Math 3 Functions Review Day Two　　　　　Name **Ms. Pace**

Factor each polynomial and answer the questions that follow.

1. $x^2 - 7x - 18$

$(x-9)(x+2)$

What are the solutions to the quadratic function?

$x = 9, -2$

2. $7x^2 + 9x$

$x(7x+9)$

What shortcut did you use to factor?

GCF

What are the solutions to the quadratic function?

$x = 0, -9/7$

3. $7x^2 - 31x - 20$

$7x^2 + 4x - 35x - 20$

$x(7x+4) - 5(7x+4)$

$(x-5)(7x+4)$

$\frac{-140}{4 \times -35}$ -31

What are the solutions to the quadratic function?

$x = 5$　　$x = -4/7$

4. $28x^4 + 16x^3 - 80x^2$

$4x^2(7x^2 + 4x - 20)$

$4x^2(7x^2 - 10x + 14x - 20)$

$4x^2(x(7x-10) + 2(7x-10))$

$4x^2(x+2)(7x-10)$

$\frac{-140}{-10 \times 14}$ 4

What should you do before using the diamond?

Factor out GCF

5. $x^2 + 16x + 64$

$(x+8)^2$

What special type of quadratic is this?

Perfect Square Trinomial

What shortcut could you have used instead of using the diamond?

$\left(x + \frac{b}{2}\right)^2$

6. $9x^2 - 1$

$(3x-1)(3x+1)$

What special type of quadratic is this?

Difference of Two Squares

What shortcut could you have used instead of using the diamond?

$(\sqrt{a}x + \sqrt{c})(\sqrt{a}x - \sqrt{c})$

7. $8x^3 - 64x^2 + x - 8$

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

$(8x^2+1)(x-8)$

What method did you use to factor the cubic function?

Factor by Grouping

8. $x^4 - 7x^2 - 8$

$x^4 - 8x^2 + x^2 - 8$

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

$(x^2+1)(x^2-8)$

$\frac{-8}{-8 \times 1}$ -7

Can you factor out a GCF?

NO

What method did you use to factor the quartic function? Diamond

Divide each polynomial. You may use long division or synthetic division.

9. $(2x^2 - 17x - 38) \div (2x + 3)$

$$
\begin{array}{r}
x - 10 \quad R -8 \\
2x+3\overline{\smash{\big)}\,2x^2 - 17x - 38} \\
\underline{2x^2 + 3x} \downarrow \\
-20x - 38 \\
\underline{-20x - 30} \\
-8
\end{array}
$$

10. $(x^3 + 7x^2 + 14x + 3) \div (x + 2)$

$$
\begin{array}{r|rrrr}
-2 & 1 & 7 & 14 & 3 \\
 & \downarrow & -2 & -10 & -8 \\
\hline
 & 1 & 5 & 4 & -5
\end{array}
$$

$x^2 + 5x + 4 \quad R -5$

Use the remainder theorem to evaluate each function at the given value.

11. $f(x) = -x^3 + 6x - 7$ at $x = 2$

$$
\begin{array}{r|rrrr}
2 & -1 & 0 & 6 & -7 \\
 & \downarrow & 2 & 4 & 20 \\
\hline
 & 1 & 2 & 10 & 13
\end{array}
$$

$f(2) = 13$

12. $x^5 - 47x^3 - 16x^2 + 8x + 52$ at $x = 7$

$$
\begin{array}{r|rrrrrr}
7 & 1 & 0 & -47 & -16 & 8 & 52 \\
 & \downarrow & 7 & 49 & 14 & -14 & -42 \\
\hline
 & 1 & 7 & 2 & -2 & -6 & 10
\end{array}
$$

$f(7) = 10$

Perform the appropriate operation on each of the following rational expressions, simplify answers and list restrictions.

13. $\dfrac{x}{x^2 - x - 30} + \dfrac{1}{x+5}$ $x \neq 6, -5$

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

$$\dfrac{x}{(x-6)(x+5)} + \dfrac{1}{(x+5)}\left(\dfrac{x-6}{x-6}\right)$$

$$\dfrac{x + x - 6}{(x-6)(x+5)} \qquad \boxed{\dfrac{2x-6}{(x-6)(x+5)}}$$

14. $\dfrac{x}{x^2 - x - 30} - \dfrac{1}{x+5}$ $x \neq 6, -5$

$$\dfrac{x - (x-6)}{(x-6)(x+5)}$$

$$\dfrac{x - x + 6}{(x-6)(x+5)}$$

$$\boxed{\dfrac{6}{(x-6)(x+5)}}$$

15. $\dfrac{x}{x^2 - x - 30} \times \dfrac{1}{x+5}$ $x \neq 6, -5$

$$\dfrac{x}{(x-6)(x+5)(x+5)}$$

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

16. $\dfrac{x}{x^2 - x - 30} \div \dfrac{1}{x+5}$ $x \neq 6, -5$

$$\dfrac{x}{(x-6)(x+5)} \cdot \dfrac{x+5}{1}$$

$$\boxed{\dfrac{x}{x-6}}$$