Trig 4.4

Identify possible rational roots of polynomial equations
Determine the number of positive and negative real
roots

Quiz 4.3-4.4 Tues.

rational root theorem

DeCarte's rule of signs:
- positive real roots
- negative real roots

Double root

whiteboards

MID-CHAPTER QUIZ

7. Determine the binomial factors of $x^3 - 2x^2 - 5x + 6$. (Lesson 4-3)

8. List the possible rational roots of $x^3 + 6x^2 + 10x + 3 = 0$. Then determine the rational roots. (Lesson 4-4)

$\pm 1 \quad \pm 3$

$-1 \;\big]\; 1 \quad 6 \quad 10 \quad 3$

$\quad\quad \downarrow \quad -1 \quad -5 \quad -5$

$\quad\quad 1 \quad 5 \quad 5 \quad -2$

$-3 \;\big]\; 1 \quad 6 \quad 10 \quad 3$

$\quad\quad \downarrow \quad -3 \quad -9 \quad -3$

$\quad\quad 1 \quad 3 \quad 1 \quad 0$

x^2+3x+1

$x = -3$

$x = \dfrac{-3 \pm \sqrt{5}}{2}$

$\dfrac{-3+\sqrt{5}}{2}$

$\dfrac{-3-\sqrt{5}}{2}$

$x = \dfrac{-3 \pm \sqrt{9-4}}{2}$

$= \dfrac{-3 \pm \sqrt{5}}{2}$

9. Find the number of possible positive zeros and the number of possible negative zeros for $F(x) = x^4 + 4x^3 + 3x^2 - 4x - 4$. Then determine the rational zeros. (Lesson 4-4)

$\pm 1 \pm 2 \pm 4$

⊕ C = 1

⊖ C = 3, 1

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

© © ©

$x = -1$
$x = -2$
$x = -2$
$x = 1$ ✓

-1 | 1 4 3 −4 −4

↓ −1 −3 0 4

1 3 0 −4 0

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

-2 | 1 3 0 −4

↓ −2 −2 4

1 1 −2 0

$x^2 + x - 2$

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

$x = -2 \quad x = 1$

-2, 2, -1, 1

10. **Manufacturing** The Universal Paper Product Company makes cone-shaped drinking cups. The height of each cup is 6 centimeters more than the radius. If the volume of each cup is 27π cubic centimeters, find the dimensions of the cup. (Lesson 4-4)

$r = 3$ cm

$h = 9$ cm

$V = 27\pi = \frac{1}{3} B \cdot h$

$= \frac{1}{3}(\pi r^2) h$

$3 \cdot 27\pi = 3 \cdot \frac{1}{3} \pi x^2 (x+6)$

$81 = x^2(x+6)$

$x^3 + 6x^2 - 81 = 0$

$x = 3$

$x =$

$x =$

$\pm 1, 3, 9, 27, 81$ ✓

$+$ 1

$-$

3 | 1 6 0 −81

↓ 3 27 81

1 9 27 0

Possible positive rational roots: f(x)

List the possible rational roots of each equation. Then determine the rational roots.

10. $x^3 + 2x^2 - 5x - 6 = 0$

11. $x^3 - 2x^2 + x + 18 = 0$

$2, \frac{3}{2}, -6$

$\sqrt{\ }$

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WB 4.4 odds

Find the number of possible positive real zeros and the number of possible negative real zeros for each function. Then determine the rational zeros.

17. $f(x) = x^3 - 7x - 6$

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