

Final Review #5 - Radicals/Rationals (Unit E&10) Date _____ Period _____

Evaluate the equation when X = 3. Give me a DECIMAL answer.

1) $f(x) = \sqrt{x+2}$
 $\sqrt{3+2} = \sqrt{5} = \boxed{2.34}$

2) $f(x) = \sqrt{3x-1}$
 $\sqrt{3(3)-1} = \sqrt{8} = \boxed{2.83}$

Classify the following numbers using the real number system. (List ALL categories that the number belongs to)

3) 15 Real, Rational, Integer, whole, Natural

4) -2.1 Real, Rational

5) 0 Real, Rational, Integer, Whole

6) $\sqrt[4]{16}$ Real, Rational, Integer, Whole, Natural

7) π Real, Irrational

8) -7 Real, Rational, Integer

9) Which option simplifies to an IRRATIONAL number?

10) Which option simplifies to a RATIONAL number?

$\sqrt{10} \cdot \sqrt{40} = \sqrt{400} = 20$
 $\sqrt{10 + \sqrt{20}}$

$(\sqrt{5})^2 = 5$
 $\sqrt{1 + \sqrt{2}}$

$\sqrt{\frac{1}{4}} + \sqrt{\frac{9}{16}} = \frac{1}{2} + \frac{3}{4} = \frac{5}{4}$
 $\sqrt{2} \cdot \sqrt{8} = \sqrt{16} = 4$

$\sqrt{\frac{3}{4}} + \sqrt{\frac{1}{2}}$
 $\sqrt{4 \cdot \sqrt{8}} = \sqrt{32}$

Simplify.

11) $\sqrt{16x^3}$
 $4x\sqrt{x}$

12) $\sqrt{98x^4}$
 $7x^2\sqrt{2}$

13) $\sqrt{108v^4}$
 $6v^2\sqrt{3}$

14) $4\sqrt{128a^3b^4}$
 $64ab^2\sqrt{2a}$

15) $-3\sqrt{8xy^4}$
 $-6y^2\sqrt{2x}$

16) $-8\sqrt{48m^2np}$
 $-32m\sqrt{3np}$

17) $\frac{\sqrt{8}}{\sqrt{12}} \cdot \frac{\sqrt{12}}{\sqrt{12}} = \frac{\sqrt{96}}{\sqrt{144}} = \frac{4\sqrt{6}}{12} = \frac{\sqrt{6}}{3}$

18) $\sqrt{\frac{9}{2}}$
 $\frac{\sqrt{9}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{18}}{\sqrt{4}} = \frac{3\sqrt{2}}{2}$

$$19) \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{\sqrt{9}} = \boxed{\frac{2\sqrt{3}}{3}}$$

$$20) \frac{\sqrt{2}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{10}}{\sqrt{25}} = \boxed{\frac{\sqrt{10}}{5}}$$

Solve each equation. Remember to check for extraneous solutions.

$$21) \sqrt{4r+9} = 7$$

$$4r+9 = 49$$

$$4r = 40$$

$$r = 10$$

check

$$\sqrt{4(10)+9} = 7$$

$$\sqrt{40+9} = 7$$

$$\sqrt{49} = 7$$

$$7 = 7 \checkmark$$

$$22) -6\sqrt{12-2v} = -24$$

$$\sqrt{12-2v} = 4$$

$$12-2v = 16$$

$$-2v = 4$$

$$v = -2$$

check

$$-6\sqrt{12+4} = -24$$

$$-6\sqrt{16} = -24$$

$$-6(4) = -24$$

$$-24 = -24 \checkmark$$

$$23) \sqrt{2-r} = \sqrt{-1-2r}$$

$$2-r = -1-2r$$

$$2+r = -1$$

$$r = -3$$

check

$$\sqrt{2+3} = \sqrt{-1-2(-3)}$$

$$\sqrt{5} = \sqrt{-1+6}$$

$$\sqrt{5} = \sqrt{5} \checkmark$$

$$24) \sqrt{2x-4} = \sqrt{16-2x}$$

$$2x-4 = 16-2x$$

$$4x = 20$$

$$x = 5$$

check

$$\sqrt{2(5)-4} = \sqrt{16-2(5)}$$

$$\sqrt{10-4} = \sqrt{16-10}$$

$$\sqrt{6} = \sqrt{6} \checkmark$$

Simplify each expression.

$$25) \frac{x-6}{12x^2-16x} + \frac{x+5}{12x^2-16x}$$

common

$$\frac{2x-1}{12x^2-16x} \rightarrow \frac{(2x-1)}{4x(3x-4)}$$

$$26) \frac{3x-8}{2x-2} + \frac{x+4}{2x-2}$$

common

$$\frac{4x-4}{2x-2} \rightarrow \frac{4(x-1)}{2(x-1)} \rightarrow \frac{4}{2} \rightarrow \boxed{2}$$

$$27) \frac{m^2+2m-8}{m+4} \cdot \frac{m-3}{3m}$$

$$\frac{(m+4)(m-2)}{(m+4)} \cdot \frac{(m-3)}{3m} \rightarrow \frac{(m-2)(m-3)}{3m}$$

$$28) \frac{10k-80}{10(k-8)} \cdot \frac{7}{(k-6)}$$

$$\frac{7}{(k-8)(k-6)}$$

$$29) \frac{8y}{6x^3y^2} \cdot \frac{2y}{9x^5}$$

KCF!

$$\frac{12x^2}{2y^2} \rightarrow \frac{6x^2}{y^2}$$

$$30) \frac{x^2-3x-70}{3x-30} \div \frac{8x^2+56x}{x-6}$$

KCF!

$$\frac{(x+10)(x-7)}{3(x-10)} \cdot \frac{(x-6)}{8x(x+7)} \rightarrow \frac{(x-6)}{24x}$$