

divide

divide the following:

$$y^4 + 2y^2 - y + 5 \div y^2 - y + 1$$

$$\begin{array}{r}
 y^2 - y + 1 \overline{) y^4 + 0y^3 + 2y^2 - y + 5} \\
 \underline{-y^4 + y^3 - y^2} \phantom{-y + 5} \\
 y^3 + y^2 - y \phantom{+ 5} \\
 \underline{-y^3 + y^2 - y} \phantom{+ 5} \\
 2y^0 - 2y + 5 \\
 \underline{-2y^2 + 2y - 2} \\
 3
 \end{array}$$

$$12. \frac{y^2 + y + 2}{y^2 - y + 1} + \frac{3}{y^2 - y + 1}$$

Find the inverse of the following functions. Make sure you use proper notation.

13.  $m(x) = 5(x - 7)$

$$x = 5(y - 7)$$

$$\frac{x}{5} = y - 7$$

$$\frac{x}{5} + 7 = y$$

13.  $m^{-1}(x) = \frac{x}{5} + 7$

14.  $p(x) = -3\sqrt{x-4} + 1$

$$x = -3\sqrt{y-4} + 1$$

$$x - 1 = -3\sqrt{y-4}$$

$$\frac{x-1}{-3} = \sqrt{y-4}$$

$$\left(\frac{x-1}{-3}\right)^2 = y-4$$

$$\left(\frac{x-1}{-3}\right)^2 + 4 = y$$

14.  $p^{-1}(x) = \left(\frac{x-1}{-3}\right)^2 + 4$

If  $f(x) = x^2 - 3x + 4$  and  $g(x) = 4x - 7$ , find:

15.  $f(g(x))$

$$(4x-7)^2 - 3(4x-7) + 4$$

$$16x^2 - 56x + 49 - 12x + 21 + 4$$

$$16x^2 - 68x + 74$$

15. \_\_\_\_\_

16.  $(g \circ g)(x)$

$$4(4x-7) - 7$$

$$16x - 28 - 7$$

$$16x - 35$$

16. \_\_\_\_\_

17. Verify that  $p(x) = 5(x - 3)$  and  $r(x) = \frac{x}{5} + 3$  are inverse functions by compositions

$$p(r(x))$$

$$5\left(\frac{x}{5} + 3 - 3\right)$$

$$5\left(\frac{x}{5}\right)$$

$$x \quad \checkmark$$

$$r(p(x))$$

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

$$x - 3 + 3$$

$$x \quad \checkmark$$

Use your identities to factor/expand #1-6.

18.  $27x^3 - 64y^3$

18.  $(3x - 4y)(9x^2 + 12xy + 16y^2)$

19.  $49 + 121x^2$

19.  $(7 + 11xi)(7 - 11xi)$

20.  $(2x - 9)^2$

20.  $4x^2 - 36x + 81$

21.  $(x + 4y)^3$

21.  $x^3 + 12x^2y + 48xy^2 + 64y^3$

22.  $256 - 289x^2$

22.  $(16 - 17x)(16 + 17x)$

23.  $8x^3 + 343$

23.  $(2x + 7)(4x^2 - 14x + 49)$

24.  $(x + 4)^2$

24.  $x^2 + 8x + 16$

25.  $(3 - x)^3$

25.  $27 - 27x + 9x^2 - x^3$

4