LESSON MAKER PRO

Remainder Reveal

Use polynomial values to find remainders quickly.

HIGH SCHOOL · MA.912.AR.6.2

MA.912.AR.6.2 "Explain and apply the Remainder Theorem to solve mathematical and real-world problems."

NAME _____ DATE _____

THE BIG IDEA

When P(x) is divided by x-a, the remainder is P(a). To find the remainder, substitute a into the polynomial and simplify.

WORKED EXAMPLE

Find the remainder when P(x)=23x-29 is divided by x-8.

1. The divisor x-8 has a value of 8.
2. Find P(8).
3. P(8)=23(8)-29=184-29=155.

Answer: 155

PRACTICE 6 problems

1 Find the remainder when P(x)=x^2+3x-5 is divided by x-2.

ANSWER _____

2 Find the remainder when P(x)=x^3-6x+1 is divided by x+1.

ANSWER _____

3 Find the remainder when P(x)=2x^2-9x+7 is divided by x-5.

ANSWER _____

4 Find k if P(x)=x^2+kx+10 has a remainder of 1 when divided by x-3.

ANSWER _____

5 Find the remainder when P(x)=x^3-2x^2+5 is divided by x-2.

ANSWER _____

6 Find the remainder when P(x)=3x^2+x-12 is divided by x+6.

ANSWER _____

APPLY IT Show your work

1 A pop-up shop models its daily profit, in dollars, by E(x)=x^3-6x+10, where x is the number of dozens of shirts sold. Use the Remainder Theorem to find the predicted profit when 5 dozen shirts are sold.

WORK SPACE

ANSWER _____

2 A robotics club models its net profit, in tens of dollars, by P(x)=2x^3-3x^2-9x+10, where x is the number of ticket bundles sold. Use the Remainder Theorem to find the net profit when 2 ticket bundles are sold.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

The polynomial P(x)=x^3+ax^2+bx-6 has a remainder of 0 when divided by x-2 and also when divided by x+1. Find a and b.

_____

_____

ANSWER KEY

Remainder Reveal

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the remainder when P(x)=x^2+3x-5 is divided by x-2.	**5**
2	Find the remainder when P(x)=x^3-6x+1 is divided by x+1.	**6**
3	Find the remainder when P(x)=2x^2-9x+7 is divided by x-5.	**12**
4	Find k if P(x)=x^2+kx+10 has a remainder of 1 when divided by x-3.	**k=-6**
5	Find the remainder when P(x)=x^3-2x^2+5 is divided by x-2.	**5**
6	Find the remainder when P(x)=3x^2+x-12 is divided by x+6.	**90**

PART 2 · APPLY IT

1. **$105** Evaluate E(5), which is the remainder when E(x) is divided by x-5. E(5)=125-30+10=105.
2. **-$40, meaning a loss of $40** Evaluate P(2), which is the remainder when P(x) is divided by x-2. P(2)=-4, and -4 tens of dollars is -$40.

CHALLENGE

a=2, b=-5

Accept correct substitution work using P(a), including equivalent arithmetic expressions. For the challenge, accept equations P(2)=0 and P(-1)=0 followed by a=2 and b=-5.