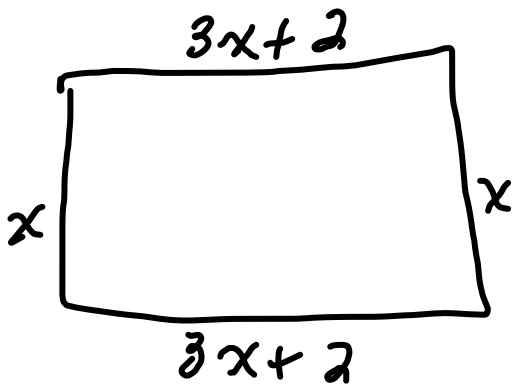
① 

Perimeter 44 in

let x = the width

$3x+2$ = the length

$44 = 2(3x+2) + 2x$

② $20 reserved

$12 general admission

total revenue $4000.

let x = the number of reserved tickets

$x+40$ = the # of general admission

	#	price	revenue
reserved	x	20	$20x$
gen adm	$x+40$	12	$12(x+40)$
total			4000

$20x + 12(x+40) = 4000$

⑥ let x = the measure of the smallest $\angle$
$2x$ = the measure of the middle $\angle$
$x+40$ = The " " the largest $\angle$

$$x + 2x + x + 40 = 180$$

⑨ let x = the 1st integer
$x+1$ = The 2nd integer

$$5(x+1) = x + 21$$

5.2 (63) $\dfrac{(a^{-2})^3 (a^4)^2}{(a^{-3})^{-2}}$

$(a^m)^n = a^{mn}$

$\dfrac{a^{-6}\ a^8}{a^6}$

$\dfrac{a^2}{a^6}$ → $a^2 a^{-6} = a^{-4} = \dfrac{1}{a^4}$

$\dfrac{1}{a^6 a^{-3}}$

$\dfrac{1}{a^4}$

want possitive exponents

(17)

# x	Square x^2	Power of 2^x
-3	9	$2^{-3} = \frac{1}{2^3} = \frac{1}{8}$
-2	4	$2^{-2} = \frac{1}{2^2} = \frac{1}{4}$
-1	1	$2^{-1} = \frac{1}{2}$
0	0	$2^0 = 1$
1	1	$2^1 = 2$
2	4	$2^2 = 4$
3	9	$2^3 = 8$

base

Simplify

a) $\frac{2^{-3}}{2^{-5}} = \frac{2^5}{2^3} = 2^{5-3} = 2^2 = 4$

OR $2^{-3}2^5 = 2^2$ $\quad \frac{1}{2^{-2}} = 2^2 = 4$

many routes

b) $(2a^2b)^0 = 1$

where $a, b \neq 0$

c) $\dfrac{(a^{-5})^{-3}\,(a^{7})^{-1}}{(a^{-3})^{5}}$

$\dfrac{a^{15}\,a^{-7}}{a^{-15}}$

$a^{15}\,a^{15}\,a^{-7}$

a^{23}

$\dfrac{a^{-3}}{a^{-3}} = 1$

d) $\frac{x^6}{125} \div \left(\frac{x^2}{5}\right)^3$

5.3 Monomials

one-term expression

4 $\quad -21x^3y \quad 49x^4y^2z^3$

$-21x^3y$: numeric part; variables with whole number exponents; called the coefficient

πx

$x^3 x^2 = x^5$

(ex) multiply

$(-4x^3)(2x^2)$

$-8x^5$

(ex) Divide $\frac{25x^5}{5x^4} = 5x$

(ex) $\dfrac{(21a^5b)(2a^8b^4)}{14ab}$

commutative property

$3 \cdot \dfrac{21(2)}{14} \cdot \dfrac{a^5 a^8}{a} \cdot \dfrac{b\,b^4}{b}$

$3 \cdot \dfrac{a^{13}}{a} \cdot b^4$

$3a^{12}b^4$

Addition & Subtraction of Monomials

Can only add/subtract like (similar) terms – have same variables to the same powers

(ex) $-3x^2 + 15x^2 = (-3+15)x^2$

$= 12x^2$

(ex) $3x^2 - 15x^3$ can't do anything

(ex) $3x^2y^3 + 6x^2y^2$

not the same

(ex) $3x^3 + 6x^2y - 2x^2 + x^2y$ ←

$x^2 + 7x^2y$

5.4 **Polynomials** - finite sum of monomials (terms)

many

- 1 term - monomial
- 2 terms - binomial
- 3 terms - trinomial
- 4 terms - polynomial of 4 terms

$x^3 + 6xy$ binomial

$3x^2 + 2x - 4$ trinomial

degree of a monomial with one variable is the power of the variable

$3x^2$ degree 2

Degree of Polynomial is the degree of the highest degree term

$4x^3 + 3x + 1$ trinomial degree 3

$2x^4 + 6x$ binomial degree 4

$13x^0$ monomial deg zero

$13x$ = deg one

Adding & subtracting polynomials

combining like terms

(ex) Add $(x^2 + 5x + 6) + (x^2 + 3x + 4)$

$x^2 + 5x + 6 + x^2 + 3x + 4$

$2x^2 + 8x + 10$

Subtraction $a - b = a + (-b)$

Add the opposite

$2x^2 - 3x + 5$

opposite $-2x^2 + 3x - 5$

Subtract $2x^2 - 3x + 5$ from $4x^2 - 5x + 10$

$4x^2 - 5x + 10 + (-2x^2 + 3x - 5)$

$4x^2 - 5x + 10 - 2x^2 + 3x - 5$

$2x^2 - 2x + 5$

(4) $(6x^2 + 2x - 3) - 1(4x^2 - 3x + 2)$

$6x^2 + 2x - 3 - 4x^2 + 3x - 2$

$2x^2 + 5x - 5$

$6x^2 + 2x - 3$

$-4x^2 + 3x - 2$

$2x^2 + 5x - 5$

$-(4x^2 - 3x + 2)$

$-4x^2 + 3x - 2$

$14x^2 - 3x + 7 - 1(3x^2 + 6x - 2)$

$$\begin{array}{r} 14x^2 - 3x + 7 \\ -3x^2 - 6x + 2 \\ \hline 11x^2 - 9x + 9 \end{array}$$

vertically

$14x^2 - 3x + 7 - 3x^2 - 6x + 2$

$11x^2 - 9x + 9$

horizontally

5.4

Just adding and subtracting the coefficients.

$2x^3 + 5x^3 = 7x^3$

$2\bigcirc + 5\bigcirc = 7\bigcirc$

Evaluate a polynomial for a certain given x

$2x^2 - 2$ evaluate at $x = 5$

$2(5)^2 - 2$

$2(25) - 2$

$50 - 2$

48

(ex) $3x^2 + 2x - 6$ evaluate at $x = -2$

$3(-2)^2 + 2(-2) - 6$

$3(4) + (-4) - 6$

$12 - 4 - 6$

$8 - 6$

2

(ex) $y^2 - 10y + 25$ evaluate at $y = -10$

$(-10)^2 - 10(-10) + 25$

$100 + 100 + 25$

225

5.5 Multiplication of Polynomials

multiply every term of the 1st by every term of the second

(ex) $5x(4x^3 - 5x^2 + x)$

$5x \cdot 4x^3 + 5x(-5x^2) + 5x(x)$

$20x^4 - 25x^3 + 5x^2$

Monomial times a polynomial

(Ex) A polynomial × a polynomial

Method I $(x-2)(x^2+3x-4)$

$x(x^2+3x-4) - 2(x^2+3x-4)$

$x^3 + 3x^2 - 4x - 2x^2 - 6x + 8$

$x^3 + x^2 - 10x + 8$

Method II

$$\begin{array}{r} x^2+3x-4 \\ \times\quad x-2 \\ \hline x^3+3x^2-4x \\ \quad -2x^2-6x+8 \\ \hline x^3+x^2-10x+8 \end{array}$$

(4) $(2x^2+6x+3)(x^2-4x-5)$

$2x^4-8x^3-10x^2+6x^3-24x^2-30x+3x^2-12x-15$

$2x^4-2x^3-31x^2-42x-15$

$2x^2+6x+3$

$\times (x^2-4x-5)$

$2x^4+6x^3+3x^2$

$-8x^3-24x^2-12x$

$-10x^2-30x-15$

$2x^4-2x^3-31x^2-42x-15$

24
32
48
72
768