Test 5
#1

$3x^3+15x^2+18x$

a. $= 3x(x^2+5x+6)$

b. $= 3x(x+2)(x+3)$

c. $\dfrac{x^2-7}{3x^3+15x^2+8x}$ has domain

$\{x \mid x=-3,\ x\neq -2,\ \&\ x\neq 0\}$

using factorization from b.:

$3x \neq 0$ $\quad x+2\neq 0$ $\quad x+3 \neq 0$

$x\neq 0$ $\quad x\neq -2$ $\quad x\neq -3$

Multiply

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

See Tuesday notes.

$$(-16)^{\frac{1}{4}}$$

Not Real

even

25

$$\sqrt{\frac{x^2 y}{100}} = \frac{\sqrt{x^2}\sqrt{y}}{\sqrt{100}} = \frac{|x|\sqrt{y}}{10}$$

But instructions say assume variables are positive. Don't need absolute values

so final answer is $\boxed{\dfrac{x\sqrt{y}}{10}}$

7.4 Evaluate $2x+3x$ if $x=\sqrt{7}$

$\boxed{2\sqrt{7}+3\sqrt{7} = 5\sqrt{7}}$, same as

$2x+3x=5x$

Today's work:

7.4 Adding, subtracting, multiplying radical expressions.

$5\sqrt{15} + 2\sqrt{15} = 7\sqrt{15}$

$9\sqrt[3]{2y} + 15\sqrt[3]{2y} = 24\sqrt[3]{2y}$

$6\sqrt{10} - 3\sqrt[3]{10} = 6\sqrt{10} - 3\sqrt[3]{10}$

Only combine LIKE radicals.

$2\underline{|50}$
$5\underline{|25}$
5

$\sqrt{50} + 5\sqrt{18}$

$= \sqrt{25\cdot 2} + 5\sqrt{9\cdot 2}$

$= \sqrt{25}\sqrt{2} + 5\sqrt{9}\sqrt{2}$

$= 5\sqrt{2} + (5)(3)\sqrt{2}$

$= 5\sqrt{2} + 15\sqrt{2} = 20\sqrt{2}$

$= \sqrt{5^2\cdot 2} + 5\sqrt{3^2\cdot 2}$

$= 5\sqrt{2} + 15\sqrt{2}$

$= 20\sqrt{2}$

$2\underline{|18}$
$3\underline{|9}$
3

$$\sqrt[3]{24} - 4\sqrt[3]{192} + \sqrt[3]{3}$$

$$(6)\left(\tfrac{1}{3}\right) = \tfrac{6}{3} = 2$$

$$\left(2^6\right)^{\frac{1}{3}} = 2^{6\cdot\frac{1}{3}} = 2^2$$

$$\begin{array}{r|l} 2 & 24 \\ 2 & 12 \\ 2 & 6 \\ & 3 \end{array} \qquad \begin{array}{r|l} 2 & 192 \\ 2 & 96 \\ 2 & 48 \\ 2 & 24 \\ 2 & 12 \\ 2 & 6 \\ & 3 \end{array}$$

$$\sqrt[3]{2^6} = \left(2^6\right)^{\frac{1}{3}} = 2^2$$

$$\sqrt[3]{2^3\cdot 3} - 4\sqrt[3]{2^6\cdot 3} + \sqrt[3]{3}$$

$$2\sqrt[3]{3} - 4\cdot 2^2\sqrt[3]{3} + \sqrt[3]{3}$$

$$2\sqrt[3]{3} - 16\sqrt[3]{3} + \sqrt[3]{3} = \boxed{-13\sqrt[3]{3}}$$

$$\frac{\sqrt{75}}{9} - \frac{\sqrt{3}}{2} = \frac{5\sqrt{3}}{9} - \frac{\sqrt{3}}{2}$$

$$= \frac{5\sqrt{3}}{9}\cdot\frac{2}{2} - \frac{\sqrt{3}}{2}\cdot\frac{9}{9} = \frac{10\sqrt{3} - 9\sqrt{3}}{2\cdot 9}$$

$$= \frac{\sqrt{3}}{18} \quad \text{OR} \quad \frac{\sqrt{3}}{2\cdot 3\cdot 3}$$

$$\sqrt{2}\left(6+\sqrt{10}\right)$$

$$6\sqrt{2} + \sqrt{2}\sqrt{10}$$

$$= 6\sqrt{2} + \sqrt{2\cdot 10} =$$

$$= 6\sqrt{2} + \sqrt{2\cdot 2\cdot 5}$$

$$= 6\sqrt{2} + 2\sqrt{5}$$

$\sqrt{\ } = \sqrt[2]{\ }$ For every pair of factors, pull one outside the radical

$$\sqrt{2\cdot 2\cdot 5} = \sqrt{2^2}\sqrt{5} = 2\sqrt{5}$$

$$(\sqrt{3}-\sqrt{5})(\sqrt{2}+7)$$

$$=\sqrt{3}\sqrt{2}+7\sqrt{3}-\sqrt{5}\sqrt{2}-7\sqrt{5}$$

$$=\boxed{\sqrt{6}+7\sqrt{3}-\sqrt{10}-7\sqrt{5}}$$

$$(a+b)(a-b)=a^2-b^2$$

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

$$\boxed{\begin{array}{c}-2^2\\(-2)^2\end{array}}$$

$$=\sqrt{5}\sqrt{5}\boxed{-2\sqrt{5}+2\sqrt{5}}+(2)(-2)$$

$$=5-4=1$$

$$(\sqrt{5y}+2)(\sqrt{5y}-2)=5y-2^2=5y-4$$

$$(a-b)^2=a^2-2ab+b^2$$

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

$$=5y-4\sqrt{5y}+4$$

$$(\sqrt{5y}-2)(\sqrt{5y}-2)=\sqrt{5y}\sqrt{5y}\boxed{-2\sqrt{5y}-2\sqrt{5y}}+4$$

§2.4 Every 4^{th} problem, up to #

1, 5, 7, 11, ..., 76

73 or 75

Monday