MAT 1033   Test 4   Name ___Key___
Prof Howard (3-16)

1. Solve and state any restrictions. $\dfrac{x+4}{x-2} = \dfrac{x}{1}$

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

$x+4 = x^2 - 2x$

$0 = x^2 - 3x - 4$

$0 = (x+1)(x-4)$

$\boxed{x = -1, 4}$

$\boxed{x \neq 2}$

2. Simplify and state any restrictions. $\dfrac{2x^2+7x+3}{x^2-3x-10} \cdot \dfrac{x^2-4}{2x^2-3x-3}$

OR If unchanged.

$\dfrac{(2x+1)(x+3)(x-2)}{(x-5)(2x^2-3x-3)}$

$\dfrac{(2x+1)(x+3)}{(x+2)(x-5)} \cdot \dfrac{(x+2)(x-2)}{(2x-3)(x+1)}$

$\boxed{x \neq -2, 5, 3/2, -1}$

$\boxed{\dfrac{(2x+1)(x+3)(x-2)}{(x-5)(2x-3)(x+1)}}$

3. Simplify and state any restrictions. $\dfrac{4x^2-7x-2}{x^2-x-2} \div \dfrac{4x+1}{x^2+2x+1}$

$\dfrac{4x^2-7x-2}{x^2-x-2} \cdot \dfrac{x^2+2x+1}{4x+1}$

$\dfrac{(4x+1)(x-2)(x+1)(x+1)}{(x+1)(x-2)(4x+1)}$

$\boxed{x \neq -1, 2, -1/4}$ $\boxed{x+1}$

4. Simplify and state any restrictions. $\dfrac{1}{x^2+2x}+\dfrac{x}{x^2+6x+8}$

$$x(x+2) \qquad (x+4)(x+2)$$

$LCD = x(x+2)(x+4)$

$$\frac{1(x+4)}{x(x+2)(x+4)} + \frac{x(x)}{x(x+2)(x+4)}$$

$\boxed{x \neq 0,-2,-4}$

$$\boxed{\dfrac{x+4+x^2}{x(x+2)(x+4)}}$$

5. Simplify and state any restrictions. $\dfrac{x+3}{6x^2-11x+5}-\dfrac{1}{6x^2-5x}$

$$(6x-5)(x-1) \qquad x(6x-5)$$

$LCD = (6x-5)(x-1)x$

$$\frac{(x+3)x}{x(6x-5)(x-1)} - \frac{1(x-1)}{x(6x-5)(x-1)}$$

$$\frac{x^2+3x-x+1}{x(6x-5)(x-1)}$$

$\boxed{x \neq 0, 5/6, 1}$

$$\boxed{\dfrac{x^2+2x+1}{x(6x-5)(x-1)} = \dfrac{(x+1)(x+1)}{x(6x-5)(x-1)}}$$

6. Solve and state any restrictions. $\dfrac{1}{x+2}+\dfrac{3}{x-2}=\dfrac{5}{x^2-4}$

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

$LCD = (x+2)(x-2)$

multiply by LCD

$$\frac{1(x+2)(x-2)}{(x+2)} + \frac{3(x+2)(x-2)}{(x-2)} = \frac{5(x+2)(x-2)}{(x+2)(x-2)}$$

$\boxed{x \neq \pm 2}$

$$1(x-2) + 3(x+2) = 5$$
$$x-2+3x+6=5$$
$$4x+4=5$$
$$4x=1 \implies \boxed{x=1/4}$$

7. Solve and state any restrictions. $\dfrac{5}{x+1} - \dfrac{3}{x+1} = \dfrac{1}{x+1}$
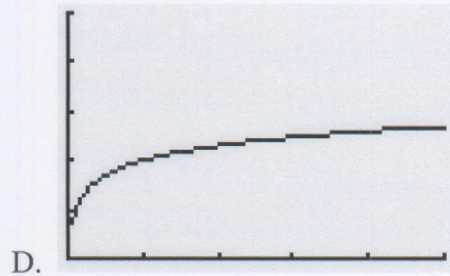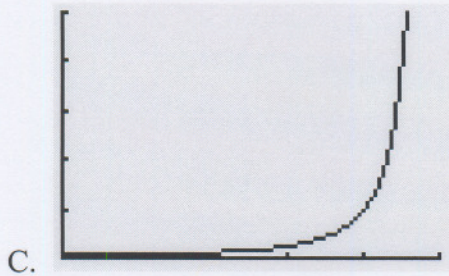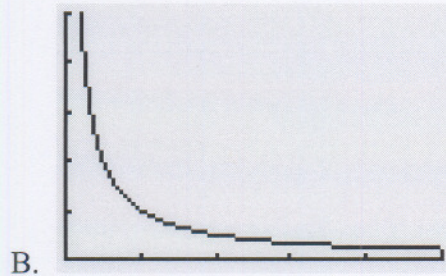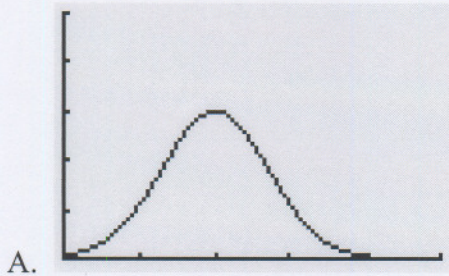
$LCD = x+1$

multiply by LCD

$\dfrac{5}{(x+1)}(x+1) - \dfrac{3}{(x+1)}(x+1) = \dfrac{1}{(x+1)}(x+1)$

$5 - 3 = 1$

$2 \neq 1$

$\boxed{\varnothing = \text{no solution}}$

For problems #8-11, match the graph with the appropriate description.

A.

B.

C.

D.

_D_ 8. A population of fish that increases and then levels off.

_B_ 9. An insect population that dies out.

_C_ 10. The length of a ticket line as the rate at which people arrive in line increases.

_A_ 11. The wind speed during a day that is initially calm, becomes windy, and then is calm again.