*

$2 \cdot 3 = 6$

factors ↑ product

(33) Factor $y^5 - x^3 y^5$ ←

GCF $= y^5$

$y^5(1 - x^3)$

$y^5[1 - x^3]$ ←

$y^5[(1)^3 - (x)^3]$

$1 \to a$
$x \to b$

$y^5[a^3 - b^3]$

only 1 cubed give you a 1.

$y^5[(a-b)(a^2+ab+b^2)]$

$a \to 1$
$b \to x$

$y^5[(1-x)(1^2+1\cdot x+x^2)]$

$y^5(1-x)(1+x+x^2)$

*

$2 \cdot 3 = 6$ (2 factors, 1 product)

(33) Factor $y^5 - x^3 y^5$ ←

GCF $= y^5$

$y^5(1 - x^3)$

$y^5[1 - x^3]$ ←

$y^5[(1)^3 - (x)^3]$

$y^5[a^3 - b^3]$ ~~Dexy~~ $1 \to a$, $x \to b$

only 1 would give you a 1.

$y^5[(a-b)(a^2+ab+b^2)]$ $a \to 1$, $b \to x$

$y^5[(1-x)(1^2+1 \cdot x+x^2)]$

$y^5(1-x)(1+x+x^2)$

§5.7 Factoring by Special Products

(p. 68)

5.7.35 Factor $27cd^3 + 8c^4$

$27cd^3 = 3 \cdot 3 \cdot 3 \cdot c \cdot d \cdot d \cdot d$

$8c^4 = 2 \cdot 2 \cdot 2 \cdot c \cdot c \cdot c \cdot c$

GCF $= c$

$$\frac{27cd^3}{c} + \frac{8c^4}{c}$$

$$c(27d^3 + 8c^3)$$

$$c\left[(3d)^3 + (2c)^3\right]$$

"a" $\leftarrow$ $3d$ $\quad$ $2c$ $\rightarrow$ "b"

$$c\left[a^3 + b^3\right]$$

factor formula

a^2

$a \cdot a$

$3d \cdot 3d$

$9d^2$

$$c\left[(a+b)(a^2 - ab + b^2)\right]$$

$a \rightarrow 3d$

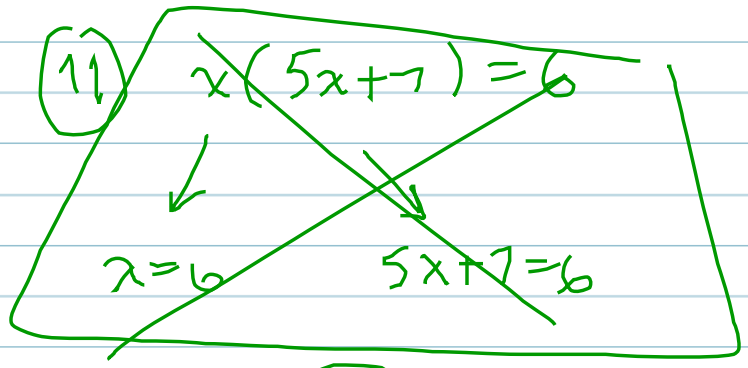
$b \rightarrow 2c$

$$c\left[(3d+2c)([3d]^2 - [3d][2c] + [2c]^2)\right]$$

$$(c)(3d+2c)(9d^2 - 6cd + 4c^2)$$

§5.8 Solving Equations by Factoring and Problem Solving

(p.69)



$x(5x+7,=6$

$5x^2+7x=6$

poly = poly

$5x^2+7x-6=6-6$

$5x^2+7x-6=0$

$(5x-3)(x+2)=0$

$+10x$
$-3x$
$7x$ ✓

$5x-3=0$ $\quad$ $x+2=0$

$+3\ +3$ $\quad$ $-2\ -2$

$\frac{5x}{5}=\frac{3}{5}$ $\quad$ $x=-2$

$x=\frac{3}{5}$ $\quad$ $\left\{-2, \frac{3}{5}\right\}$

(15) Solve.

$$\frac{z^2}{6} - \frac{7z}{2} - 12 = 0$$

LCD = 6

$$6\left(\frac{z^2}{6} - \frac{7z}{2} - 12\right) = 6(0)$$

$$\frac{\cancel{6}^{1}}{1}\cdot\frac{z^2}{\cancel{6}_{1}} - \frac{\cancel{6}^{3}}{1}\cdot\frac{7z}{\cancel{2}_{1}} - 6\cdot 12 = 0$$

$$z^2 - 21z - 72 = 0$$

$$(z+3)(z-24) = 0$$

$-24z$
$+3z$
$-21z$ ✓

$z+3=0$
$-3\ \ -3$
$z=-3$

$z-24=0$
$+24\ \ +24$
$z=24$

$\{-3, 24\}$

(45) Solve.

$9z(z+6) = 9z^2+54z-2$

$9z^2+54z = 9z^2+54z-2$

$0 = \cancel{9z^2} - \cancel{9z^2} + \cancel{54z} - \cancel{54z} - 2$

$0 = -2$ false

"contradiction"

No Solution

(83) $W(x) = 0.5x^2$

$W(x)$: # of people; x: side of a cake

x-inch square wedding cake tier

We want to serve 50 people.

$50 = 0.5x^2$

$(10)(50) = (10)(0.5x^2)$

$500 = 5x^2$

$-500 \quad -500$

$0 = 5x^2 - 500$

$0 = 5(x^2-100)$

$0 = 5(x+10)(x-10)$

$5=0$ No Solution

$x+10=0$, $-10 \ -10$, $x=-10$ (Extraneous)

$x-10=0$, $+10 \ +10$, $x=10$

Extraneous

We want a two-layer 10-inch square cake

§6.1 Rational Functions and Multiplying and Dividing Rational Expressions

(p. 71)

(6.111) Domain of $\frac{x+3}{x^2-4}$ Final ~~answer~~ answer in Set-Builder

set $x^2-4=0$

$(x-2)(x+2)=0$

$x-2=0$ $\quad$ $x+2=0$

$x=2$ $\quad$ $x=-2$

$\{x \mid x \text{ is real}, x \neq 2, x \neq -2\}$

(23) Simplify $\frac{x^2-16}{4-x} = \frac{(x+4)(x-4)}{-1)(x-4)} = \frac{x+4}{-1}$

NUMER x^2-16

GCF=1 $(x+4)(x-4)$

DENOM $4-x$

$-x+4$

$-1 \quad -1$

$(-1)(x-4)$

GCF $= -1$

$= -\frac{x+4}{1}$

$= -(x+4)$

$-x-4$

factored form

polynomial form

6.1.27 Simplify.

$$\frac{x^3-216}{3x-18} = \frac{(x-6)(x^2+6x+36)}{(x-6)(3)} = \frac{x^2+6x+36}{3}$$

NUMER

x^3-216

$(x)^3-(6)^3$

a^3-b^3

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

$(x-6)(x^2+x\cdot 6+6^2)$

$(x-6)(x^2+6x+36)$

DENOM

$\frac{3x}{3}-\frac{18}{3}$ GCF=3

$3(x-6)$

$x^2+6x+12$

(41) $\dfrac{a^3+a^2b+a+b}{5a^3+5a} \cdot \dfrac{18a^2}{9a^2-9b^2}$

a^3+a^2b+a+b

$a^2(a+b)+1(a+b)$

$(a^2+1)(a+b)$

$5a^3+5a$

$\frac{5a^3}{5a} \quad \frac{5a}{5a}$

$5a(a^2+1)$

$18a^2 = 2 \cdot 3 \cdot 3 \cdot a \cdot a$

$\frac{9a^2}{9} \quad \frac{-9b^2}{9}$ GCF = 9

$9(a^2-b^2)$

$9(a+b)(a-b)$

$\dfrac{(a^3+1)(a+b)}{(5a)(a^2+1)} \cdot \dfrac{(2)(3)(3)(a)(a)}{(9)(a+b)(a-b)}$

$\dfrac{(a+b)(2)(a)(a)}{(5)(a)(a+b)(a-b)} = \boxed{\dfrac{2a}{5(a-b)}}$