$\frac{64}{64} = 100$

Math 0099
University of North Georgia
Fall 2015
Exam #1

Name: Key Date: October 2, 2015

Perform the indicated operation and simplify if possible.

1) $(2x^3 - 2x^2 + 4x - 2) - (4x^3 - 9x^2 - 7x - 4)$

$2x^3 - 2x^2 + 4x - 2 - 4x^3 + 9x^2 + 7x + 4$

$-2x^3 + 7x^2 + 11x + 2$

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

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

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

$9x^2 - 48x + 64$

Factor.

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

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

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

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

$$\left(\frac{x^4y}{x^4y^5}\right)^2 = \frac{(x^4)^2 \cdot y^2}{x^2 \cdot (y^5)^2} = \frac{x^8y^2}{x^2y^{10}}$$

$$= x^6y^{-8}$$

$$= \boxed{\frac{x^6}{y^8}}$$

Solve the equation.

5) $3(n + 4) = -2(3 - 2n)$

$3n + 12 = -6 + 4n$

$\boxed{18 = n}$

Ck

$3(18+4) = -2(3-2(18))$

$3(22) = -2(3-36)$

$= -2(-33)$

$66 = 66$ ✓

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

6) $\left(\frac{81}{49}\right)^{-1/2}$

$$\left(\frac{49}{81}\right)^{1/2} = \frac{49^{1/2}}{81^{1/2}} = \frac{\sqrt{49}}{\sqrt{81}} = \boxed{\frac{7}{9}}$$

Perform the indicated operation and simplify if possible.

7) $17\sqrt[3]{2} - 3\sqrt[3]{54}$

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

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

54
2 · 27
3 · 9
3 · 3

Solve the equation.

8) $x = \sqrt{3x - 5} + 3$

$x - 3 = \sqrt{3x - 5}$

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

$x^2 - 9x + 14 = 0$

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

① $\boxed{x = 7}$

② $x = 2$

ch

$x = 7$

$7 = \sqrt{3(7) - 5} + 3$

$= \sqrt{21 - 5} + 3$

$= \sqrt{16} + 3$

$= 4 + 3$

$7 = 7$ ✓

$x = 2$

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

$= \sqrt{6 - 5} + 3$

$= \sqrt{1} + 3$

$= 1 + 3$

$2 \neq 4$

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

9) $\sqrt{\frac{1}{2}}$

$\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{\frac{\sqrt{2}}{2}}$

10) $\frac{3}{\sqrt{17}+4} \cdot \frac{\sqrt{17}-4}{\sqrt{17}-4} = \frac{3\sqrt{17}-12}{17-16} = \frac{3\sqrt{17}-12}{1} = \boxed{3\sqrt{17}-12}$

11) $\sqrt[3]{\frac{10}{9x^2}} = \frac{\sqrt[3]{10}}{\sqrt[3]{9x^2}} \cdot \frac{\sqrt[3]{3x}}{\sqrt[3]{3x}} = \frac{\sqrt[3]{30x}}{\sqrt[3]{27x^3}} = \boxed{\frac{\sqrt[3]{30x}}{3x}}$

Write in terms of a + bi form.

12) $\sqrt{-81}$ $= i\,9$

$= 9i$

$= \boxed{0 + 9i}$

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

13) $(5 + 6i) - (-2 + i)$

$5 + 6i + 2 - i$

$\boxed{7 + 5i}$

14) $(8 - 4i)^2$

$(8 - 4i)(8 - 4i)$ $\qquad i^2 = -1$

$64 - 64i + 16i^2$

$64 - 64i - 16$

$\boxed{48 - 64i}$

15) $\frac{7 - 6i}{7 + 8i} \cdot \frac{7 - 8i}{7 - 8i} = \frac{49 - 56i - 42i + 48i^2}{49 - 64i^2}$

$= \frac{49 - 98i - 48}{49 + 64} = \frac{1 - 98i}{113}$

$= \boxed{\frac{1}{113} - \frac{98}{113}i}$

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

16) i^{24}

$\frac{24}{4} = 6$

$(i^4)^6 = 1^6 = 1$

$= \boxed{1 + 0i}$