Accel Geom/ Adv Alg

Name _____

Benchmark 1 Review Part I

Date _____ Period _____

1) Find the values of x and y that make the equation $5x + 6i = -35 - (24y)i$ true

A. x = -7, y = -1/4 B. x = -1/7, Y = -1/4 C. x = -1/7, y = -4 D. x = -7, y = -4

$5x = -35$

$x = -7$

$6 = -24y$

$y = -1/4$

2) Find the complex conjugate of 5i + 7

$7 + 5i \rightarrow 7 - 5i$

A. 7 – 5i B. 7 + 5i C. 5i – 7 D. -7 – 5i

3) Write the result in the form a + bi: $-2i(4 + 3i) - 3(5 + 9i)$

$-8i \pm 6i^2 - 15 - 27i$

$-9 - 35i$

4) Express $\sqrt{-192}$ in simplest radical form

A. $8\sqrt{3}$ B. $i\sqrt{192}$ C. $8i\sqrt{3}$ D. $3i\sqrt{8}$

192
96 2
48 2
24
12
3 4

5) Find the product and quotient of $(5 + 2i)$ and $(3 - 8i)$

Product:

$(5+2i)(3-8i)$

$15 - 40i + 6i \pm 16i^2$

$31 - 34i$

Quotient:

$\frac{5+2i}{3-8i} \cdot \frac{3+8i}{3+8i} = \frac{15+40i+6i \pm 16i^2}{9+24i-24i+64i^2}$

$= \frac{-1+46i}{73}$

Simplify the following powers of i

6) $-4i^{12}$

$-4(1) = -4$

7) $2 - 3i^5 + 2i^{19}$

$2-3(i)+2(-i)$

$2-3i-2i$

$2-5i$

8) $5i^{34} - 2i^8$

$5(-1)-2(1)$

$-5-2 = -7$

9) Find the product $i\sqrt{7}(6 - i\sqrt{7})$

$6i\sqrt{7} - i^2(7)$

$6i\sqrt{7} - (-1)(7)$

$6i\sqrt{7} + 7$

$7 + 6i\sqrt{7}$

10) Simplify $-i^2\sqrt{-100}$

$-10i^3$

$-10(-i) = 10i$

SIMPLIFY EACH OF THE FOLLOWING EXPRESSIONS:

11) $\sqrt[3]{\frac{4x^5}{8x}} = \frac{\sqrt[3]{x^4}}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}} = \frac{\sqrt[3]{4x^4}}{2}$

$= \boxed{\frac{x\sqrt[3]{4x}}{2}}$

12) $4^{\frac{1}{2}} \cdot 4^{\frac{3}{2}} = 4^{7/2}$

$= \sqrt{4}^{7}$

$= 2^7 = \boxed{128}$

13) $\frac{64^{\frac{2}{3}}}{64^{\frac{7}{3}}}$ $\frac{1}{64^{5/3}} = \frac{1}{\sqrt[3]{64}^5}$

$= \frac{1}{4^5} = \boxed{\frac{1}{1024}}$

14) $\left(a^{\frac{1}{4}}b^2\right)^8 \sqrt{a^{10}b^7}$

$= a^2 b^{16} (a^{10}b^7)^{1/2}$

$= a^2 b^{16} a^5 b^{7/2}$

$= \boxed{a^7 b^{39/2}}$

15) $\sqrt{\frac{80}{25}}$ $\angle 16$ $\frac{4}{4}$

$\boxed{\frac{4\sqrt{5}}{5}}$

16) $\sqrt[3]{-48x^8y^{12}}$

$16 \; 3$

$4 \; 4$

$2 \; 2 \; 2 \; 2$

$\boxed{-2x^2y^4\left(\sqrt[3]{6x^2}\right)}$

17) $\frac{-8}{5i} \cdot \frac{-5i}{-5i} = \frac{40i}{+25i^2} = \frac{40i}{25} = \boxed{\frac{8i}{5}}$

18) $\frac{(5x^4y^3)^{-2}}{1} = \frac{1}{(5x^4y^3)^2} = \boxed{\frac{1}{25x^8y^6}}$

19) $x^{\frac{12}{5}}y^{\frac{10}{4}} \cdot x^{\frac{5}{15}}y^{\frac{1}{2}} \cdot x^{\frac{15}{15}}y^{2/2}$

$\boxed{x^{32/15}y^{13/2}}$

20) $\sqrt[3]{\frac{3x^3}{49}} \cdot \frac{\sqrt[3]{7}}{\sqrt[3]{7}} = \frac{\sqrt[3]{21x^3}}{7}$

$= \boxed{\frac{x\sqrt[3]{21}}{7}}$

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Benchmark 1 Review Part II

Name Key

Date _____ Period _____

Determine the function/equation with the following roots:

1. $x = \frac{-1}{2}, 0, -4$

$x(2x+1)(x+4) = 0$

$(2x^2+x)(x+4) = 0$

$2x^3+8x^2+x^2+4x = 0$

$\boxed{2x^3+9x^2+4x = 0}$

2. $x = 0$ *mult of* 3, $\frac{4}{5}$ *mult of* 2

$x^3(5x-4)(5x-4) = 0$

$(5x^4-4x^3)(5x-4)$

$\boxed{25x^5-40x^4+16x^3 = 0}$

Solve the following quadratics by FACTORING:

3. $x^2 = 7x + 18$

$x^2-7x-18 = 0$

$(x-9)(x+2) = 0$

$\boxed{x = 9, -2}$

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

$(x^2+4)(x^2-1) = 0$

$(x^2+4)(x+1)(x-1) = 0$

$\boxed{x = \pm 2i, \pm 1}$

5. $2x^3 - 7x = 13x^2$

$2x^3-13x^2-7x = 0$ (−14 / −14, 1, −13)

$x(2x^2-13x-7) = 0$

$(2x^2-14x)+(x-7)$

$2x(x-7)\ 1(x-7)$

$x(2x+1)(x-7) = 0$

$\boxed{x = 0, -1/2, 7}$

6. $-4x = 25x^3 + 20x^2$

$25x^3+20x^2+4x = 0$

$x(25x^2+20x+4) = 0$

$x(5x+2)^2 = 0$

$x = 0, -2/5$ mult of 2

Solve the following quadratics by COMPLETING THE SQUARE:

7. $x^2 + 12x + 39 = 0$

$x^2+12x+\underline{36} = -39+\underline{36}$

$\sqrt{(x+6)^2} = \sqrt{-3}$

$x+6 = \pm i\sqrt{3}$

$\boxed{x = -6 \pm i\sqrt{3}}$

8. $\frac{3x^2 = 21x + 9}{3}$

$x^2 = 7x + 3$

$x^2-7x+\underline{49/4} = 3+\underline{49/4}$ (12/4)

$\sqrt{(x-7/2)^2} = \sqrt{61/4}$

$x-7/2 = \frac{\pm\sqrt{61}}{2}$

$\boxed{x = \frac{7 \pm \sqrt{61}}{2}}$

Solve the following for x:

9. $\frac{2}{3}x^2 + 18 = 0$

$\frac{2}{3}x^2 = -18$

$\sqrt{x^2} = \sqrt{-27} < 9, 3, 3$

$x = \pm 3i\sqrt{3}$

10. $16x^2 - 7 = 42$

$16x^2 = 49$

$\sqrt{x^2} = \sqrt{49/16}$

$x = \pm 7/4$

Factor each of the following completely:

11. $16x^{10} - 4y^{16}$

$4(4x^{10} - y^{16})$

$4(2x^5 + y^8)(2x^5 - y^8)$

12. $3x^4 - 15x^3 - 150x^2$

$3x^2(x^2 - 5x - 50)$

$3x^2(x - 10)(x + 5)$

13. $15x^2 - 100x + 60$

36, -18, -2, -20

$5(3x^2 - 20x + 12)$

$(3x^2 - 18x)(-2x + 12)$

$3x(x - 6) - 2(x - 6)$

$5(3x - 2)(x - 6)$

14. $24x^2 - 30x - 9$

-24, -12, 2, -10

$3(8x^2 - 10x - 3)$

$(8x^2 - 12x) + (2x - 3)$

$4x(2x - 3) \mid (2x - 3)$

$3(4x + 1)(2x - 3)$

Simplify the following:

15. $\sqrt[3]{\frac{15x^8}{80x^2}}$

$\frac{\sqrt[3]{3x^6}}{\sqrt[3]{16}} \cdot \frac{\sqrt[3]{4}}{\sqrt[3]{4}} = \frac{\sqrt[3]{12x^6}}{4}$

$= \frac{x^2(\sqrt[3]{12})}{4}$

16. $\frac{\sqrt{x^9}}{(x^5)^{\frac{1}{3}}}$

$\frac{x^{9/2}}{x^{5/3}}$, $27/6$, $10/6$

$= x^{17/6}$

17. $\frac{6-4i}{3+i} \cdot \frac{3-i}{3-i} = \frac{18 - 6i - 12i + 4i^2}{9 - 3i + 3i - i^2}$

$= \frac{14 - 18i}{10}$

$= \frac{7 - 9i}{5}$

18. $-5i^{51}\sqrt{-4}$

$-5i^{51} \cdot 2i$

$-10i^{52}$

$-10(1) = -10$

1. Write in the form a+bi

$6(2+5i)^2$

$6(2+5i)(2+5i)$

$(12+30i)(2+5i)$

$24+60i+60i+150i^2$

$\boxed{-126+120i}$

2. Solve by square roots.

$3(x-5)^2-10=86$

$3(x-5)^2=96$

$\sqrt{(x-5)^2}=\sqrt{32}$

$x-5=\pm 4\sqrt{2}$

$\boxed{x=5\pm 4\sqrt{2}}$

3.Solve by factoring.

$4x^6-68x^4=-64x^2$

$4x^6-68x^4+64x^2=0$

$4x^2(x^4-17x^2+16)=0$

$(x^2-16)(x^2-1)=0$

$4x^2(x-4)(x+4)(x+1)(x-1)=0$

$\boxed{x=0 \text{ mult. of } 2,\ \pm 4,\ \pm 1}$

$108x^4=3x^2$

$108x^4-3x^2=0$

$3x^2(36x^2-1)$

$3x^2(6x+1)(6x-1)=0$

$\boxed{x=0 \text{ mult. of } 2,\ \pm 1/6}$

4. Find the value(s) of k for which the expression $16x^2+8x+2k$ is a perfect square trinomial.

a) ½ b) 1 c) 2 d) 4

5. Find a value of k for which the expression $3x^2+6x+k$ if factorable (more than one answer).

a) 18 b) 0 c) -9 d) 5 e) 3 f) -3

$3x^2+6x+18$

$3(x^2+2x+6)$

$3x^2+6x-9$

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

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

$3x^2+6x-3$

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

$3x^2+6x+3$

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

$3(x+1)^2$

6. Find the value of b in each perfect square trinomial

$x^2-bx+144$

$b=\pm 24$

$4x^2-bx+16$

$b=\pm 16$

$\frac{3x^2+bx+27}{3}$

$x^2+\frac{b}{3}x+9$

$b=\pm 18$