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Name Key

Math 092
Test 1

1) Find the square root of 64. What is the principal square root?

Square root:

8 and -8

Principal square root:

8

15

2) Find the specified functional value if it exists. $f(x) = \sqrt{2 - x^2}$

f(4)= $\sqrt{2-4^2} = \sqrt{2-16} = \sqrt{-14}$ = not a real number

f(1)= $\sqrt{2-1^2} = \sqrt{1} = 1$

15

30 25

3) Simplify. Remember to use absolute value notation. $\sqrt{x^2-6x+9}$

$\sqrt{x^2-6x+9} = \sqrt{(x-3)^2} = |x-3|$

(10)

4) Write an equivalent statement using radical notation simplify if possible:

$(x-2)^{\frac{2}{6}} =$

$= \sqrt[3]{(x-2)}$

$(x-2)^{1/3}$

(10)

(20)

5) Write an equivalent statement using exponential notation:

$\sqrt[3]{(x+1)^6} =$ $(x+1)^{6/3} = (x+1)^2$

(10)

6) Write an equivalent expression with positive exponents and if possible, simplify.

$\frac{5(x+1)^{-2}}{6y^{-1}} =$ $\frac{5y}{6(x+1)^2}$

(10)

(20)

7) Multiply: Simplify if possible

$\sqrt[4]{(x-1)^2} * \sqrt[4]{x^2-2x+1}$

$= \sqrt[4]{(x-1)^2} \cdot \sqrt[4]{(x-1)^2}$

$= \sqrt[4]{(x-1)^4}$

$= |(x-1)|$

(15)

8) Simplify. Assume no radicands were formed by raising negative numbers to even powers.

$\sqrt[4]{x^{13}y^8z^{17}}$

$= \sqrt[4]{x^{12} \cdot x \cdot y^8 \cdot z^{16} \cdot z}$

$= \sqrt[4]{x^{12}} \cdot \sqrt[4]{x} \cdot \sqrt[4]{y^8} \cdot \sqrt[4]{z^{16}} \cdot \sqrt{z}$

$= x^3 \cdot \sqrt[4]{x} \cdot y^2 \cdot z^4 \cdot \sqrt{z}$

$= x^3 y^2 z^4 \sqrt[4]{xz}$

$x^{13} = x^{12} \cdot x$

$y^8 = y^8$

$z^{17} = z^{16} \cdot z$

(15)

(30)

9) Multiply and Simplify:

$(\sqrt{14})(\sqrt{21})$

$\sqrt{14}\ \sqrt{21}$

$= \sqrt{7 \cdot 2}\ \sqrt{7 \cdot 3}$

$= \sqrt{7^2 \cdot 6}$

$= 7\sqrt{6}$

(15)

10) Simplify by taking the roots of the numerator and the denominator. Assume all variables represent positive numbers

$\sqrt[4]{\dfrac{16x^4}{b^4c^8}} = \dfrac{\sqrt[4]{16x^4}}{\sqrt[4]{b^4c^8}} = \dfrac{2x}{bc^2}$

(15)

(30)

11) Divide and if possible simplify. Assume all variables represent positive numbers

$$\frac{\sqrt{40x^3y}}{\sqrt{8xy}} = \sqrt{\frac{40x^3y}{8xy}} = \sqrt{5x^2} = x\sqrt{5}$$

(15)

12) Rationalize the denominator. Assume all variables represent positive numbers.

$$\frac{\sqrt[3]{16}}{\sqrt[3]{25x}} = \frac{\sqrt[3]{16}}{\sqrt[3]{5^2x}} = \frac{\sqrt{5\cdot x^2}}{\sqrt{5\cdot x^2}} = \frac{\sqrt[3]{80x^2}}{\sqrt[3]{5^3x^3}} = \frac{2\sqrt[3]{10x^2}}{5x}$$

(17)

5^2x

$\frac{5\cdot x^2}{5^3x^3}$

(31)

13) Simplify by combining like radical terms. Assume all variables represent positive number

$8\sqrt{18}-\sqrt{2}$

$= 8\sqrt{9\cdot 2} - \sqrt{2}$

$= 24\sqrt{2} - \sqrt{2}$

$= 23\sqrt{2}$

(15)

14) Multiply and if possible simplify. Assume all variables represent positive numbers

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

(15)

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

$= 1+2\sqrt{x}+x$

(30)

15) Rationalize each denominator. Assume all variables represent positive numbers.

$$\frac{\sqrt{a}}{\sqrt{a}-\sqrt{b}} = \frac{\sqrt{a}}{(\sqrt{a}-\sqrt{b})}\cdot\frac{(\sqrt{a}+\sqrt{b})}{(\sqrt{a}+\sqrt{b})} = \frac{\sqrt{a^2}+\sqrt{ab}}{\sqrt{a^2}+\sqrt{ab}-\sqrt{ab}-\sqrt{b^2}}$$

$$= \frac{a+\sqrt{ab}}{a-b}$$

(15)

16) Solve for y: $(y-3)^{\frac{1}{2}} = -2$ Justify your answers

no solution: principal square root can never be negative.

(15)

but . . .

$(y-3)^{1/2} = -2$

$\left((y-3)^{1/2}\right)^2 = (-2)^2$

$y-3 = 4$

$y = 7$

candidate for solution

check

$(7-3)^{1/2} \stackrel{?}{=} -2$

$4^{1/2} \stackrel{?}{=} -2$

$2 \neq -2$

does not check!

25

17) Solve this equation for x. $3\sqrt{x} = x$

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

$9x = x^2$

$x^2 - 9x = 0$

$x(x-9) = 0$

$x=0$ or $x=9$

check:

$3\sqrt{9} \stackrel{?}{=} 9$ (9)

$3 \cdot 3 = 9$ ✓

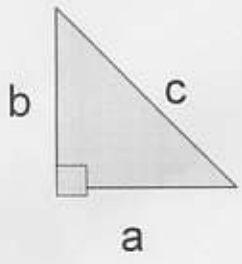
(0)

$3\sqrt{0} \stackrel{?}{=} 0$ ✓

$0 = 0$

15

18) Solve the right triangle



(15)

2) a=4, b= ,c=7

$a^2 + b^2 = c^2$

$4^2 + b^2 = 7^2$

$16 + b^2 = 49$

$b^2 = 33$

$b = \pm\sqrt{33}$

$b = \sqrt{33}$

(8)