FRIDAY - Week 1

Factor the expression $(r+1)^2 + 12t(r+1) + 36t^2$.

Quadratic Type

$\downarrow$

$ax^2 + bx + c$

1. Think: $x = r+1$, substitute:
2. $x^2 + 12tx + 36t^2 \leftarrow$ perfect square
3. $(x + 6t)^2$
4. $(r + 1 + 6t)^2$

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

$\sqrt{x^2} = x \leftrightarrow a$

$\sqrt{36t^2} = \sqrt{36} \cdot \sqrt{t^2} = 6t$ b

#35 ww

$$\frac{\sqrt[3]{125x^{10}y^7}}{\sqrt[3]{27x^4y}} = \frac{(125x^{10}y^7)^{\frac{1}{3}}}{(27x^4y)^{1/3}}$$

or

$$\boxed{\begin{gathered}\sqrt[3]{\frac{125x^{10}y^7}{27x^4y}} \\ \sqrt[3]{\frac{125}{27}\cdot x^6 \cdot y^6} \\ \frac{5}{3}\cdot x^2 y^2\end{gathered}}$$

$$= \frac{125^{\frac{1}{3}}(x^{10})^{\frac{1}{3}}(y^7)^{\frac{1}{3}}}{27^{1/3}\cdot(x^4)^{1/3}(y)^{1/3}}$$

$$= \frac{5\,(x^{10})^{\frac{1}{3}}\cdot(y^7)^{\frac{1}{3}}}{3\,(x^4)^{1/3}(y)^{1/3}}$$

$$= \frac{5}{3}\left(\frac{x^{10}}{x^4}\right)^{\frac{1}{3}}\cdot\left(\frac{y^7}{y}\right)^{1/3} = \frac{5}{3}(x^6)^{\frac{1}{3}}\cdot(y^6)^{\frac{1}{3}} = \frac{5}{3}x^2\cdot y^2$$

Ideas:

1. $\sqrt[3]{A} = A^{1/3}$

"radicals are fractional exponents"

2. only see mult. & division of terms

3. exponents play nicely with mult. & div.

Note:

$$\sqrt{a^2+b^2} \neq \sqrt{a^2} + \sqrt{b^2}$$

but

$$\sqrt{a^2\cdot b^2} = \sqrt{a^2}\cdot\sqrt{b^2} = |a|\cdot|b|$$

Combine radicals, if possible. Simplify your answer as much as possible.

$8\sqrt{12t^3} + 3t\sqrt{128t} - 3t\sqrt{48t} = \left(\ 24t\ \right)\sqrt{2t} + \left(\ 4t\ \right)\sqrt{3t}$

goal: factor $\sqrt{2t}$ & $\sqrt{3t}$ out

$8\sqrt{2t(6t^2)} + 3t\sqrt{2t(64)} - 3t\sqrt{2t(24)}$ ← (factoring $2t$ out w/in radical repeat for $3t$ & clean up

$8\sqrt{2t}\sqrt{6t^2} = \sqrt{3t^2 \cdot 2}$

$= 8\sqrt{2t} \cdot t\sqrt{6}$

$= 8t\sqrt{12t}$

$= 8t\sqrt{3t \cdot 4}$

$8t \cdot \sqrt{3t} \cdot \sqrt{4}$

$-3t\sqrt{16 \cdot 3t}$

$= -12t\sqrt{3t}$

$16t\sqrt{3t} + 24t\sqrt{2t} - 12t\sqrt{3t}$

#23

Idea:

- $a^{-1} = \frac{1}{a}$
- $a^m \cdot a^n = a^{m+n}$

$$e^{t-3}(t+4) = \frac{\boxed{e^t (t+4)}}{\boxed{e^3}}$$

$$e^t \cdot e^{-3} (t+4) = e^t \left(\frac{1}{e^3}\right)(t+4)$$

#26

$$a^m \cdot b^m = (a \cdot b)^m$$

Rewrite the following using a single exponent. help (formulas)

$$(x^2+y)^5 (x+y^2)^5 = \left(\boxed{(x^2+y)(x+y^2)} \right)^{\boxed{5}}$$

Write the expression as a single fraction. Simplify your answer.

$$5+\frac{1}{\frac{\cancel{x}}{\cancel{x}}(1)+\frac{1}{x}} = \frac{\square}{\square}$$

Idea:

mixed fractions!

sum of fractions

common denom.

$$5+\frac{1}{\frac{x}{x}+\frac{1}{x}} = 5+\frac{1}{\left[\frac{x+1}{x}\right]}$$

dividing by fraction

mult. by recip.

$$= 5 + 1\cdot\frac{x}{x+1}$$

$$= 5\left(\frac{x+1}{x+1}\right)+\frac{x}{x+1} = \frac{5x+5+x}{x+1} = \boxed{\frac{6x+5}{x+1}}$$

$$\frac{ab+b}{2b^2+18b} \cdot \frac{9a^2+18a}{a+a^2} = \frac{}{}$$

Idea

try to make it easy on yourself.

$ab9a^2 + 18a^2b + 9a^2b + 18ab$ ⟵ expanding mult. first

instead....

factor 1st

$$\frac{\cancel{b}\cancel{(a+1)}}{2\cancel{b}(b+9)} \cdot \frac{9\cancel{a}(a+2)}{\cancel{a}\cancel{(1+a)}} = \frac{9(a+2)}{2(b+9)} \checkmark$$

$A^{n+8} \underbrace{B^n} B^8$

$A^{n+8} B^{n+8}$

$(AB)^{n+8}$

$\frac{1}{x^2-25}$ ← DNE when denom = 0

$x^2-25=0 \Rightarrow x^2=25$

$x=\pm 5$

$[-7,-5) \cup (-5,-3)$

-5.1 -4.9

$\frac{1}{(\frac{1}{5})^2-25} = \frac{1}{-24.}$

$\boxed{x=-4}$

$\sqrt{x^2} = |x|$

$\sqrt{(-4)^2} = \sqrt{16} = 4$