Alg2 CC Chapter 4 Review **Name:** Key

1. Simplify the rational expression $\frac{2r^2 - 6r}{r - 3}$. Identify any excluded values.

$2r(r-3)$ / $r-3$

$2r$ $r \neq 3$

2. Simplify the rational expression $\frac{x+6}{x^2+7x+6}$.

$\frac{x+6}{(x+6)(x+1)} = \boxed{\frac{1}{x+1}}$

3. $x\left(\frac{2}{x+1} + \frac{-3}{x}\right)$ $\frac{x+1}{x+1}$

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

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

E.C.

4. Multiply. Simplify your answer.

$\frac{3x^2y}{5xy} \cdot \frac{4xy^3}{3y^2}$ $\frac{12x^3y^4}{15xy^3} = \boxed{\frac{4x^2y}{5}}$

5. Add. Simplify your answer.

$(x-2)\frac{x-5}{x+3} + \frac{x+4}{x-2}(x+3)$ $\frac{x^2-7x+10}{(x+3)(x-2)} +$ $\frac{x^2+7x+12}{(x+3)(x-2)}$ $\boxed{= \frac{2x^2+22}{(x+3)(x-2)}}$

$\frac{2(x^2+11)}{(x+3)(x-2)}$ E.C.

6. Simplify $\frac{3x+15}{x-2} \cdot \frac{7x-14}{x^2-5x}$

$3(x+5)$ $7(x-2)$

$x(x-5)$

$\frac{21(x+5)}{x(x-5)}$

(x+2)

7. Add $\frac{x+4}{x-6}+\frac{-11x-14}{x^2-4x-12}$. Identify any x-values for which the expression is undefined.

$(x-6)(x+2)$ $\quad \frac{x^2+6x+8}{(x-6)(x+2)}+\frac{-11x-14}{(x-6)(x+2)}$

$\frac{x^2-5x-6}{(x-6)(x+2)}$ $\quad \frac{(x-6)(x+1)}{(x-6)(x+2)}$ $\quad \frac{x+1}{x+2}$ E.C.

-21 / 6

8. Subtract. $\frac{7}{x^2-4x+4}-\frac{-3x}{x-2}$ $(x-2)$

$\frac{7}{(x-2)^2}+\frac{-3x^2+6x}{(x-2)^2}$ $\quad \frac{-3x^2+6x+7}{(x-2)^2}$

9. Divide the expressions. Simplify the result.

$\frac{x^2+12x+35}{x^2-25}\div\frac{x+7}{x-7}$ $\quad \frac{(x+7)(x+5)}{(x+5)(x-5)}\cdot\frac{x-7}{x+7}=\frac{x-7}{x-5}$

10. The production rate of a small factory is modeled by $\frac{x+22}{4x(x+3)}$, while the production rate of another factory is modeled by $\frac{3x+24}{4x(x+3)}$. What is the model for the combined production rate of the two factories?

Add

$\frac{3x+24}{4x(x+3)}+\frac{x+22}{4x(x+3)}=\frac{4x+46}{4x(x+3)}=\frac{2(2x+23)}{2\cdot 4x(x+3)}=\frac{2x+23}{2x(x+3)}$ E.C.

11. Solve the equation: $\frac{x-3}{x+2}=\frac{x+4}{x+5}$

$(x-3)(x+5)=(x+4)(x+2)$

$x^2+2x-15=x^2+6x+8$

$-x^2\ -2x\ -8\quad -x^2\ -2x\ -8$

$\frac{-23}{4}=\frac{4x}{4}$

12. Solve $\frac{1}{z}+\frac{9}{4z}=\frac{10}{z+7}$.

$x=\frac{-23}{4}$

13. Solve $\frac{x}{x+3} = \frac{x-4}{x-3}$.

$-x^2-3x = x^2-x-12$
$+x^2 \quad +3x \quad +x^2 \quad +3x$
$0 = 2x^2+2x-12$
$\frac{0}{2} = \frac{2(x^2+x-6)}{2}$
$0 = (x+3)(x-2)$

$x+3=0$
$-3 \quad -3$
$x=-3$ → NO Solution
$x-2=0$
$+2 \quad +2$
or $x=2$

$x=2$ is the only solution

14. Divide. $\frac{4x}{x-3} \div \frac{x^2}{3x-9}$

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

$\frac{12}{x}$

15. Which function matches the graph?

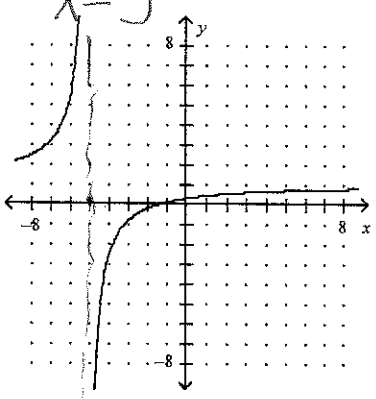
a. $f(x) = \frac{x+1}{x+5}$ $x+5=0$, $-5 \quad -5$, $x=-5$

b. $f(x) = \frac{x+5}{x+1}$

c. $f(x) = \frac{x+3}{x+3}$

d. $f(x) = \frac{x+3}{x+3}$

$x=-5$



Short Answer

16. Graph the function. $y = \frac{2x+7}{x+3}$

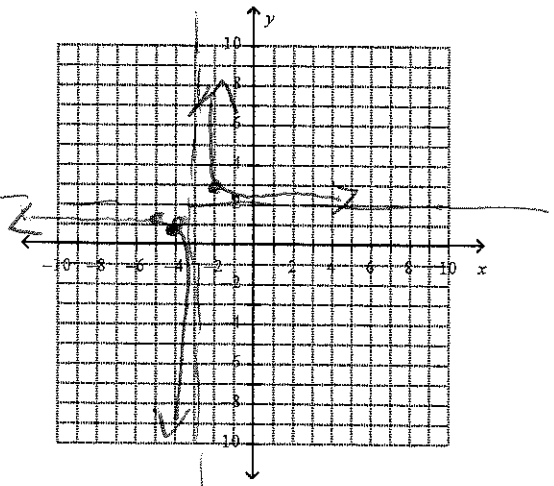
Vert Asym: $x=-3$

Hort. Asym: $y=2$

Domain: $x \in \mathbb{R}: x \neq -3$

Range: $y \in \mathbb{R}: y \neq 2$

-2	3
-1	2.5
-4	1
-5	1.5



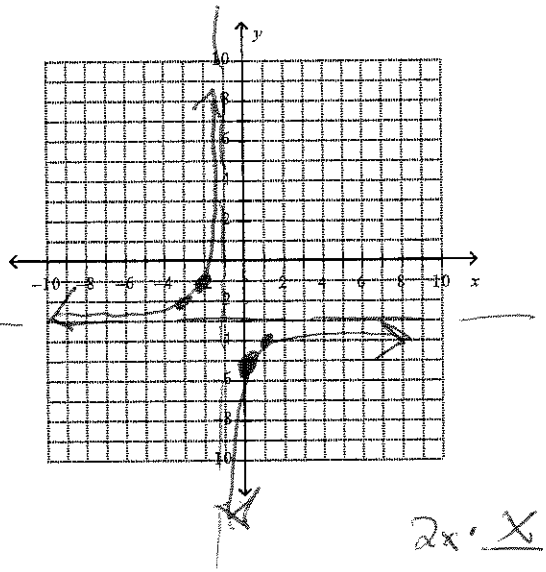
17. What is the horizontal asymptote for the graph? $y = \frac{1}{x+3} + 3$

$y=3$

Go through the y-axis

18. Graph $f(x)=\frac{-2}{x+1}-3$

0	-5
1	-4
-2	-1
-3	-2



Vert Asym: $x=-1$

Hort. Asym: $y=-3$

Domain: $x \in \mathbb{R} : x \neq -1$

Range: $y \in \mathbb{R} : y \neq -3$

19. The area of a rectangle is $2x^2 - x - 3$, and its width is $2x - 3$.

Part A: What is the length of the rectangle?

$x(2x-3) =$ Length $= x+1$

$2x-3 \overline{)2x^2-x-3}$

$-2x^2+3x$

$2x-3$

$2x+3$

$x+1$

$2x \cdot x = 2x^2$

$2x \cdot 1 = 2x$

Part B: What would be the length of the rectangle if its width is doubled?

$w = (2x-3)2 = 4x-6$

Length $= \frac{1}{2}x + \frac{1}{2}$

Decreased by $\frac{1}{2}$

$4x-6 \overline{)2x^2-x-3}$

$-2x^2+3x$

$2x-3$

$2x+3$

$\frac{1}{2}x+\frac{1}{2}$

$4 \cdot \frac{1}{2}x = 2x^2$

$4x \cdot \frac{1}{2} = 2x$

Part C: Anthony says that the width of a rectangle with an area of $6x^2+5x-6$ cannot be $x + 1$. Alex says that this width is possible. Which student is correct? Justify your answer.

$6x(x+1) =$

$x+1 \overline{)6x^2+5x-6}$

$-6x^2+6x$

$-1x-6$

$+1x+1$

-5

$6x-1+\frac{-5}{x+1}$

$x \cdot 6x = 6x^2$

$x \cdot -1 = -1x$

Alex is correct because there is a remainder.

20. The length of a rectangle is $\frac{2}{y-1}$ meters, while its width is $\frac{1}{y}$ meters. Write expressions for its perimeter and its area.

Perimeter: Add all sides $= 2\left(\frac{2}{y-1}\right) + 2\frac{1}{y}$

$\frac{4}{y-1} + \frac{2}{y}$

$\frac{2}{y-1}$ $\frac{1}{y}$

Area: $L \cdot W$

$\left(\frac{2}{y-1}\right) \cdot \frac{1}{y} = \frac{2}{y(y-1)}$