Kerry Ojakian's MTH 30 Class
Class Assignment #11

1. Consider the graph of $y = x^2 + x - 6$. Find all its intercepts (both x- and y-intercepts).

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2. For each function, find the zeroes and their multiplicities.

   (a) $f(x) = (x-3)^2(x+1)^4$ (b) $g(x) = (x+4)(x-12)^3(x-1)$

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3. For each function, find the zeroes and their multiplicities.

   (a) $f(x) = (2x-1)^3(x+7)$ (b) $h(x) = (4x+5)^2(7x)^5$

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4. Find the roots and their multiplicities for the function $f(x) = 5x^5 - 45x^3$

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5. Suppose a polynomial function has degree 5. What is the maximum number of intercepts it can have?

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6. Suppose a polynomial function has degree 7. If it is completely factored, what is the maximum number of factors?

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7. Suppose a polynomial function has degree 7. If it is completely factored, and complex numbers are allowed, how many factors are there?

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8. Suppose a polynomial function has exactly 2 roots. What is the least possible degree of the function?

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9. Suppose a polynomial function has exactly 5 intercepts. What is the least possible degree of the function?

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10. Draw a polynomial function which has to have degree at least 3 (just a rough sketch; no equation required).

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11. Draw a polynomial function which has to have degree at least 5 (just a rough sketch; no equation required).

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12. Show that the polynomial function $f(x) = x^3 - 9x$ has a zero between $x = -4$ and $x = -2$.

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13. Show that the polynomial function $g(x) = x^4 - 7x^3 - 5$ has a zero between $x = -1$ and $x = 2$.

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14. Graph $h(x) = 4(x + 3)(x - 1)$. Find its zeroes and the multiplicity of each.

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15. Graph $f(x) = (x + 3)^2(x - 1)$. Find its zeroes and the multiplicity of each.

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16. Graph $g(x) = 2(x - 5)^3(x + 1)^2$. Find its zeroes and the multiplicity of each.

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17. Graph $f(x) = (x-3)^3(x+3)^2$. Find its zeroes and describe its end behavior.

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18. Graph $f(x) = (x+7)(x+2)^4$. Find its zeroes and describe its end behavior.

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19. Graph a polynomial function of degree 3 with zeros at $-3, -2$, and 1 and y intercept at $(0, 5)$.

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20. Graph a polynomial function of degree 5 with a root of multiplicity 2 at -3, a root of multiplicity 2 at 2, and a final root at -2. It has a y-intercept at $(0, -3)$.
