Unit 3 – Polynomials Review Sheet **Name** _____

Given the equation $y = 4x^2 - 6x + 7$, answer the following questions (1- 7)

1. What is the degree of the polynomial? 2

2. Calculate the discriminant and explain its meaning.

$(-6)^2 - 4(4)(7) \rightarrow 36 - 112$

$-76 \rightarrow$ 2 imag roots

3. What is the concavity of the polynomial? up

4. What process would you use to covert this polynomial into vertex form? Complete the Square

5. Determine the number of roots for the above function. 2

6. Determine the x-intercepts of the above function. none

7. What is the scale factor of the above function? 4

8. If 4 +3*i* is a root of a quadratic function, what is the second root. 4 - 3i

9. Solve $252 = 9x^2 - 27x$. $x = 7, -4$

10. How can you determine if you have completely factored a polynomial?

graph to look at x-int. discriminant if possible

11. Rewrite the equation $y = 4(x - 7)^2 + 9$ in general form.

$4(x^2 - 14x + 49) + 9$ $y = 4x^2 - 56x + 205$

12. Complete the square and find the vertex, focus, and directrix of $y = \frac{1}{8}x^2 + 4x - 3$.

$\frac{1}{4(\frac{1}{8})} = 2$

$\frac{1}{8}(x^2 + 32x) - 3$

$\frac{1}{8}(x^2 + 32x + 256 - 256) - 3$

$\frac{1}{8}((x+16)^2 - 256) - 3$

$y = \frac{1}{8}(x+16)^2 - 35$

V: $(-16, -35)$

F: $(-16, -33)$

D: $y = -37$

13. Factor: $128x^{10} - 2x$ $2x(64x^9 - 1)$ $2x(4x^3 - 1)(16x^6 + 4x^3 + 1)$

14. Factor: $81x^4 - 16$ $(9x^2 - 4)(9x^2 + 4) = (3x - 2)(3x + 2)(9x^2 + 4)$

15. Factor: $4x^2 - 17xy - 15y^2$ $(x - 5y)(4x + 3y)$

16. Factor: $12n^2 + 32n - 35$ $(6n - 5)(2n + 7)$

17. Factor: $xw - 3xz + 2yw - 6yz$

$x(w - 3z) + 2y(w - 3z)$ $(w - 3z)(x + 2y)$

18. Find exact roots for $x^5 - 11x^4 - 27x^3 + 401x^2 - 124x - 1860$

$10, -2, 3, \sqrt{31}, -\sqrt{31}$

19. Find the general form of a polynomial that has a root at $\sqrt{7}$, a double root at -2, and a root at 5i. Assume the scale factor is 3.

$3x^6 + 12x^5 + 66x^4 + 216x^3 - 309x^2 - 2100x - 2100$

20. Solve $-4x^2 + 6x = 9$

$\frac{-6 \pm \sqrt{36 - 4(-4)(-4)}}{2(-4)}$ $\frac{-6 \pm i\sqrt{108}}{-8}$

21. A polynomial has roots at 5 and -3/2 and goes through the point (-2, -35). Write the equation in factored and general forms.

$-35 = a(-2 - 5)(-4 + 3)$ $y = -5(x - 5)(2x + 3)$

$y = -10x^2 + 35x + 75$

22. Assume in the middle of your test the teacher takes your calculator away from you. How would you factor $30x^2 - 61x - 11$?

use quad. formula to find roots $(x - r)(x - r)$

or

$30x - 11 = -330$ find 2 #'s that mult. to be -330 that add to -61.