INTERMEDIATE ALGEBRA **TEST 3** 100/100 NAME: Paul Patel +5

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

Outstanding!

1. Evaluate the following: (8 points)

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

$$\frac{(2x+1)(x-2)}{(x+1)(7x+1)} \times \frac{(7x+1)(x+1)}{(x-2)(x+3)} = \boxed{\frac{2x+1}{x+3}}$$ ✓

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

$$\left(\frac{4}{y}+\frac{8}{y^2}\right)y^2$$ ✓ LCD: y^2 ✓

$$\left(\frac{6}{y}+\frac{12}{y^2}\right)y^2 = \frac{4y+8}{6y+12} = \frac{2\cancel{4}(y+2)}{\cancel{6}_3(y+2)} = \boxed{\frac{2}{3}}$$ ✓ ✓ -2

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

$$\left(\frac{5}{x-3}-\frac{3}{x+3}\right)=\left(\frac{4}{x^2-9}\right)^{x^2-9}$$ ✓ LCD: $(x-3)(x+3)$ or (x^2-9) ✓

$5(x+3)-3(x-3)=4$ ✓

$5x+15-3x+9=4$

$2x=4-24$ ✓

$x=\frac{-20}{2}$ $\boxed{x=-10}$ ✓

Domain: $\{x \mid x \neq -10\}$ or $(-\infty,-10)$ or $(-10,\infty)$ -2

Sol. set $\{x \mid x=-10\}$ ✓

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

a) $\left(\frac{k}{12}\right)=\left(\frac{4}{3}\right)^{12}$ LCD: 12

$\boxed{k=16}$

or cross method

$3k=12\cdot 4$

$k=\frac{12\cdot 4}{3}$

$\boxed{k=16}$ ✓

b) $\left(\frac{y}{15}\right)=\left(\frac{30}{45}\right)^{45}$ LCD: 45

$3y=30$

$y=10$

or: cross method

$45y=30\cdot 15$

$y=\frac{30\cdot 15}{4.5}$ ✓

$\boxed{y=10}$

5. The current in a simple electrical circuit is inversely proportional 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: $y=\frac{k}{x}$: y varies inversely as x.]

$y=5$ amperes

$x=20$ ohms

$k=?$

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

$\boxed{k=100}$ ✓

Replace $k=100$

Find $y=?$,

$k=100$

$x=25$

$y=\frac{100}{25}$ ✓

$\boxed{y=4 \text{ amperes}}$

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

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

$= -\frac{3}{4}$ ✓

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

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

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

$= (3-2x)\sqrt[4]{x^3y}$ ✓

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

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

still →

$= \frac{2\sqrt{7}+\sqrt{21}+2\sqrt{3}+3}{7-3}$ ✓

$= \frac{2\sqrt{7}+\sqrt{21}+2\sqrt{3}+3}{4}$ ✓

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

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

$x+10 = \pm\sqrt{6}$ ✓

$x+10 = \sqrt{6}$ or $x+10 = -\sqrt{6}$

$x = \sqrt{6}-10$ ✓ $x = -\sqrt{6}-10$ ✓

Sol. set $\{x \mid x = \pm\sqrt{6}-10\}$

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

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

$a-4 = 2$ ✓

$a = 2+4$

$a = 6$ ✓

Sol. set $\{a \mid a = 6\}$ ✓

Let $(a-4) = k$

$k^3 = 8$

$k = 2$

$a-4 = 2$

$a = 6$

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

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

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

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

$= 40 - 21i + 2(-1)$

$= 40 - 2 - 21i$

$= 38 - 21i$ ✓

b) $\frac{3i}{5-4i} \cdot \frac{(5+4i)}{(5+4i)}$ ✓

$= \frac{15i + 12i^2}{25 - 16i^2}$

$= \frac{15i + 12(-1)}{25 - 16(-1)}$

$= \frac{15i - 12}{41}$ ✓

$= \frac{-12}{41} + \frac{15}{41}i$

25
16
41