$\frac{72}{72} = 100$

Math 0099
University of North Georgai
Summer 2015
Exam #1

Name: Key Date: July 2, 2015

Perform the indicated operation and simplify if possible.

1) $(9x^3 - 3x^2 + 7x + 6) - (2x^3 + 6x^2 - 2x + 5)$

$9x^3 - 3x^2 + 7x + 6 - 2x^3 - 6x^2 + 2x - 5$

$7x^3 - 9x^2 + 9x + 1$

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

$(3x - 8)(3x - 8)$

$9x^2 - 24x - 24x + 64$

$9x^2 - 48x + 64$

Factor.

3) $x^2 - 4x - 21$

$(x - 7)(x + 3)$

4) $4r^3 - 108$

$4(r^3 - 27)$

$4(r - 3)(r^2 + 3r + 9)$

Simplify the expression. Write the result using positive exponents only.

5) $\left(\frac{xy5}{x^4y}\right)^{-2}$

$$\frac{x^{-2}(y^5)^{-2}}{(x^4)^{-2}y^{-2}} = \frac{x^2y^{-10}}{x^{-8}y^{-2}} = \frac{x^8y^2}{x^2y^{10}} = \boxed{\frac{x^6}{y^8}}$$

Solve the equation.

6) $3(n + 2) = -2(2 - 2n)$

$3n + 6 = -4 + 4n$

$\boxed{10 = n}$

$3(10+2) = -2(2-2(10))$

$3(12) = -2(2-20)$

$36 = -2(-18)$

$36 = 36$ ✓

Simplify. If needed, write answers with positive exponents only.

7) $\left(\frac{9}{64}\right)^{-1/2}$

$$\frac{9^{-1/2}}{64^{-1/2}} = \frac{64^{1/2}}{9^{1/2}} = \frac{\sqrt{64}}{\sqrt{9}} = \boxed{\frac{8}{3}}$$

Perform the indicated operation and simplify if possible.

8) $17\sqrt[3]{2} - 3\sqrt[3]{54}$

$17\sqrt[3]{2} - 3\sqrt[3]{27 \cdot 2}$

$17\sqrt[3]{2} - 9\sqrt[3]{2}$

$\boxed{8\sqrt[3]{2}}$

Solve the equation.

9) $x = \sqrt{3x+1} + 3$

$x - 3 = \sqrt{3x+1}$

$x^2 - 6x + 9 = 3x + 1$

$x^2 - 9x + 8 = 0$

$(x-8)(x-1) = 0$

$\boxed{x = 8}$ & ~~$x = 1$~~

checks

$x = 8$

$8 = \sqrt{3(8)+1} + 3$

$= \sqrt{24+1} + 3$

$= \sqrt{25} + 3$

$= 5 + 3$

$8 = 8$ ✓

$x = 1$

$1 = \sqrt{3(1)+1} + 3$

$= \sqrt{3+1} + 3$

$= \sqrt{4} + 3$

$= 2 + 3$

$1 \neq 5$

Rationalize the denominator and simplify. Assume that all variables represent positive real numbers.

10) $\sqrt{\frac{1}{6}}$

$\frac{\sqrt{1}}{\sqrt{6}} = \frac{1}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \boxed{\frac{\sqrt{6}}{6}}$

11) $\frac{3}{\sqrt{17}+4} \cdot \frac{\sqrt{17}-4}{\sqrt{17}-4} = \frac{3\sqrt{17}-12}{17-16} = \boxed{3\sqrt{17}-12}$

12) $\sqrt[3]{\frac{4}{9x^2}}$ $\frac{\sqrt[3]{4}}{\sqrt[3]{9x^2}} \cdot \frac{\sqrt[3]{3x}}{\sqrt[3]{3x}} = \frac{\sqrt[3]{12x}}{\sqrt[3]{27x^3}} = \boxed{\frac{\sqrt[3]{12x}}{3x}}$

Write in terms of a + bi form.

13) $\sqrt{-49}$ $\sqrt{-1} \cdot \sqrt{49} = i\ 7$

$= 7i$

$= \boxed{0 + 7i}$

Multiply or divide and write in terms of a + bi form.

14) $\frac{\sqrt{-60}}{\sqrt{-10}}$

$= \frac{i\sqrt{60}}{i\sqrt{10}} = \sqrt{\frac{60}{10}} = \boxed{\sqrt{6} + 0i}$

Perform the indicated operation. Write the result in the form a + bi form.

15) (4 + 5i) – (–8 + i)

$4 + 5i + 8 - i$

$(4+8) + (5-1)i$

$\boxed{12 + 4i}$

16) $(6 - 9i)^2$

$i^2 = -1$

$(6 - 9i)(6 - 9i)$

$36 - 54i - 54i + 81i^2$

$36 - 108i - 81$

$\boxed{-45 - 108i}$

17) $\frac{8-5i}{9+4i} \cdot \frac{9-4i}{9-4i} = \frac{72-32i-45i+20i^2}{81-16i^2}$

$= \frac{72-77i-20}{81+16}$

$= \frac{52-77i}{97} = \boxed{\frac{52}{97} - \frac{77}{97}i}$

Find the power of i and write in a + bi form.

18) i^{44}

$\boxed{i^4 = 1}$

$i^{44} = (i^4)^{11} = (1)^{11} = \boxed{1+0i}$