$-5x > 3$
$x < -1$

Quiz 2.4-2.8

Name: **Solutions.**

1. Which is the solution to the inequality $-5x + 6 > -2x + 9$?

a. ←———————→ -3 -2 -1 0 1 2 3
b. (circled) ←———————→ -3 -2 -1 0 1 2 3
c. ←———————→ -3 -2 -1 0 1 2 3
d. ←———————→ -3 -2 -1 0 1 2 3
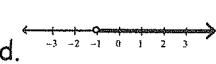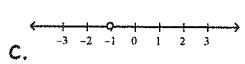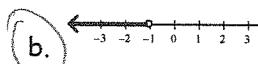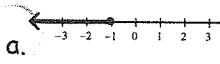
2. Solve. Give exact values. N.N.

a) $5x^3 - 20x - 3x^2 = -12$

$5x^3 - 3x^2 - 20x + 12 = 0$

$x^2(5x-3) - 4(5x-3) = 0$

$(x^2 - 4)(5x-3) = 0$

$(x-2)(x+2)(5x-3) = 0$

$x = \{\pm 2, \frac{3}{5}\}$

b) $-2 \le \frac{-x+1}{3} < 5$

$-6 \le -x + 1 < 15$

$-6 - 1 \le -x < 15 - 1$

$-7 \le -x < 14$

$7 \ge x > -14$

$\therefore -14 < x \le 7$

c) $\frac{8}{x^2-4} = \frac{2}{x+2}$ $x \ne \pm 2$

$8(x+2) = 2(x^2 - 4)$

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

$0 = 2x^2 - 8x - 24$

$0 = 2(x^2 - 4x - 12)$

$0 = 2(x-6)(x+2)$

$x = 6, -2$ ← inadmissible

$\therefore x = 6$

3. Determine the value of k such that when $f(x) = x^4 - kx^3 + 7x - 6$ is divided by x-2, the remainder is -8.

$f(2) = -8$

$-8 = (2)^4 - k(2)^3 + 7(2) - 6$

$-8 = 16 - 8k + 14 - 6$

$-8 - 24 = -8k$

$k = \frac{-32}{-8}$

$= 4$ $\therefore k = 4$

4. Explain how you go about finding the original factor of a polynomial. Don't forget to talk about the rational zero test.

Subst $\frac{p}{q}$ ← factors of constant into polynomial for x
    q ← factors of LC

If remainder is zero $\therefore$ you have $(qx - p)$ as a factor

5. Determine when $g(x) > f(x)$ given $g(x) = x^2 + 7x + 25$ and $f(x) = -x^2 - 10x - 10$.

$x^2 + 7x + 25 > -x^2 - 10x - 10$ $(2x+7)(x+5) > 0$

$2x^2 + 17x + 35 > 0$ $p = 70$ $\frac{7}{2}, \frac{10}{2}$ roots, $-5, -\frac{7}{2}$
                          $s = 17$

$\therefore \{x < -5, x > -\frac{7}{2}\}$

6. Solve algebraically (chart) and graphically $x^3 + 4x^2 + x - 6 \ge 0$

$P(x) = x^3 + 4x^2 + x - 6$

$\therefore P(1) = 0 \therefore (x-1)$ is a factor.

```
1 | 1   4   1  -6
  |     1   5   6
    1   5   6   0
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$P(x) = (x-1)(x^2 + 5x + 6)$
     $= (x-1)(x+3)(x+2)$

zeros: $-3, -2, 1$

	$x < -3$	$-3 < x < -2$	$-2 < x < 1$	$x > 1$
x-1	−	−	−	+
x+3	−	+	+	+
x+2	−	−	+	+
product	−	+	−	+

$\therefore \{-3 \le x \le -2, x \ge 1\}$
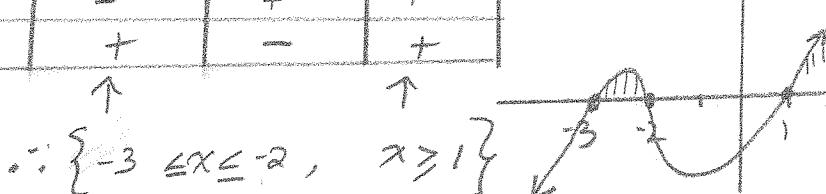
7. Colin purchased a shipment of T-shirts for $375. He gave 7 shirts to his friends then sold the rest for $552, making a profit of $11.50 on each one. How many shirts were in the original shipment? **Set up equation only. Do not solve.**

profit = revenue - cost

$11.50 = \frac{552}{x-7} - \frac{375}{x}$

$\frac{\$}{\# \text{ of T-shirts}}$