

Math 3

Unit 3 Day 4 Notes – Polynomials Equations & Model

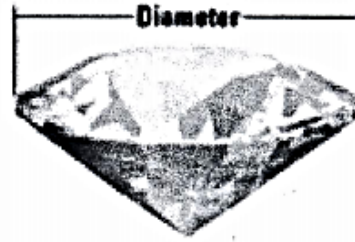
Name: Key

Date: _____

DIAMONDS The weight of an ideal round-cut diamond can be modeled by

$$w = 0.0071d^3 - 0.090d^2 + 0.48d$$

where w is the diamond's weight (in carats) and d is its diameter (in millimeters). According to the model, what is the weight of a diamond with a diameter of 15 millimeters?



$w = 10.9125$ carats

- ① STO button on Calc.
- or
- ② Table on the Calc.

CLOTHING The profit P (in millions of dollars) for a T-shirt manufacturer can be modeled by $P = -x^3 + 4x^2 + x$ where x is the number of T-shirts produced (in millions). Currently, the company produces 4 million T-shirts and makes a profit of \$4,000,000. What lesser number of T-shirts could the company produce and still make the same profit?

1 million T-shirts

MP3 PLAYERS The profit P (in millions of dollars) for a manufacturer of MP3 players can be modeled by $P = -4x^3 + 12x^2 + 16x$ where x is the number of MP3 players produced (in millions). Currently, the company produces 3 million MP3 players and makes a profit of \$48,000,000. What lesser number of MP3 players could the company produce and still make the same profit?

2 million MP3 players

SWIMMING POOL You are designing a rectangular swimming pool that is to be set into the ground. The width of the pool is 5 feet more than the depth, and the length is 35 feet more than the depth. The pool holds 2000 cubic feet of water. What are the dimensions of the pool?

depth = x
 width = $x + 5$
 length = $x + 35$

$V = l \cdot w \cdot d$
 $V = x(x+5)(x+35)$
 $2000 = x(x+5)(x+35)$

depth = 5 ft
 width = 10 ft
 length = 40 ft

BUSINESS For the 12 years that a grocery store has been open, its annual revenue R (in millions of dollars) can be modeled by the function

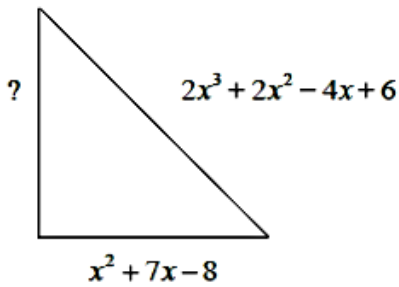
$$R = 0.0001(-t^4 + 12t^3 - 77t^2 + 600t + 13,650)$$

where t is the number of years since the store opened. In which year(s) was the revenue \$1.5 million?

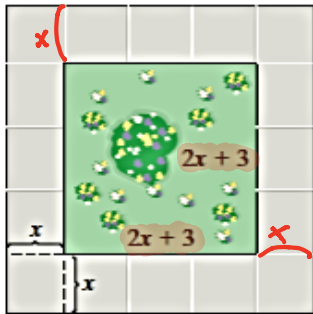
3 years + 9 years after the store opened.

GIVEN THE PERIMETER, FIND THE MISSING SIDE.

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



$$\begin{aligned} & \cancel{2x^3} + 4x^2 + 6x + 3 - (\cancel{2x^3} + 2x^2 - 4x + 6) \\ & (2x^2 + 10x - 3) - (\cancel{x^2} + 7x - 8) \\ & \underline{x^2 + 3x + 5} \end{aligned}$$



- $L \cdot W$
- A) FIND THE AREA OF THE GARDEN.
- B) FIND THE AREA OF THE WALKWAY AND THE GARDEN.

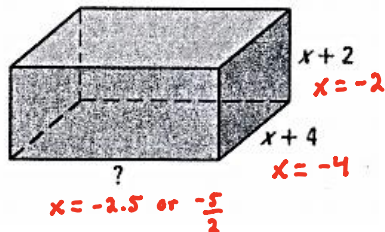
A). $(2x+3)(2x+3)$

m	2x	3
2x	4x ²	6x
3	6x	9
		<u>4x² + 12x + 9</u>

B). $(2x+3+2x)(2x+3+2x)$

m	4x	3
4x	16x ²	12x
3	12x	9
		<u>16x² + 24x + 9</u>

$$V = 2x^3 + 17x^2 + 46x + 40$$

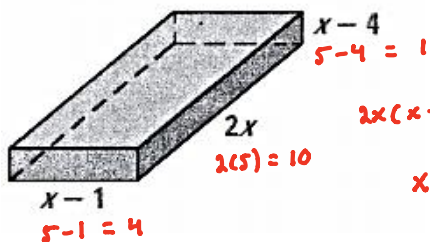


$x = -2.5$ or $-\frac{5}{2}$

$(x + 2.5)$ or $(x + \frac{5}{2})$

$(2x + 5)$

Volume = 40



$2x(x-4)(x-1) = 40$

$x = 5$

$10 \times 4 \times 1$