Name: _____
Block: _____

Algebra 2H: Polynomials and Factoring
Group A

Practice

There are **10 questions** in this test, each worth **2pts** .
(In the practice test you have MORE than 10, just to gain more practice!!)
You have **30 minutes** to complete the test (more if you have accommodations).

==== Start of test
For each of the following questions: factor, solve or simplify as required.

1. Factor

$$4x^2 - 9$$

$(2x)^2 - (3)^2 =$

$\boxed{(2x-3)(2x+3)}$

2. Factor

$$27x^3 + 8$$

$(3x)^3 + (2)^3 =$

$\boxed{(3x+2)(9x^2 - 6x + 4)}$

same, opposite, always positive

3. Factor

$$x^2 - 9x + 18$$

M	A	T
18	-9	-6, -3

$x^2 - 6x - 3x + 18 =$

$x(x-6) - 3(x-6) =$

$\boxed{(x-3)(x-6)}$

4. Factor

$$12x^2 - 7x + 1$$

M	A	T
12	-7	-4, -3

$12x^2 - 4x - 3x + 1 =$

$4x(3x-1) - (3x+1) =$

$\boxed{(4x-1)(3x-1)}$

5. Factor

$15x^2 - x - 6$

M	A	T
-90	-1	-10, +9

$15x^2 - 10x + 9x - 6 =$

$= 5x(3x-2) + 3(3x-2) = \boxed{(5x+3)(3x-2)}$

6. Factor

$x^4 - 16$

$(x^2)^2 - (4)^2 = (x^2-4)(x^2+4) =$

$= \boxed{(x+2)(x-2)(x^2+4)}$

7. Factor

$2x^7y - 16xy$

$2xy(x^6 - 8) =$

$2xy((x^2)^3 - 2^3) =$

$\boxed{2xy(x^2-2)(x^4+2x^2+4)}$

8. Simplify

$(2x + 3y)^2$

$(2x)^2 + 2 \cdot (2x) \cdot 3y + (3y)^2 =$

$= \boxed{4x^2 + 12xy + 9y^2}$

9. Simplify

$(3x^2 - 2)^2$

$(3x^2)^2 - 2 \cdot 2(3x^2) + 4 =$

$= \boxed{9x^4 - 12x^2 + 4}$

10. Solve

$4x^2 + 12x + 9 = 0$

M	A	T
36	12	6, 6

$4x^2 + 6x + 6x + 9 = 0$

$2x(2x+3) + 3(2x+3) = 0$

$(2x+3)(2x+3) = 0$

$2x + 3 = 0$

$\boxed{x = -\frac{3}{2}}$ check ✓

11. Solve

$$2x^2 + x = 3$$

$2x^2+x-3=0$

M	A	T
-6	1	+3, -2

$2x^2-2x+3x-3=0$

$2x(x-1)+3(x-1)=0$

$(2x+3)(x-1)=0$

$x=1$ or $x=-\frac{3}{2}$

check

12. Factor

$$x^4 - 16$$

$(x^2)^2-(4)^2=(x^2-4)(x^2+4)$

$=(x-2)(x+2)(x^2+4)$

13. Factor

$$4x^6 + 32$$

$4(x^6+8)=$

$=4((x^2)^3+2^3)=$

$=4(x^2+2)(x^4-2x+4)$

14. Simplify

~~$(2x + 3y)^2$~~

$(2x+5)(4x^2-10x+25)=$

$=8x^3-20x^2+50x+20x^2-50x+125$

$=8x^3+125$

15. ~~Simplify~~ solve

~~$(3x^2 - 2)^2$~~

$x(x-1)(2x+3)=0$

$x=0$ or $x=1$ or $x=-\frac{3}{2}$

16. Solve

~~$4x^2 + 12x + 9 = 0$~~

$x^2+2x=0$

$x(x+2)=0$

$x=0$ or $x=-2$

===

17. (Credit to Derron)

A friend describe a math trick he discovered: If I take a number and multiply it by itself, I get the number squared. If I then multiple 1 less then the original number by 1 more than the original number, I get one less than the original number squared.

a. Show that this trick works if the original number I choose is 5.

$5 \cdot 5 = 25$

$(5-1)(5+1) = 4 \cdot 6 = 24$

$25 - 1 = 24$

b. Explain why this trick works for any number.

$x \cdot x = x^2$

$(x-1)(x+1) = x^2 - 1$

c. Would this trick work if the original number is negative? yes ✓

d. Would this trick work if the original number is a fraction? yes ✓

} x can be any real number!

18. Simplify

$$\left(\frac{1}{2}x^3\right)^3 \cdot \left(\frac{2y^2}{x^3}\right)^2$$

$\frac{1}{8}x^9 \cdot \frac{4y^4}{x^6} = \frac{4}{8}\frac{x^9}{x^6} \cdot y^4 = \boxed{\frac{1}{2}x^3y^4}$

19. Simplify

$$\left(\frac{1}{2}x^3\right)^3 \div \left(\frac{2y^2}{x^3}\right)^2$$

$\frac{1}{8}x^9 \div \frac{4y^4}{x^6} = \frac{\frac{1}{8}x^9}{\frac{4y^4}{x^6}} = \boxed{\frac{1}{32}\frac{x^{15}}{y^4}}$

=== End of test