factor

① $x^2-9$

② $3x+6$

③ $2x^2+5x-3$

④ $8x^2-24x+18$

Answers

① $x^2-9$

$\boxed{(x+3)(x-3)}$ - Difference of squares!

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

② $3x+6$

$\boxed{3(x+2)}$ → pull out GCF

$3x^2+6x$

$3x(x+2)$

③ $2x^2+5x-3$

$2x^2+5x-3$

$2x \cdot x$ $\quad$ $-3 \cdot 1$, $1 \cdot -3$

$\boxed{(2x-1)(x+3)}$ → trinomial factors to 2 binomials

④ $8x^2-24x+18$

$2(4x^2-12x+9)$ → Look for GCF then maybe keep factoring...

$2(2x-3)(2x-3)=\boxed{2(2x-3)^2}$

# Factoring

① GCF

$3x+6$

$3(x+2)$

$4x^2+8x \quad (0=c)$

$4x(x+2)$

② Diff of Squares

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

$(b=0)$

$x^2-16$

$(x-4)(x+4)$

$x^2-4$

$(x-2)(x+2)$

$64x^2-36$

$(8x-6)(8x+6)$

$2(4x-3)\cdot 2(4x+3)$

$4(4x-3)(4x+3)$

$9x^2-25$

$(3x-5)(3x+5)$

③ $a=1$ Foil method

$1x^2+6x+5$

$x\ x \qquad 5\ 1$

$-5\ -1$

$(x+5)(x+1)$

$1x^2-6x-16$

$x\cdot x \qquad -16\ 1$

$16\ -1$

$4\ -4$

$8\ -2$

$-8\ 2$

$(x-8)(x+2)$

$12x^2+4x-1$

| | | |
|---|---|---|
| $-1$ | $-2x$ | $-1$ |
| $6x$ | $12x^2$ | $6x$ |
| | $2x$ | $1$ |

$-12x^2$

$6x \quad -2x$

$4x$

$(2x+1)(6x-1)$

④ $a\neq 1$ $\quad 2x^2+17x+8$

$(2x+1)(x+8)$

| | | |
|---|---|---|
| $1$ | $1x$ | $8$ |
| $2x$ | $2x^2$ | $16x$ |
| | $x$ | $8$ |

$x \quad x$

$16x^2$

$16x \quad 1x$

$17x$

$+$

$a\cdot b$

$a \quad b$

$a+b$

◎ Simplify expressions using "1's"

| expression | vs | equations |
|---|---|---|
| ↓ | | ↓ |
| no = signs | | = signs |
| ↓ | | ↓ |
| "simplify" | | "solve" |

GOAL: $\dfrac{x+2}{x^2+4x+4} - \dfrac{2}{x+2} = \dfrac{-7}{3}$

end of chapter

$$\boxed{* \quad \frac{\text{Anything}}{\text{itself}} = 1}$$ for any non-zero #

$\dfrac{7}{7} = 1$ $\qquad \dfrac{bc}{bc} = 1$ $\qquad \dfrac{b+c}{b+c}$

$\dfrac{\cancel{b}\cdot\cancel{c}}{\cancel{b}\cdot\cancel{c}}$ $\qquad \dfrac{\cancel{(b+c)}}{\cancel{(b+c)}} = 1$

EX 1] $\dfrac{3x^2+6x}{x}$

$$\frac{3x(x+2)}{x} = \frac{3\cdot\cancel{x}\cdot(x+2)}{\cancel{x}} = \boxed{3(x+2)}$$

Ex 2

$$\frac{3x+6}{4x-12} \cdot \frac{x-3}{x+2}$$

FACTOR →

$$\frac{3\cancel{(x+2)} \cdot \cancel{(x-3)}}{4\cancel{(x-3)}\ \cancel{(x+2)}} = \boxed{\frac{3}{4}}$$

Ex 3]

$$\frac{2x(x-4)}{3x^2} \cdot \frac{12x-36}{2x-8}$$

FACTOR →

$$\frac{\cancel{2}\cdot\cancel{x}\cdot\cancel{(x-4)} \cdot \overset{4}{\cancel{12}}\cdot(x-3)}{\cancel{3}\cdot\cancel{x}\cdot x\ (\cancel{2})\cancel{(x-4)}} = \boxed{\frac{4(x-3)}{x}}$$

Ex 4]

$$\frac{2x^2-x-3}{10x-15} \cdot \frac{x^2-4}{x^2-x-2}$$

FACTOR →

$$\frac{\cancel{(2x-3)}\cancel{(x+1)} \cdot (x+2)\cancel{(x-2)}}{5\cdot\cancel{(2x-3)}\ \cancel{(x-2)}\cancel{(x+1)}}$$

$$\boxed{\frac{x+2}{5}}$$

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