

M9 - 5.0 - Polys Notes

$a + 1 = a + 1$ You can only add and subtract like terms.
 $x + x^2 = x + x^2$ You cannot add or subtract unlike terms.

Coefficient = 4 \rightarrow $4x^2$ \leftarrow Exponent/Power = 2
 \leftarrow Letter/Variable/Base = x
Exponent : $5^3 = 5 \times 5 \times 5$
Variable : a letter

Like term: Same Letter(s), Same Exponent(s).

| Term: | Degree: | Degree of term: |
|------------|--------------|-----------------|
| x^2 | ... 2 | The Variable |
| $x = x^1$ | ... 1 | Exponent or |
| $x^2(y^3)$ | ... 5 | Sum of Variable |
| $8 = 8x^0$ | ... 0 | Exponents. |

| Polynomial: | Leading Term: | Degree of Poly: |
|-----------------------|--------------------|-----------------|
| $x^2 - 4$ | ... x^2 | ... 2 |
| $2x^2 - 5x^3$ | ... $-5x^3$ | ... 3 |
| $\sqrt{3}x + 2$ | ... $\sqrt{3}x^1$ | ... 1 |
| $2^{-3}x^2y + 2x + 2$ | ... $2^{-3}x^2y^1$ | ... 3 |

Degree of polynomial: Degree of Leading term.
Leading Coefficient: Coefficient of Highest Degree Term
Leading Term: The Term with the Highest Degree.

Polynomial: Terms with Variables with Whole Number Exponents*.
 (ie. 0,1,2,3...)

- Monomial:** One term. $2, x, x^2, 2xy, 5z, 10$
- Binomial:** Two terms. $x + 2, x^2 - 4, xy + 5, 3x^2 + y^2, 2x^2 + x$
- Trinomial:** Three terms. $x^2 + 5x + 6, a + b + c$
- Polynomial:** Any # $2, x + 2, x^2 + 5x + 6, a + b + c + d + e$

Not Polynomial
 $x^{-2}, x^\pi, 2^x, \frac{1}{x}, \sqrt{x} = x^{\frac{1}{2}}, \log x, \sin x$

$x + x = 2x$ ✓ Check Answer $x = 3^*$ $x + x = 2x$ Pick an x value*
 $3 + 3 = 2(3)$ Sub into question/answer
Combine Like Terms : $6 = 6$ Must be equal!

$3y + 2y = 5y$ $x^2 + x^2 = 2x^2$ $-9xy + 7xy = -2xy$ **Add/Subtract Coefficients.**

$2 + x + 3 =$ $3x + 1 - x =$ $3 + x^2 + 2x - 1 + 3x^2 + x =$
 $x + 2 + 3$ $3x - x + 1$ $x^2 + 3x^2 + 2x + x + 3 - 1$ **Descending Degree**
 $x + 5$ $2x + 1$ $4x^2 + 3x^1 + 2$ $2 = 2x^0$

$5 - x + 2 =$ **Circle/Square/Cloud* Like Terms** $2x - 3 + 3y =$ $-2x + 3(-x) =$
 $7 - x$ $5x - 3$ $-3x + 3$

$5x - 2 - 2x + 3 =$ $-3 - 2x + 1 + 6x =$ $x^2 + 3x - 2x^2 - 1 - 2x =$ $5xy + 2yx = 7xy$
 $3x + 1$ $4x - 2$ $x^2 + 3x - 2x^2 - 1 - 2x$ $3x^2y^3 - 5y^3x^2 =$
 $-2x^2y^3$

Don't forget to include the sign out in front (left)

Multiplying/Dividing :

$a \times a = a^2$ $a = 3^*$ $3 \times 3 = 9$ $3^2 = 9$ **Multiply Coefficients**
Add Exponents

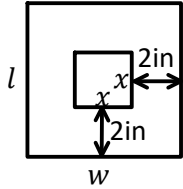
$2a \times 3a = 6a^2$ $-3x^2y \times 5x^3 = -15x^5y$ $2x \times 3x^2 = 6x^3$ $abcd \times efgh = abcdefgh$

$20x^3 \div -5x^2 = -4x$ $30a^4 \div 6a^2 = 5a^2$ $\frac{6x}{2} = 3x$ $\frac{12x^2}{6x} = 2x$ $\frac{8x}{2x} = 4$ $\frac{4x}{2x^2} = \frac{2}{x}$

$\frac{8x + 4}{2} =$ $\frac{9x^2 + 6x}{3x} =$ $\frac{1}{2}(8x + 4) =$ $-\frac{2x + 4}{2} =$
 $\frac{8x}{2} + \frac{4}{2}$ **Separate Fractions** $\frac{9x^2}{3x} + \frac{6x}{3x} =$ $\frac{8x + 4}{2}$ **Distribute** $-\left(\frac{2x + 4}{2}\right)$
 $4x + 2$ $3x + 2$ \dots $-\left(\frac{2x}{2} + \frac{4}{2}\right)$
 $-(x + 2)$
 $-x - 2$

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Find area of large square.



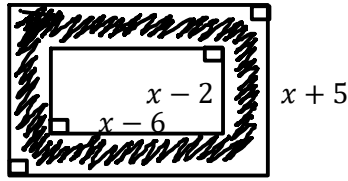
$$A = lw$$

$$A = (2 + x + 2)(2 + x + 2)$$

$$A = (x + 4)(x + 4)$$

$$A = x^2 + 8x + 16$$

Find area of shaded region.



$$A = lw$$

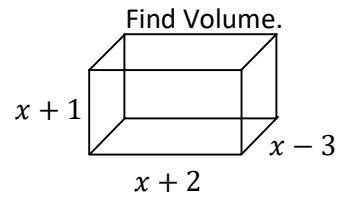
$$A = (2x + 11)(x + 5)$$

$$A = 2x^2 + 21x + 55$$

$$A = lw$$

$$A = (x - 6)(x - 2)$$

$$A = x^2 - 8x + 12$$



Find Volume.

$$V = lwh$$

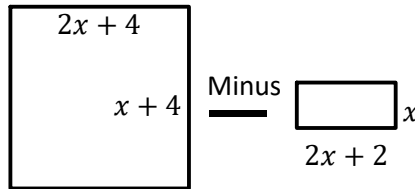
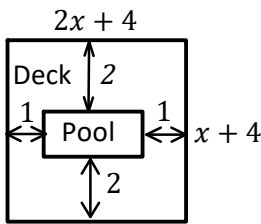
$$V = (x + 1)(x + 2)(x - 3)$$

$$V = (x^2 + 3x + 2)(x - 3)$$

$$V = x^3 + 3x^2 + 2x - 3x^2 - 9x - 6$$

$$V = x^3 - 7x - 6$$

Find area of pool.



$$A_{shaded} = A_{big} - A_{small}$$

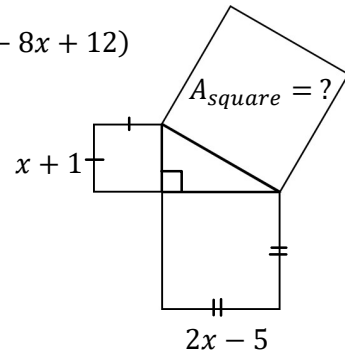
$$A = 2x^2 + 21x + 55 - (x^2 - 8x + 12)$$

$$A_{shaded} = x^2 + 13x + 43$$

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

$$2x^2 + 12x + 16 - 2x^2 - 2x$$

$$10x + 16$$

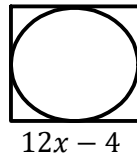


$$a^2 + b^2 = c^2$$

$$(x + 1)^2 + (2x - 5)^2 = c^2$$

$$A = 5x^2 - 18x + 25$$

Find an expression in expanded form for the circumference and area of this circle inscribed in this square.



$$r = \frac{d}{2}$$

$$r = \frac{12x - 4}{2}$$

$$r = 6x - 2$$

$$C = 2\pi r$$

$$C = 2\pi(6x - 2)$$

$$C = 12\pi x - 4\pi$$

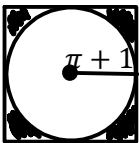
$$A = \pi r^2$$

$$A = \pi(6x - 2)^2$$

$$A = \pi(6x - 2)(6x - 2)$$

$$A = 36\pi x^2 - 24\pi x + 4\pi$$

Find area of shaded region.



$$l = w = 2(\pi + 1)$$

$$= 2\pi + 2$$

$$A_{square} = l \times w$$

$$= (2\pi + 2)(2\pi + 2)$$

$$= 4\pi^2 + 8\pi + 4$$

$$A_{circle} = \pi r^2$$

$$= \pi(\pi + 1)^2$$

$$= \pi^3 + 2\pi^2 + \pi$$

$$A_{shaded} = A_{square} - A_{circle}$$

$$A_{shaded} = 4\pi^2 + 8\pi + 4 - (\pi^3 + 2\pi^2 + \pi)$$

$$A_{shaded} = -\pi^3 - 6\pi^2 + 7\pi + 4$$

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Find the dimensions.

$b = 6$
 $a = 2b - 2$
 $a = 10$
 $P = 25m$
 $c = b + 3$
 $c = 9$
 $P = b + b + 3 + 2b - 2$
 $25 = 4b + 1$
 $\frac{24}{4} = \frac{4b}{4}$
 $b = 6$
 $6 + 10 + 9 = 25$

A rectangle's length is 7 less than twice its width and its length and width decreased by one and four respectively to have a perimeter of 66 meters. Find the dimension of both rectangles.

$L \downarrow 1$
 $w \downarrow 4$

$P = 2L + 2w$
 $66 = 2(2w - 8) + 2(w - 4)$
 $66 = 6w - 24$
 $90 = 6w$
 $\frac{90}{6} = \frac{6w}{6}$
 $w = 15$

$P = 66m$
 $L = 2w - 7$
 $L = 2(15) - 7$
 $L = 23$

$66 = 22 + 22 + 11 + 11$

Find width.

$A = lw$
 $5.4x^2 = 2.7x(w)$
 $A = 5.4x^2$
 $2.7x$
 $\frac{5.4x^2}{2.7x} = \frac{2.7x(w)}{2.7x}$
 $2x = w$
 $w = 2x$

Find perimeter and area.

$3x - (x + 1)$
 $3x - x - 1$
 $2x - 1$

$P = 3x + (x + 2) + (2x - 1) + x + (x + 1) + x + (x + 2)$
 $P = 10x + 4$

$A = lw$
 $A = 3x(x + 2)$
 $A = 3x^2 + 6x$

$A = lw$
 $A = x(x + 1)$
 $A = x^2 + x$

$Area = 3x^2 + 6x - (x^2 + x)$
 $Area = 2x^2 + 5x$

Find height.

$A = 18x^2$
 $b = 4x$
 $h = ?$
 $A = \frac{bh}{2}$
 $18x^2 = \frac{4xh}{2}$
 $2 \times 18x^2 = \frac{4xh}{2} \times 2$
 $\frac{36x^2}{4x} = \frac{4xh}{4x}$
 $9x = h$

Find length.

$A = 2x^2 + 9x - 5$
 $l = ?$
 $w = x + 5$
 $2x^2 + 9x - 5$
 $(x + 5)(\quad)$
 $(x + 5)(2x \quad)$
 $(x + 5)(2x - 1)$
 $2x^2 - 1x + 10x - 5$
 $2x^2 + 9x - 5$

Find k : $3x^2 - 16x + k$
If: $(x - 7)$ Is a factor.

$3x^2 - 16x + k$
 $(x - 7)(\quad)$
 $(x - 7)(3x \quad)$
 $3x^2 + \underline{\quad}x - 21x + \underline{\quad}$
 $3x^2 - 16x + k$
 $3x^2 + 5x - 21x + \underline{\quad}$
 $(x - 7)(3x + 5)$
 $3x^2 + 5x - 21x - 35$
 $3x^2 - 16x - 35$
 $k = -35$