Name:

Practice Worksheet:
Polynomial Long Division

Answer each question using the work shown in the box below.

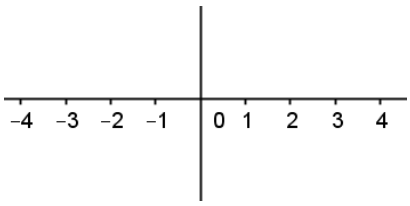
1] Write the standard form of the original polynomial.

$$x+3 \overline{)\, x^3+3x^2-x-3} \qquad x^2-1$$

2] Write the factored form of the original polynomial.

3] Identify all zeros of the original polynomial.

4] Sketch the graph of the original polynomial.



Find the missing information in each problem using the work shown.

5]

$$x-4 \overline{)\, x^3+2x^2-6x+12}$$
$$-(x^3-4x^2)$$
$$6x^2-6x+12$$
$$-(6x^2-24x)$$
$$18x+12$$
$$-(18x-72)$$
$$84$$

6]

$$\text{[ ]} \overline{)\, x^3+2x^2-6x+12} \qquad x^2-x-3$$
$$-(x^3+3x^2)$$
$$-x^2-6x+12$$
$$-(-x^2-3x)$$
$$-3x+12$$
$$-(-3x-9)$$
$$21$$

Circle any errors in each polynomial long division and explain what the student did wrong.

7]

$$x-3 \overline{)\, x^3-8x^2+21x-18} \qquad x^2-11x+54+\frac{-180}{x-3}$$
$$x^3-3x^2$$
$$-11x^2+21x-18$$
$$-11x^2+33x$$
$$54x-18$$
$$54x-162$$
$$-180$$

8]

$$x-2 \overline{)\, x^4+2x^3-x^2+3} \qquad x^3+4x^2+7x+\frac{17}{x-2}$$
$$-(x^4-2x^3)$$
$$4x^3-x^2+3$$
$$-(4x^3-8x^2)$$
$$7x^2+3$$
$$-(7x^2-14)$$
$$17$$

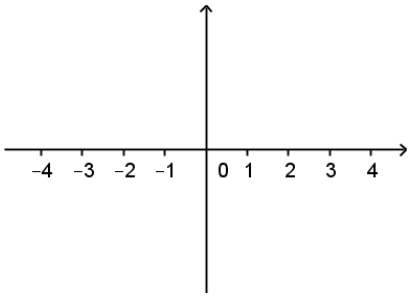
Use long division to find the quotient. Show all work.

9] $(10x^2+19x-25) \div (x+3)$

10] $(x^3-19x-30) \div (x-5)$

Use long division to rewrite f(x) in factored form and find all zeros. Then sketch the graph. Show all work.

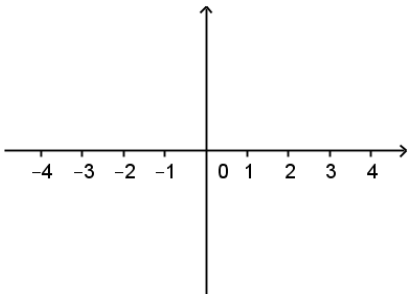
11] $f(x) = x^4 - 4x^3 - 6x^2 + 36x - 27$ has a factor of $(x - 3)$ with multiplicity two.



Factored Form:

Zeros:

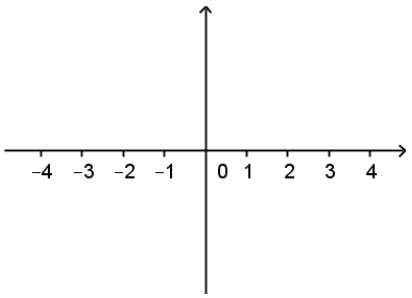
12] $f(x) = 2x^3 - 3x^2 - 14x + 15$ has factors of $(x - 1)$ and $(x - 3)$.



Factored Form:

Zeros:

BONUS: $f(x) = -x^5 + 7x^4 - 9x^3 - 27x^2 + 54x$ has a factor of $(x - 3)$ with multiplicity 3.



Factored Form:

Zeros: