Math 71 Spring 2006 QUIZ #7@ 15 points Name:

Write in a neat and organized fashion. You should use a pencil. For an exercise to be complete there needs to be a detailed solution to the problem. Do not just write down an answer. No proof, no credit given.

1. Let $f(x)=\sqrt{x+4}$. Find the domain of the function. Then graph the function. Label the axes and the points.

DOMAIN

CONDITION: $x+4 \geq 0$

$\boxed{x \geq -4}$

$\boxed{\text{Domain: } x \in [-4, \infty)}$

GRAPH

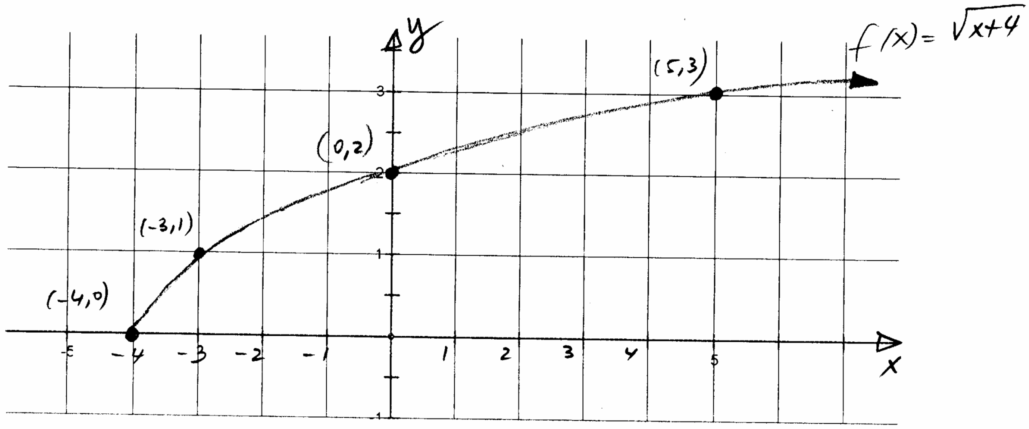
x	y
-4	0
-3	1
0	2
5	3

$f(-4)=\sqrt{-4+4}=\sqrt{0}=0$

$f(-3)=\sqrt{-3+4}=\sqrt{1}=1$

$f(0)=\sqrt{0+4}=\sqrt{4}=2$

$f(5)=\sqrt{5+4}=\sqrt{9}=3$



2. Factor out the greatest common factor:

$5x^{\frac{1}{2}}+15x^{\frac{5}{2}} = 5x^{\frac{1}{2}}\left(1+3x^{\frac{4}{2}}\right)$

$= \boxed{5x^{\frac{1}{2}}\left(1+3x^{2}\right)}$

(Check: $5x^{\frac{1}{2}}(1+3x^2) = 5x^{\frac{1}{2}} + 5x^{\frac{1}{2}}(3x^2)$
$= 5x^{\frac{1}{2}} + 15x^{\frac{1}{2}+2}$
$= 5x^{\frac{1}{2}} + 15x^{\frac{5}{2}}$)

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3. Simplify the following expressions.

a) $\dfrac{\sqrt[3]{x^3+y^3}}{\sqrt[3]{x+y}} = \sqrt[3]{\dfrac{x^3+y^3}{x+y}} =$

$= \sqrt[3]{\dfrac{\cancel{(x+y)}(x^2-xy+y^2)}{\cancel{x+y}}}$

$= \boxed{\sqrt[3]{x^2-xy+y^2}}$

b) $\sqrt[3]{48(x-2)^3} = \sqrt[3]{2^4 \cdot 3\,(x-2)^3}$

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

$= \sqrt[3]{2^3}\,\sqrt[3]{6}\,\sqrt[3]{(x-2)^3}$

$= \boxed{2(x-2)\sqrt[3]{6}}$

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4. Let $f(x)=x^{\frac{3}{2}}-x^{\frac{1}{2}}$. Find $f(9)$ and simplify.

$f(9) = 9^{\frac{3}{2}} - 9^{\frac{1}{2}}$

$= (3^2)^{\frac{3}{2}} - (3^2)^{\frac{1}{2}}$

$= 3^{2\cdot\frac{3}{2}} - 3^{2\cdot\frac{1}{2}}$

$= 3^3 - 3$

$= 27 - 3 = 24$

$\boxed{f(9) = 24}$

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5. Rationalize the denominators:

a) $\dfrac{7}{\sqrt[3]{2x^2}} = \dfrac{7\sqrt[3]{2^2x}}{\sqrt[3]{2x^2}\sqrt[3]{2^2x}}$

$= \dfrac{7\sqrt[3]{4x}}{\sqrt[3]{2^3x^3}}$

$= \boxed{\dfrac{7\sqrt[3]{4x}}{2x}}$

b) $\dfrac{\sqrt{b}}{\sqrt{a}-\sqrt{b}} = \dfrac{\sqrt{b}(\sqrt{a}+\sqrt{b})}{(\sqrt{a}-\sqrt{b})(\sqrt{a}+\sqrt{b})}$

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

$= \boxed{\dfrac{\sqrt{ab}+b}{a-b}}$