Math103 Intermediate Algebra – Spring 2008 – DLA – PreTest 4

Name SOLUTIONS !

Each of the 19 questions is worth 5 points plus 1 point for each of 5 homework problems for a total of 100

Find the root if it is a real number.

1) $\sqrt[4]{\frac{81}{625}}$

$\frac{\sqrt[4]{81}}{\sqrt[4]{625}}$ $\boxed{\frac{3}{5}}$

Simplify the root.

2) $\sqrt[3]{x^{27}}$

$(x^{27})^{1/3}$ $\boxed{x^9}$

Simplify by first converting to rational exponents. Assume that all variables represent positive real numbers.

3) $\sqrt[4]{100s^{18}}$

$(100\,s^{18})^{1/4}$

$([10\,s^9]^2)^{1/4}$

$(10\,s^9)^{2/4}$

$(10\,s^9)^{1/2}$

$\boxed{\sqrt{10\,s^9} \text{ OR } s^4\sqrt{10s}}$

Use the rules of exponents to simplify the expression. Write the answer with positive exponents. Assume that all variables represent positive real numbers.

4) $\dfrac{x^{1/2}}{x^{5/4} \cdot x^{-3}}$

$$\frac{x^{\frac{1}{2}}}{x^{\frac{5}{4}} x^{-3}}$$

$$x^{\frac{1}{2}-\frac{5}{4}-(-3)}$$

$$x^{\frac{2}{4}-\frac{5}{4}+\frac{12}{4}}$$

$$\boxed{x^{\frac{9}{4}}}$$

Express the radical in simplified form.

5) $\sqrt[3]{864}$

$$\sqrt[3]{216}\ \sqrt[3]{4}$$

$$\boxed{6\sqrt[3]{4}}$$

Express the radical in simplified form. Assume that all variables represent positive real numbers.

6) $\sqrt[3]{\dfrac{y^{10}}{125}}$

$$\sqrt[3]{\frac{y^9}{125}}\ \sqrt[3]{y}$$

$$\boxed{\frac{y^3\sqrt[3]{y}}{5}}$$

Simplify. Assume that all variables represent positive real numbers.

7) $4\sqrt{7} + 5\sqrt{63}$

$$4\sqrt{7} + 5\sqrt{9}\sqrt{7}$$

$$4\sqrt{7} + 3.5\sqrt{7}$$

$$4\sqrt{7} + 15\sqrt{7}$$

$$\boxed{19\sqrt{7}}$$

8) $9\sqrt[3]{m^7p^5} - 7m^2p\sqrt[3]{mp^2}$

$9\sqrt[3]{m^6p^3}\sqrt[3]{mp^2} - 7m^2p\sqrt[3]{mp^2}$

$9m^2p\sqrt[3]{mp^2} - 7m^2p\sqrt[3]{mp^2}$

$\boxed{2m^2p\sqrt[3]{mp^2}}$

Multiply, then simplify the product. Assume that all variables represent positive real numbers.

9) $(3 - 5\sqrt{2})^2$

$9 - 2 \cdot 3 \cdot 5\sqrt{2} + (5\sqrt{2})^2$

$9 - 30\sqrt{2} + 25 \cdot 2$

$9 - 30\sqrt{2} + 50$

$\boxed{59 - 30\sqrt{2}}$

Simplify. Assume that all variables represent positive real numbers.

10) $\sqrt[3]{\frac{7}{3}}$

$\frac{\sqrt[3]{7}}{\sqrt[3]{3}} \cdot \frac{\sqrt[3]{3^2}}{\sqrt[3]{3^2}}$

$\frac{\sqrt[3]{7} \cdot \sqrt[3]{9}}{\sqrt[3]{3^3}}$

$\boxed{\frac{\sqrt[3]{63}}{3}}$

Rationalize the denominator. Assume that all variables represent positive real numbers and that the denominator is not zero.

11) $\dfrac{\sqrt{7}}{7\sqrt{3}-\sqrt{7}}$

$$\frac{\sqrt{7}}{(7\sqrt{3}-\sqrt{7})}\cdot\frac{(7\sqrt{3}+\sqrt{7})}{(7\sqrt{3}+\sqrt{7})}$$

$$\frac{\sqrt{7}(7\sqrt{3})+\sqrt{7}\cdot\sqrt{7}}{(7\sqrt{3})^2-(\sqrt{7})^2}$$

$$\frac{7\sqrt{21}+7}{49\cdot3-7}$$

$$\frac{7(\sqrt{21}+1)}{147-7}$$

$$\frac{7(\sqrt{21}+1)}{140}$$

$$\frac{7(\sqrt{21}+1)}{7\cdot20}$$

$$\boxed{\frac{\sqrt{21}+1}{20}}$$

Solve the equation.

12) $\sqrt{2k+1}=13$

$$(\sqrt{2k+1})^2=13^2$$

$$2k+1=169$$

$$2k=168$$

$$\boxed{k=84}$$

Solve this equation.

13) $\sqrt{p^2-2p+49}=p+3$

$$(\sqrt{p^2-2p+49})^2=(p+3)^2$$

$$p^2-2p+49=p^2+6p+9$$

$$p^2-2p+49-(p^2+6p+9)=0$$

$$-8p+40=0$$

$$-8p=-40$$

$$\boxed{p=5}$$

Multiply or divide as indicated.

14) $\frac{\sqrt{-144}}{\sqrt{-4}}$

$\frac{i\sqrt{144}}{i\sqrt{4}}$

$\frac{12i}{2i}$

$\boxed{6}$

Add or subtract as indicated. Write your answer in the form a + bi.

15) [(4 + 6i) – (10 + 7i)] – (5 – 6i)

$4+6i-10-7i-5+6i$

$4-10-5+6i-7i+6i$

$\boxed{-11+5i}$

Use the quadratic formula to solve the equation. (All solutions are real numbers.)

16) $x^2 = 3 - 4x$

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

$a=1$

$b=4$

$c=-3$

$x=\frac{-4\pm\sqrt{(4)^2-4\cdot1\cdot(-3)}}{2\cdot1}$

$x=-\frac{4}{2}\pm\frac{\sqrt{16+12}}{2}$

$x=-2\pm\frac{\sqrt{28}}{2}$

$x=-2\pm\frac{\sqrt{4}\sqrt{7}}{2}$

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

$\boxed{x=-2\pm\sqrt{7}}$

Use the quadratic formula to solve the equation.

17) $x^2 - \frac{2}{5}x = -\frac{7}{10}$

$x^2 - \frac{2}{5}x + \frac{7}{10} = 0$

$10\left(x^2 - \frac{2}{5}x + \frac{7}{10}\right) = 0$

$10x^2 - 4x + 7 = 0$

$A = 10$

$B = -4$

$C = 7$

$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(10)(7)}}{2 \cdot 10}$

$x = \frac{4 \pm \sqrt{16 - 280}}{20}$

$x = \frac{4 \pm \sqrt{-264}}{20}$

$x = \frac{4 \pm i\sqrt{4}\sqrt{66}}{20}$

$x = \frac{4 \pm 2i\sqrt{66}}{20}$

$\boxed{x = \frac{2 \pm i\sqrt{66}}{10}}$

Identify the vertex of the given parabola.

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

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

$a = -1$

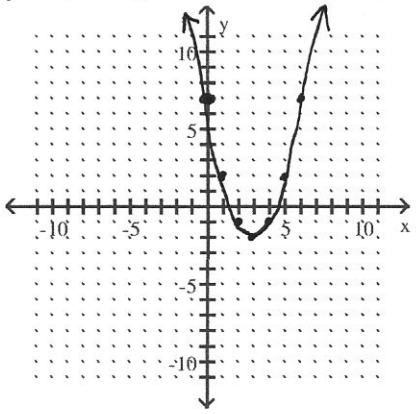
$h = -1$

$k = -2$

$\boxed{\text{VERTEX IS AT } (-1, -2)}$

Sketch the graph of the parabola.

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



x	y
0	7
1	2
2	-1
3	-2
4	-1
5	2
6	7

$y = (0-3)^2 - 2 = 9 - 2 = 7$

$y = (1-3)^2 - 2 = 4 - 2 = 2$

$y = (2-3)^2 - 2 = 1 - 2 = -1$

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

$y = (4-3)^2 - 2 = 1 - 2 = -1$

$y = (5-3)^2 - 2 = 4 - 2 = 2$

$y = (6-3)^2 - 2 = 9 - 2 = 7$