Algebra 2 Name_____ ID: 1

Midterm Review Day #2

Date_____ Period____

Simplify.

1) $\sqrt{36p^2}$

$6p$

2) $7\sqrt{512x^2}$

$16 \cdot 7 \cdot x\sqrt{2}$

$112x\sqrt{2}$

3) $3\sqrt{24} - \sqrt{6}$

$5\sqrt{6}$

4) $4\sqrt{10p^2} \cdot -4\sqrt{6p}$

$-16\sqrt{60p^3}$

$-16 \cdot 2 \cdot p\sqrt{15p} = -32p\sqrt{15p}$

5) $\sqrt{15}(5 + \sqrt{6})$

$5\sqrt{15} + 3\sqrt{10}$

6) $(-1 + \sqrt{2})(3 + \sqrt{2})$

$-3 - \sqrt{2} + 3\sqrt{2} + 2$

$-1 + 2\sqrt{2}$

7) $\frac{4}{3\sqrt{2} - \sqrt{3}} \frac{(3\sqrt{2} + \sqrt{3})}{(3\sqrt{2} + \sqrt{3})} =$

$\frac{12\sqrt{2} + 4\sqrt{3}}{9 \cdot 2 + 3\sqrt{6} - 3\sqrt{6} - 3} =$

$\frac{12\sqrt{2} + 4\sqrt{3}}{15}$

8) $\frac{2 + 3\sqrt{3}}{4 + \sqrt{2}} \frac{(4 - \sqrt{2})}{(4 - \sqrt{2})} = \frac{8 - 2\sqrt{2} + 12\sqrt{3} - 3\sqrt{6}}{16 - 4\sqrt{2} + 4\sqrt{2} - 2}$

$\frac{8 - 2\sqrt{2} + 12\sqrt{3} - 3\sqrt{6}}{14}$

9) $\frac{\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{10}}{2}$

10) $\frac{5}{3 + 7i} \frac{(3 - 7i)}{(3 - 7i)} = \frac{15 - 35i}{9 - 21i + 21i - 49i^2}$

$\frac{15 - 35i}{58}$

11) $\frac{-4-3i}{10i}\frac{(i)}{(i)} = \frac{-4i-3i^2}{10i^2} =$

$\frac{-4i+3}{-10} = \frac{4i-3}{10}$

12) $\frac{10-i}{7-i}\frac{(7+i)}{(7+i)} = \frac{70+10i-7i-i^2}{49+7i-7i-i^2}$

$\frac{71+3i}{50}$

13) $(-3-2i)(2-8i)$

$-6+24i-4i+16i^2$

$-22+20i$

14) $-4-2i-(-2+7i)$

$-4-2i+2-7i$

$-2-9i$

15) $-5-7i-2i-(5+8i)$

$-5-7i-2i-5-8i$

$-10-17i$

Solve each equation by taking square roots.

16) $9x^2+1=-175$

$-1 \quad -1$

$\frac{9x^2}{9} = \frac{-176}{9}$

$x^2 = \frac{-176}{9} = \pm\frac{4i\sqrt{11}}{3}$

Solve each equation with the quadratic formula.

17) $12a^2-5a+9=0$

$\frac{5\pm\sqrt{(-5)^2-4(12)9}}{2(12)} = \frac{5\pm\sqrt{-407}}{24} = \frac{5\pm i\sqrt{407}}{24}$

18) $10b^2+4b-7=-9$

$+9 \quad +9$

$\frac{-4\pm\sqrt{(4)^2-4(10)(2)}}{2(10)} = \frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$\frac{-4\pm\sqrt{-64}}{10} = \frac{-4\pm 8i}{10} = \frac{-2\pm 4i}{5}$

19) $8b^2+14b+21=12+7b$

$-7b \quad -12 \quad -12 \quad -7b$

$8b^2-7b+9=0$

$\frac{7\pm\sqrt{(-7)^2-4(8)(9)}}{2(8)} = \frac{7\pm\sqrt{-239}}{16} = \frac{7\pm i\sqrt{239}}{16}$

Solve each equation by factoring.

20) $b^2-42=b$

$-b \quad -b$

$b^2-b-42=0$

$(b-7)(b+6)=0$

$b-7=0 \qquad b+6=0$

$\boxed{b=7} \qquad \boxed{b=-6}$

21) $x^2-9x=-3x-8$

$+8 \quad +3x \quad +3x \quad +8$

$x^2-6x+8=0$

$(x-4)(x-2)=0$

$x-4=0 \qquad x-2=0$

$\boxed{x=4} \qquad \boxed{x=2}$

Solve each equation by completing the square.

22) $x^2 + 4x - 23 = 0$

$+23 \quad +23$

$x^2 + 4x + 4 = 23 + 4$

$\sqrt{(x+2)^2} = \sqrt{27}$

$x + 2 = \pm\sqrt{27}$

$-2 \quad -2$

$x = -2 \pm \sqrt{27}$

$\boxed{x = -2 \pm 3\sqrt{3}}$

23) $n^2 - 10n + 36 = -2$

$-36 \quad -36$

$n^2 - 10n + 25 = -38 + 25$

$\sqrt{(n-5)^2} = \sqrt{-13}$

$n - 5 = \pm\sqrt{-13}$

$+5 \quad +5$

$\boxed{n = 5 \pm i\sqrt{13}}$

Divide, using long division or synthetic division.

24) $(7b^3 + 37b^2 + 8b - 10) \div (b + 5)$

$-5 \mid 7 \quad 37 \quad 8 \quad -10$

$\downarrow \quad -35 \quad -10 \quad 10$

$7 \quad 2 \quad -2 \mid \emptyset$

$\boxed{7b^2 + 2b - 2}$

25) $(x^4 - 6x^3 + 14x^2 - 42x - 14) \div (x - 5)$

$5 \mid 1 \quad -6 \quad 14 \quad -42 \quad -14$

$\downarrow \quad 5 \quad -5 \quad 45 \quad 15$

$1 \quad -1 \quad 9 \quad 3 \mid 1$

$\boxed{x^3 - x^2 + 9x + 3 + \frac{1}{x-5}}$

State if the given binomial is a factor of the given polynomial, using long division or synthetic division to determine your answer.

26) $(r^3 - r^2 - 84r - 60) \div (r - 10)$

$10 \mid 1 \quad -1 \quad -84 \quad -60$

$\downarrow \quad 10 \quad 90 \quad 60$

$1 \quad 9 \quad 6 \mid 0$

yes

27) $(n^3 - 11n^2 + 6n + 40) \div (n - 10)$

$10 \mid 1 \quad -11 \quad 6 \quad 40$

$\downarrow \quad 10 \quad -10 \quad -40$

$1 \quad -1 \quad -4 \mid 0$

Yes

Simplify each expression.

28) $(6x^4 + 4x^2 - 7x^3) - (5x^3 + 6x^4 + 7x^2)$

$6x^4 + 4x^2 - 7x^3 - 5x^3 - 6x^4 - 7x^2$

$-3x^2 - 12x^3$

$\boxed{-12x^3 - 3x^2}$

Name each polynomial by degree and number of terms.

29) $-7 + 8a^5 + 2a - 3a^6 + 6a^4$

Sextic Polynomial

Expand completely, using the Binomial Theorem.

30) $(2-y)^4$

$1(2)^4(-y)^0 \quad 4(2)^3(-y)^1 \quad 6(2)^2(-y)^2 \quad 4(2)^1(-y)^3 \quad 1(2)^0(-y)^4$

$16 - 32y + 24y^2 - 8y^3 + y^4$

$(3n-4)(3n-4)$

$9n^2 - 12n - 12n + 16$

$9n^2 - 24n + 16$

$(3n-4)(9n^2 - 24n + 16)$

$27n^3 - 72n^2 + 48n$

$- 36n^2 + 96n - 64$

$27n^3 - 108n^2 + 144n - 64$

Perform the indicated operation.

31) $g(x) = x + 5$
$f(x) = x^3 + 1 + 2x$
Find $(g \cdot f)(x)$

$(x+5)(x^3+1+2x)$

$x^4 + x + 2x^2 + 5x^3 + 5 + 10x$

$\boxed{x^4 + 5x^3 + 2x^2 + 11x + 5}$

32) $g(n) = -n^3 - 4n$
$h(n) = 3n - 4$
Find $(g \circ h)(n)$

$-\square^3 - 4\square$

$-(3n-4)^3 - 4(3n-4)$

$-27n^3 + 108n^2 - 144n + 64 - 12n + 16$

$\boxed{-27n^3 + 108n^2 - 156n + 80}$

33) $g(n) = n + 2$
$h(n) = n^2 - 2n$
Find $(g \circ h)(6)$

$\square + 2$

$n^2 - 2n + 2$

$(6)^2 - 2(6) + 2$

$\boxed{26}$

34) $g(t) = 4t - 2$
$f(t) = 2t + 1$
Find $(g - f)(7)$

$4t - 2 - (2t + 1)$

$4t - 2 - 2t - 1$

$\boxed{2t - 3}$

Find the inverse of each function.

35) $f(x) = \sqrt[5]{x+3}$

$y = \sqrt[5]{x+3}$

$(x)^5 = \left(\sqrt[5]{y+3}\right)^5$

$x^5 = y + 3$

$-3 \quad -3$

$y = x^5 - 3$

$\boxed{f^{-1}(x) = x^5 - 3}$

State if the given functions are inverses. Use composition.

36) $f(x) = 2x - 5$
$g(x) = \frac{1}{2}x + \frac{5}{2}$

$x = 2y - 5$

$+5 \quad +5$

$\frac{x+5}{2} = \frac{2y}{2}$

$y = \frac{1}{2}x + \frac{5}{2}$

$x = \frac{1}{2}y + \frac{5}{2}$

$-\frac{5}{2} \qquad -\frac{5}{2}$

$2\left(x - \frac{5}{2}\right) = \frac{1}{2}y\,(2)$

$2x - 5 = y$

$y = 2x - 5$

$\boxed{\text{yes inverses}}$