

Score 100%

Name Key  
+60 possible

Test #4

Directions: Please show all your work since partial credit is given. Answers without the necessary work will receive no credit. And remember, have fun!

1. Simplify the following rational expressions.

+4 a)  $\frac{3w}{w+2} + \frac{5}{w-3}$

$$\frac{3w^2 - 4w + 10}{(w+2)(w-3)}$$

LCD =  $(w+2)(w-3)$

$$\frac{3w(w-3) + 5(w+2)}{(w+2)(w-3)}$$

$$\frac{3w^2 - 9w + 5w + 10}{(w+2)(w-3)}$$

$$\frac{3w^2 - 4w + 10}{(w+2)(w-3)}$$

Numerator does not factor

+4 b)  $\frac{1 - \frac{81}{y^2}}{1 + \frac{9}{y}}$

$$\frac{y-9}{y}$$

LCD =  $y^2 \Rightarrow \frac{(1 - \frac{81}{y^2}) \cdot y^2}{(1 + \frac{9}{y}) \cdot y^2}$

$$= \frac{y^2 - 81}{y^2 + 9y}$$

$$= \frac{(y-9)(y+9)}{y \cdot (y+9)}$$

2. Solve the following rational equations.

+4 a)  $\frac{2}{p^2 - 2p} = \frac{3}{p^2 - p}$

$$p = 4$$

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

$$2p^2 - 2p = 3p^2 - 6p$$

$$0 = p^2 - 4p$$

$$0 = p \cdot (p - 4)$$

~~$p = 0$~~  or  $p = 4$

+4 b)  $\frac{v}{v-3} = \frac{1}{v-3} + 2$

LCD =  $v-3$

$$v = 5$$

$$\frac{v \cdot (v-3)}{(v-3)} = \frac{1 \cdot (v-3)}{(v-3)} + 2 \cdot (v-3)$$

$$v = 1 + 2v - 6$$

$$v = 2v - 5$$

$$-v \quad -v$$

$$0 = v - 5$$

$$5 = v$$

+16

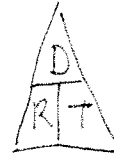
+4

3. Steve can paddle his canoe 2 miles upstream against the current in the same time it would take him to paddle 6 miles downstream. Steve can paddle 2 mph in still water. What is the speed of the current?

1 mph

	D	R	T
up stream	2	2 - c	$\frac{2}{2-c}$
down stream	6	2 + c	$\frac{6}{2+c}$

Let c; current speed (mph)



So,  $T = \frac{D}{R}$

(Time up) = (Time down)

$$\frac{2}{2-c} = \frac{6}{2+c}$$

$$2 \cdot (2+c) = 6 \cdot (2-c)$$

$$\begin{array}{r}
 4 + 2c = 12 - 6c \\
 +6c \quad \quad +6c
 \end{array}$$

$$\begin{array}{r}
 \rightarrow 4 + 8c = 12 \\
 -4 \quad \quad -4 \\
 \hline
 8c = 8 \\
 c = 1
 \end{array}$$

+4

4. It takes Brad 2 hours to mow his lawn, while it takes Gail 3 hours to mow the same lawn. How long will it take them to mow the lawn if they do the job together?

$\frac{1}{5}$  hrs  $\Rightarrow$  1 hr, 12 min

Brad's Rate =  $\frac{1 \text{ lawn}}{2 \text{ hrs}}$

Gail's Rate =  $\frac{1 \text{ lawn}}{3 \text{ hrs}}$

(Total rate)(time) = (Job Completed)

$$\left(\frac{1}{2} + \frac{1}{3}\right) \cdot t = 1$$

$$\frac{t}{2} + \frac{t}{3} = 1$$

$$\begin{array}{l}
 \rightarrow LCD = 6 \\
 \frac{6t}{2} + \frac{6t}{3} = 6 \\
 3t + 2t = 6 \\
 5t = 6 \\
 t = \frac{6}{5} \text{ or } 1\frac{1}{5} \text{ hrs}
 \end{array}$$

+8

5. Simplify the following radical expressions.

+4 a)  $\sqrt{\frac{4}{25v}}$   $\frac{2\sqrt{v}}{5v}$

$$\frac{\sqrt{4}}{\sqrt{25v}}$$

$$= \frac{2}{5\sqrt{v}}$$

$$= \frac{2}{5\sqrt{v}} \cdot \frac{\sqrt{v}}{\sqrt{v}}$$

$$= \frac{2\sqrt{v}}{5v}$$

+4 b)  $3\sqrt{360x^5} - 4x^2\sqrt{490x}$

$-10x^2\sqrt{10x}$

$3\sqrt{36x^4}\sqrt{10x} - 4x^2\sqrt{49}\sqrt{10x}$

$3 \cdot 6x^2\sqrt{10x} - 4x^2 \cdot 7\sqrt{10x}$

$18x^2\sqrt{10x} - 28x^2\sqrt{10x}$

$-10x^2\sqrt{10x}$

+4 c)  $3\sqrt{7}(2\sqrt{7} + 4\sqrt{5})$   $42 + 12\sqrt{35}$

Distribute

$3\sqrt{7} \cdot 2\sqrt{7} + 3\sqrt{7} \cdot 4\sqrt{5}$

$6 \cdot 7 + 12\sqrt{35}$

$42 + 12\sqrt{35}$

+4 d)  $\sqrt[4]{160a^7b^5}$   $2ab\sqrt[4]{10a^3b}$

$\sqrt[4]{16a^4b^4} \cdot \sqrt[4]{10a^3b}$

$2ab\sqrt[4]{10a^3b}$

+4 e)  $(12 - \sqrt{r})^2$   $144 - 24\sqrt{r} + r$

FOIL

$(12 - \sqrt{r})(12 - \sqrt{r})$

$144 - 12\sqrt{r} - 12\sqrt{r} + \sqrt{r}^2$

$144 - 24\sqrt{r} + r$

+20

6. Solve the following radical equations.

+4 a)  $\sqrt{2y+1} + y = 7$   $y = 4$  +4

$$\sqrt{2y+1} = 7 - y$$

$$(\sqrt{2y+1})^2 = (7-y)^2$$

$$2y+1 = 49 - 14y + y^2$$

$$0 = y^2 - 16y + 48$$

$$0 = (y-12)(y-4)$$

~~$y = 12$~~  or  $y = 4$

Check  $\downarrow$

$$\sqrt{2 \cdot 12 + 1} + 12 \stackrel{?}{=} 7$$

$$\sqrt{25} + 12 = 7$$

$$5 + 12 \neq 7 \text{ No}$$

$$\sqrt{2 \cdot 4 + 1} + 4 \stackrel{?}{=} 7$$

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

$$3 + 4 = 7 \checkmark$$

b)  $\sqrt{x-4} = \sqrt{x-32}$

$x = 36$

$$(\sqrt{x-4})^2 = (\sqrt{x-32})^2$$

$$x - 8\sqrt{x} + 16 = x - 32$$

$$-8\sqrt{x} = -48$$

$$\sqrt{x} = 6$$

$$x = 36$$

Check:  $\sqrt{36} - 4 \stackrel{?}{=} \sqrt{36-32}$

$$6 - 4 = \sqrt{4} \checkmark$$

7. Simplify the following exponential expressions.

+4 a)  $\left(\frac{-64}{27}\right)^{2/3}$

$\frac{16}{9}$

$$\left(\frac{\sqrt[3]{-64}}{\sqrt[3]{27}}\right)^2$$

$$\left(\frac{\sqrt[3]{-64}}{\sqrt[3]{27}}\right)^2$$

$$\left(\frac{-4}{3}\right)^2$$

$$\frac{+16}{9}$$

+4 b)  $(m^3 n^{1/4})^{2/3}$

$m^2 n^{1/6}$

$$m^{3 \cdot \frac{2}{3}} \cdot n^{\frac{1}{4} \cdot \frac{2}{3}}$$

$$m^2 n^{\frac{2}{12}}$$

$$m^2 n^{1/6}$$

+16