Section 5.1 Polynomial functions

#1 – 16

a) List each x-intercept (zero) and its multiplicity (round to 2 decimal places when needed)
b) Determine whether the graph crosses or touches the x-axis at each x-intercept
c) Determine the maximum number of turning points on the graph
d) Sketch a graph and approximate the turning points, also label the x-intercepts
e) Describe the end behavior (find the power function that the graph resembles for large values of $|x|$
f) State the intervals where the function is increasing and decreasing

1) $f(x) = (x - 3)^2(x + 1)$              2) $f(x) = (x - 5)^2(x + 2)$

3) $f(x) = (x - 3)^3(x + 4)$              4) $f(x) = (x - 2)^3(x + 1)$

5) $f(x) = (x + 3)(x - 3)(3x + 21)$     6) $f(x) = (x + 2)(x - 2)(3x + 15)$

7) $f(x) = (x + 3)^2(2x - 10)$          8) $f(x) = (x + 3)^2(3x - 18)$

9) $f(x) = x^2 + 6x - 7$                 10) $f(x) = x^2 - 6x - 7$

11) $f(x) = x^2 - 4$                    12) $f(x) = x^2 - 9$

13) $f(x) = -3x^3 - 3x^2 + 18x$        14) $f(x) = -3x^3 + 3x^2 + 18x$

15) $f(x) = 3x^4 - 12x^2$              16) $f(x) = 2x^4 - 18x^2$

#17 – 24: Form a polynomial function of lowest degree with whose x-intercepts are given, that passes through the given point.

17) x-intercepts: (3,0), (-4,0); point (2, -12)         18) x-intercepts (-2,0), (4,0); point (2, -24)

19) x-intercepts: (-3,0), (4,0); point (5, -16)         20) x-intercepts (2,0), (-4,0); point (3, -21)

21) x-intercepts: (3,0) multiplicity 2, (-4,0); point (4, 16)

22) x-intercepts (-2,0) multiplicity 2, (4,0); point (3, -100)

23) x-intercepts: (-3,0), (4,0) multiplicity 2; point (3, -24)

24) x-intercepts (2,0), (-4,0) multiplicity 2; point (3, -98)