Name _____ Date _____

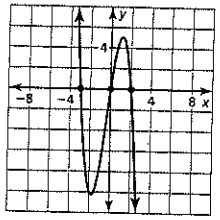
4A: Writing Equations from intercepts and points

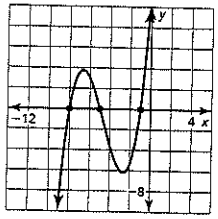
4.9 Puzzle Time

What Do You Throw Out When You Need It And Take In When You Don't Need It?

Write the letter of each answer in the box containing the exercise number.

Write a cubic function whose graph passes through the points.

1. $(-2, 0), (-1, 0), (0, -8), (2, 0)$
2. $(-1, 0), (1, 0), (2, 0), (3, 16)$
3. $(-10, 0), (-5, 0), (4, 0), (-8, -2)$
4. $(2, 0), (1, 0), (4, 0), (5, -3)$
5. 

6. 

Answers

R. $f(x) = \frac{3}{10}(x + 8)(x + 5)(x + 1)$

O. $f(x) = -\frac{5}{4}x(x + 3)(x - 2)$

A. $f(x) = 2x^3 + 2x^2 - 8x - 8$

N. $f(x) = 2(x - 1)(x + 1)(x - 2)$

H. $f(x) = -\frac{1}{4}(x - 2)(x - 1)(x - 4)$

C. $f(x) = -\frac{1}{36}(x + 10)(x + 5)(x - 4)$

1	2	3	4	5	6

Name _____ Date _____

4A: Writing Equations of Polynomials given x and y intercepts

4.5 Enrichment and Extension

Solving Polynomial Equations

Given the zeros of a polynomial function, you can write the polynomial function.

Example: Write the simplest polynomial function for which -2 and $-3 + i$ are zeros and $P(0) = -40$.

Solution: Recall that if $a + bi$ is a zero of a polynomial function, then $a - bi$ is also a zero. So, the factors are $(x + 2)$, $[x - (-3 + i)]$, and $[x - (-3 - i)]$.

Allow for a stretch by a factor of a.

$P(x) = a(x + 2)[(x + (3 - i)][x + (3 + i)]$

$P(x) = a(x + 2)(x^2 + 6x + 10)$

Because $P(0) = -40$, substitute 0 for x and -40 for $P(x)$.

$-40 = a(0 + 2)(0^2 + 6(0) + 10)$

$-40 = 20a$

$a = -2$

So, $P(x) = -2(x + 2)(x^2 + 6x + 10)$ or $P(x) = -2x^3 - 16x^2 - 44x - 40$.

In Exercises 1–5, write a polynomial function in standard form.

1. P is of degree 2; $P(0) = 14$; zeros: 1 and -2
2. P is of degree 3; $P(0) = 2$; zeros: -2 and 1 with a multiplicity of 2
3. P is of degree 4; $P(0) = 0$; zeros: -2, 3, and 0 with a multiplicity of 2
4. P is of degree 4; $P(0) = -60$; zeros: -5, 1, $-2i$, and $2i$
5. P is of degree 3; $P(0) = 45$; zeros: 3 and $-2 + i$

Name _____ Date _____

4.6 Puzzle Time

4A: write equations from intercepts

What Do You Get When You Cross A Dog With Canvas?

Write the letter of each answer in the box containing the exercise number.

Write a polynomial function f of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

1. $-4, 1, 2$
2. $0, 3, 5$
3. $-6, -1, 3$
4. $-4, 1, 12$
5. $-\sqrt{2}, 3$
6. $7, 1 + i$
7. $2i, 1 - i$
8. $2, 3 + 2i, \sqrt{5}$

* if you have a postive or negative radical or i, you know you have the other.

Answers

E. $f(x) = x^3 - 9x^2 + 16x - 14$

N. $f(x) = x^4 - 2x^3 + 6x^2 - 8x + 8$

P. $f(x) = x^3 - 8x^2 + 15x$

A. $f(x) = x^3 + x^2 - 10x + 8$

U. $f(x) = x^3 + 4x^2 - 15x - 18$

T. $f(x) = x^3 - 3x^2 - 2x + 6$

P. $f(x) = x^3 - 9x^2 - 40x + 48$

T. $f(x) = x^5 - 8x^4 + 20x^3 + 14x^2 - 125x + 130$

1		2	3	4		5	6	7	8

4.9 Puzzle Time
ANCHOR

4.5 Enrichment and Extension

1. $P(x) = -7x^2 - 7x + 14$
2. $P(x) = x^3 - 3x + 2$
3. $P(x) = a(x^4 - x^3 - 6x^2)$, a can be any real number
4. $P(x) = 3x^4 + 12x^3 - 3x^2 + 48x - 60$
5. $P(x) = -3x^3 - 3x^2 + 21x + 45$

..., $-4, -3i, \frac{1}{2}, 3$

4.6 Puzzle Time
A PUP TENT