Chapter 3 Hand-in Assignment – Polynomials

Name: _____

1. Complete the following table of polynomial characteristics.

Characteristic	$f(x) = 4x^4 - 7x^3 - 3x^2 + x - 4$	$f(x) = -3x^5 + 2x^4 - 3x^2 + 2x + 1$
Sign of leading coefficient		
Degree (is it odd or even?)		
End behavior		
Number of x-intercepts an equation of this degree can have	between _____ and _____	between _____ and _____
Coordinates of y-intercept		
Domain		
Range		

2. Use **long division** to find the quotient of the following polynomial division question:
$$\left(2x^4 - 5x^3 + 3x^2 - 12\right) \div \left(x - 2\right)$$

Write the final answer as a division statement in this form: $\dfrac{P(x)}{x-a} = Q(x) + \dfrac{R}{x-a}$

3. Use **synthetic division** to find the quotient of the following polynomial division question:

$$\left(3x^3 - 6x^2 + 3x + 7\right) \div \left(x + 1\right)$$

Write the final answer as a division statement in this form: $\dfrac{P(x)}{x-a} = Q(x) + \dfrac{R}{x-a}$

4. Show the use of the remainder theorem to find the remainder for the following:

a) $\left(2x^4 - 5x^3 + 3x^2 + 2x - 5\right) \div \left(x - 3\right)$

b) $\left(-5x^2 + 15x - 6\right) \div \left(x + 2\right)$

5. Determine the value of k if we know that the remainder for this division question is 11.
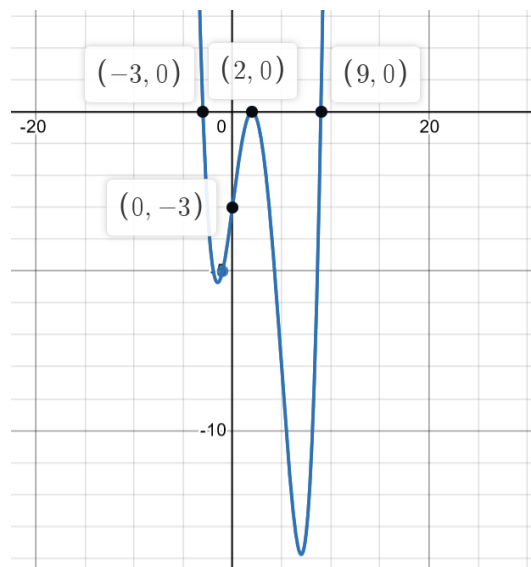
$$\left(4x^3 - kx + 8\right) \div \left(x - 3\right)$$

6. Find the value of k if we know that $x - 2$ is a factor of $-3x^4 + kx^3 - 20x^2 + 5x + 62$.

7. List all possible integral zeros for the polynomial: $f(x) = x^3 - 8x^2 + 20$

8. Fully factor the following polynomial: $2x^4 - 3x^3 - 23x^2 + 27x + 45$

9. Determine the equation of the function shown in the graph.

10. Determine the equation of the function that has the following:

Roots at -2, -1 (multiplicity 3) and 4 (multiplicity 2) and a y-intercept at $(0, -8)$.

You do NOT need to expand the equation – just leave it in factored form.

11a) Give the mapping that shows what happens to points on the base function, $y = x^3$, when
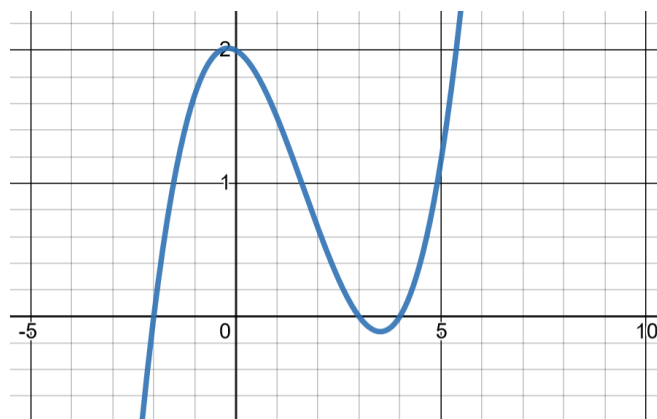
the equation is changed to $y = \frac{1}{2}\left(-\frac{1}{2}x - 1\right)^3 - 2$

b) Fill in the table of key points for the base function. Using the mapping, create the table of image points that result when the original points are transformed. Sketch the transformed graph on the grid.

x	y
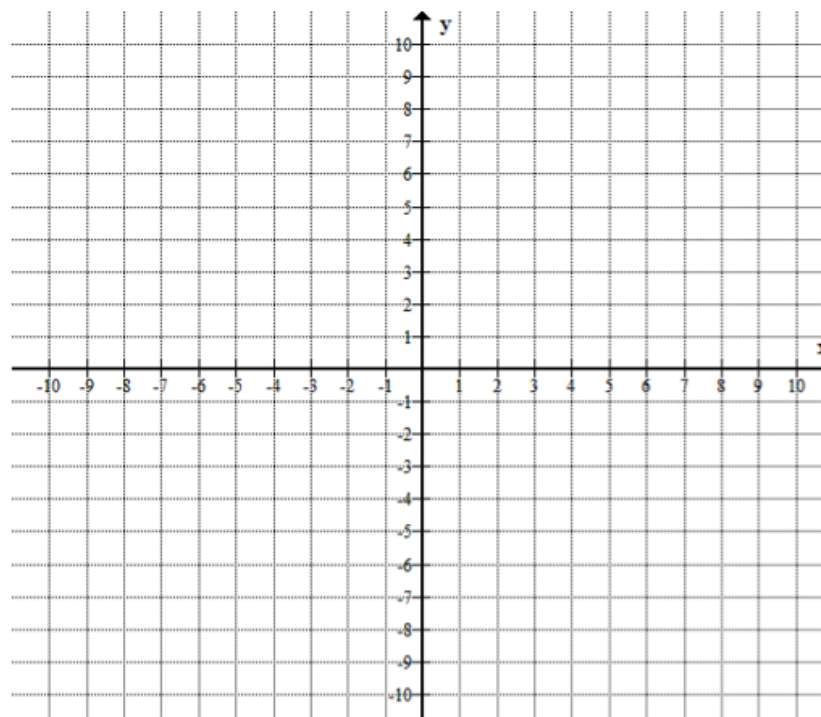
12. Use the graph of the given function to fill in the table below.

Characteristic	
Roots of the equation $f(x) = 0$	
End Behavior	
Intervals where $y = f(x)$ is greater than or equal to 0	
Intervals where $y = f(x)$ is less than 0	

13. If a box has a volume represented by $V(x) = 2x^3 - 17x^2 + 27x + 18$, determine the dimensions of the box, as expressions in terms of x.