INTERMEDIATE ALGEBRA   **TEST 3** $\frac{89}{100}$ NAME: Kelly Fenton

No books and no notes. **Be sure to set up each problem before evaluation. Show all work in the space** provided for full credit.

1. Evaluate the following: (8 points)

$$\frac{2x^2-3x-2}{(x+1)(7x+1)} \div \frac{(x-2)(x+3)}{7x^2+8x+1} = \frac{(2x+1)(x-2)}{(x+1)(7x+1)} \cdot \frac{(7x+1)(x+1)}{(x-2)(x+3)} = \frac{(2x+1)}{(x+3)}$$

✓

2. Simplify the following complex fractions. (8 points)

$$\frac{y^2\left(\dfrac{4}{x}+\dfrac{8}{y^2}\right)y^2}{y^2\left(\dfrac{6}{x}+\dfrac{12}{y^2}\right)y^2} = \frac{4y+8^2}{6y+12_3} = \frac{2y+64}{3y+6}$$ } -2

✓ ✓

3. Solve the equation and give the domain and the solution set. (12 points)

$$\frac{5}{x-3} - \frac{3}{x+3} = \frac{4}{x^2-9}$$

$$\frac{x+3}{x-3}\left(\frac{5}{x-3}\right) - \frac{x-3}{x+3}\left(\frac{3}{x+3}\right) = \frac{x+3}{x-3}\left(\frac{4}{(x+3)(x-3)}\right) = 5x+15-(3x-9)=4$$

✓

$$= 5x+15-3x+9=4$$
$$= 2x+24=4$$
$$\quad\quad -24 \quad -24$$
$$= \frac{2x}{2} = \frac{-20}{2}$$ ✓
$$\boxed{x=-10}$$

$(-10, \infty)$

$\{x \mid x=-10\}$ ✓

$\left(-1\right)$

4. Find the missing number in the proportion. (12 points)

a) $\dfrac{k}{12} = \dfrac{4}{3}$ $k=16$

$\dfrac{16}{12} = \dfrac{4}{3}$ ✓

b) $\dfrac{y}{15} = \dfrac{30}{45}$ $\dfrac{3y}{3} = \dfrac{30}{3}$

$y=10$ ✓

5. The current in a simple electrical circuit is <u>inversely proportional</u> to the resistance. If the current is 5 Amperes when the resistance is 20 ohms, find the current when the resistance is 25 ohms. (10 points)

[Hint: $y=\dfrac{k}{x}$: y varies <u>inversely</u> as x.]

current = y
resistance = x

$(20)\,5 = \dfrac{k}{20}\,(20)$

$\boxed{k=100}$ ✓

$y = \dfrac{100}{25}$

$\boxed{y=4 \text{ current}}$ ✓

$y = \frac{20}{5}$

6. Assume all variables represent positive real numbers. Simplify the following (if possible): (12 points)

a) $\sqrt[3]{-\dfrac{27}{64}}$ $\dfrac{\sqrt[3]{-27}}{\sqrt[3]{64}} = \dfrac{-3}{4}$ $\dfrac{-27}{64}$

b) $\sqrt[4]{81x^3y} - \sqrt[4]{16x^7y}$ $x^4 x^3$

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

$= (3-2x)\sqrt[4]{x^3y}$ ✓

-1

7. Rationalize the denominator in the following expression. (8 points)

$\dfrac{2+\sqrt{3}}{\sqrt{7}-\sqrt{3}} \cdot \dfrac{(\sqrt{7}+\sqrt{3})}{(\sqrt{7}+\sqrt{3})} = \dfrac{2\sqrt{7}+2\sqrt{3}+\sqrt{21}+3}{7-3}$ ✓ $= \dfrac{2\sqrt{7}+2\sqrt{3}+\sqrt{21}+3}{4}$ ✓

$\left(-8\right.$

8. Solve each equation and give the solution set. (16 points)

a) $(x+10)^2 = 6$

$X+10 = \pm\sqrt{6}$

$X+10 = \sqrt{6}$ $X-10 = -\sqrt{6}$
$-10-10$ $+10+10$

$X = -4$ $X = 4$

$\{X \mid X \neq -4 \text{ or } X \neq 4\}$

b) $(a-4)^3 = 8$

$a-4 = \sqrt[3]{8}$

$a-4 = \pm 2$

$a-4 = 2$ $a-4 = -2$
$+4+4$ $+4+4$

$a = 6$ $a \neq 2$

-4

$\{a \mid a \neq 6\} \text{ or } a \neq 2$

9. Write the following in standard form. (16 points)

a) $(8-i)(5-2i)$

$= 40 - 16i - 5i + 2i^2$

$= 38 - 21i$ ✓

b) $\dfrac{3i}{5-4i} \cdot \dfrac{(5+4i)}{(5+4i)} = \dfrac{15i+12i^2}{25-16i^2}$

$= \dfrac{15i-12}{25+16}$

$= \dfrac{-12+15i}{41}$ ✓ $= -1$