ame Key

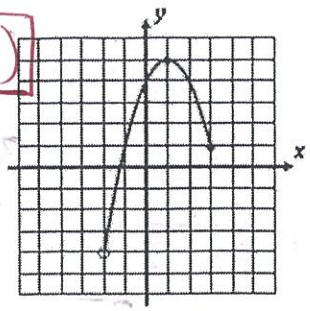
ALG II ~ Quarterly Review #1

1. Factor Completely: $x^3 - x^2 + 4x + 4$

$x^2(x-1) \quad -4(x-1)$

$(x^2-4)(x-1) \rightarrow \boxed{(x+2)(x-2)(x-1)}$

2. The graph of $y = f(x)$ is shown. State the range of $y = -f(x)$.



Range of $f(x)$: $(-4, 5]$

↑ x-axis

Range of $-f(x) = [-5, 4)$

$x+5$ $\quad -y$

3. a. Write a transformation of $f(x)$ that translates it 5 units left, followed by a reflection in the x axis.

$-f(x+5)$

b. If the turning point on $f(x)$ is (3, -6), state the coordinates of the turning point of $g(x)$ if $g(x) = 2f(-x) + 3$.

$(3,-6) \rightarrow (-3,-6) \rightarrow (-3,-12)$

$-x \quad 2y \quad y+3$

$\boxed{(-3,-9)}$

4. Which of the following is equivalent to $\dfrac{(3x^4)^{-2}}{(2x^{-5})^3}$ for all $x \neq 0$?

(1) $\frac{-9}{8}x^7$ (2) $\frac{x^7}{72}$ (3) $\frac{-9}{8x^{23}}$ (4) $\frac{1}{72x^{23}}$

$\dfrac{3^{-2}x^{-8}}{8x^{-15}} = \dfrac{x^7}{3^2 \cdot 8}$

5. The expression $\dfrac{1}{\sqrt{4x}}$ is the same as

power root

$= \dfrac{1}{\sqrt{4}\sqrt{x}} = \dfrac{1}{2x^{1/2}} = \dfrac{1}{2}x^{-1/2} = \dfrac{x^7}{72}$

(1) $\frac{1}{2}x^{-1/2}$ (2) $4x^{1/2}$ (3) $2x^{-1/2}$ (4) $\frac{1}{2}x^{1/2}$

6. Factor Completely $6x^2 - 11x - 10$

-60

$-15x \quad +4x$

-11

$6x^2 - 15x + 4x - 10$

$3x(2x-5) \quad 2(2x-5)$

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

7. Simplify $\sqrt[3]{40x^6y^{13}}$

÷ exp by 3

$\sqrt[3]{8}\sqrt[3]{5}\sqrt[3]{x^6}\sqrt[3]{y^{12}}\sqrt[3]{y}$

$\boxed{2x^2y^4\sqrt[3]{5y}}$

For #8 – 9 Identify whether the function is even, odd or neither.

8. $f(x) = x^4 - 3$

$f(-x) = (-x)^4 - 3$

$= x^4 - 3$

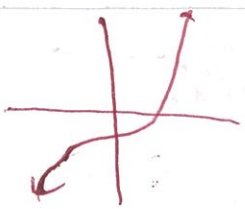
Even

9. $g(x) = x^3 + x - 2$

$g(-x) = (-x)^3 + (-x) - 2$

$= -x^3 - x - 2$

Neither



10. Algebraically determine if $h(x) = 2x^5 + x$ is odd, even or neither. Justify your answer.

$h(-x) = 2(-x)^5 + (-x)$

$= -2x^5 - x$

Odd (signs switch)

11. Determine the quotient and remainder when $f(a) = 6a^3 + 14a^2 - 9$ is divided by $d(a) = 3a - 2$. Express your answer in the form $q(a) + \frac{r(a)}{d(a)}$.

$2a^2 + 6a + 4$

$3a - 2 \;|\; 6a^3 + 14a^2 + 0a - 9$

$-6a^3 + 4a^2$

$18a^2 + 0a$

$-18a^2 + 12a$

$12a - 9$

$-12a + 8$

-1

$2a^2 + 6a + 4 + \frac{-1}{3a-2}$

12. The expression $\frac{-3x^2 - 5x + 2}{x^3 + 2x^2}$ can be rewritten as

Factor

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

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

(3) $-3x^{-1} + 1$

(4) $-3x^{-1} + x^{-2}$

-6, $-6x$, $+1x$, -5

$-3x^2 - 6x + 1x + 2$

$-3x(x+2) \;|\; 1(x+2)$

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

13. Solve for x: $\frac{x}{x-5} - \frac{2}{x+5} = \frac{50}{x^2 - 25}$

$(x+5)(x-5)$

$x^2 + 5x - 2x + 10 = 50$

$x^2 + 3x - 40 = 0$

$(x+8)(x-5) = 0$

$x = -8$

~~$x = 5$~~

For #14 – 17 Perform the indicated operation if $f(x) = x^2 + 3$ and $g(x) = x - 4$

14. $f(x) + g(x)$

$x^2 + 3 + x - 4$

$x^2 + x - 1$

15. $f(x) - g(x)$

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

$x^2 + 3 - x + 4$

$x^2 - x + 7$

16. $f(x) \cdot g(x)$

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

$x^3 - 4x^2 + 3x - 12$

17. $f(x - 2)$

$(x-2)^2 + 3$

$(x-2)(x-2) + 3$

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

$x^2 - 4x + 7$

18. Solve algebraically: $\sqrt{3x + 7} - 3 = x$

$(\sqrt{3x+7})^2 = (x+3)^2$

$3x + 7 = (x+3)(x+3)$

$3x + 7 = x^2 + 6x + 9$

$-3x \quad -7 \quad -3x \quad -7$

$x^2 + 3x + 2 = 0$

$(x+2)(x+1) = 0$

$x = -2 \quad x = -1$

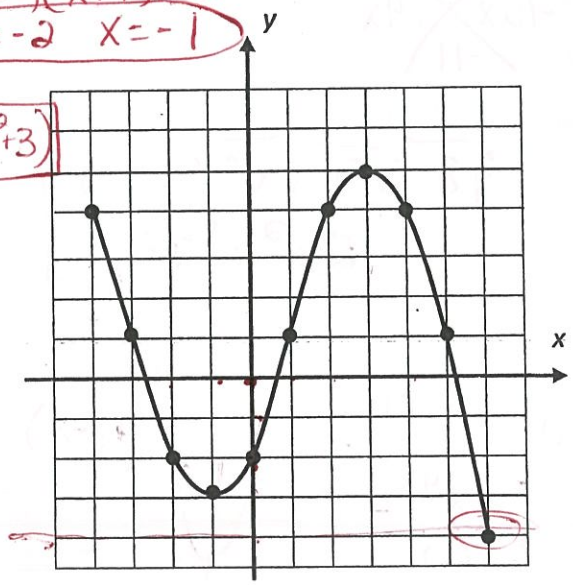
19. Factor completely: $ax^4 - 6ax^2 - 27a$

$a(x^4 - 6x^2 - 27)$

$a(x^2 - 9)(x^2 + 3)$

$a(x+3)(x-3)(x^2+3)$

20. For the function $y = f(x)$ shown graphed on the right:



a) State the domain of $f(2x)$

D: $[-4, 6]$

$\div 2 \quad \div 2$

a) $[-2, 3]$

b) State the range of $f(x + 3)$

doesn't change range

b) $[-4, 5]$

c) Find the value of $f(0) + f(-4)$

$-2 + 4 = 2$

d) Find the value of x if $f(x) = -4$

$y = -4 \rightarrow x = 6$