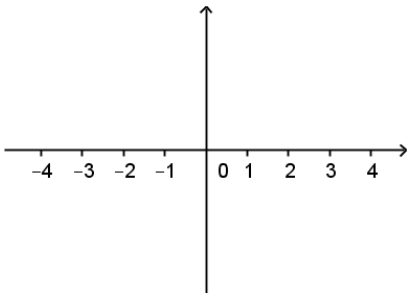
Factored Form:



**A polynomial $f(x)$ and one or more factors of $f(x)$ are given. Factor completely using synthetic division and rewrite in factored form. Then sketch the graph. Show all work.**

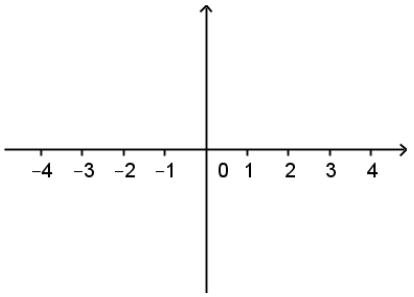
12] $f(x) = -x^3 - 3x^2 + 6x + 8$ has factors of $(x - 2)$and $(x + 1)$.

Factored form:



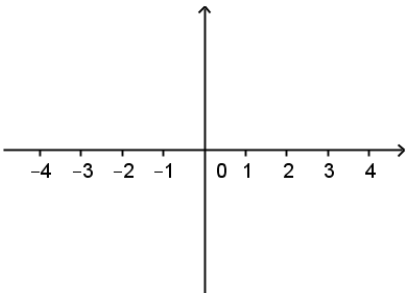

13 $f(x) = 2x^3 - 3x^2 - 14x + 15$ has factors of $(x - 1)$and $(x - 3)$.

Factored form:




14] $f(x) = x^4 - 7x^3 + 9x^2 + 27x - 54$ has a factor of $(x - 3)$ with multiplicity 3.

Factored form:




15] $f(x) = x^4 - 11x^2 - 18x - 8$ has a factor of $(x + 2)$ and $(x + 1)$ with multiplicity 2.

Factored form: