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Algebra 2 Chapter 5 Test Review (Part 1)

***Please do your work on an extra sheet of paper.***

1) The monthly minimum payment *p* due on a certain credit card with a fixed rate varies directly as the balance *b*, and $p=\$19.80$ when $b=\$1100$. Find *p* when $b=\$3000$.

2) The time *t* that it takes Hannah to bike to school varies inversely as her average speed *s*. If she can bike to school in 25 min when her average speed is 6mi/h, what would her average speed need to be to get to school in 20 min?

3) Newton’s Law of Gravity states that any two objects have a gravitational force between them that is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.

 a) Write Newton’s Law of Gravitation using *F* for the gravitational force, $m\_{1}$ and $m\_{2}$ for the masses, *G* for the constant of proportionality, and *r* for the distance between the objects.

 b) If two objects of mass 1.0 kg and 2.0 kg located 1.0 m apart exert a gravitational force of $1.3333×10^{-10}$ N on each other, what is the value of the gravitational constant?

 c) What is the gravitational force between two football players with masses of 115 kg and 130 kg who are lined up 1.5m from one another?

***Simplify. Identify any x-vales for which the expression is undefined.***

4) $\frac{24x^{14}y^{10}z^{6}}{9x^{16}y^{4}z^{10}}$ 5) $\frac{x+4}{3x^{2}+11x-4}$

6) $\frac{6x^{2}+7x-3}{-3x^{2}+x}$ 7) $\frac{x^{3y}+4x^{2y}-3x^{y}-12}{x^{y}+4}$

***Perform the indicated operation. Assume all expressions are defined.***

8) $\frac{2x+14}{x^{2}-25}∙\frac{8x+40}{6x+42}$ 9) $\frac{3x^{2}+15x-18}{36x^{3}-12x^{2}}∙\frac{9x^{3}-3x^{2}}{9x^{2}+36x-108}$

10) $\frac{3x^{2}+6x-24}{x^{2}-x-20}÷\frac{3x^{3}-9x^{2}+6}{x}$ 11) $\frac{4x^{2}-12x-72}{8x^{2}+32x-40}÷\frac{x^{2}-9x+18}{x^{2}+2x-15}$

12) $\frac{2a^{2}-2a-12}{a^{2}-49}∙\frac{4a^{2}-1}{2a^{2}+5a+2}∙\frac{2a^{2}-13a-7}{2a^{2}-7a+3}$ 13) $\frac{m^{3}+n^{3}}{mp-mq-np+nq}÷\frac{mn-m^{2}-n^{2}}{mp-mq+np-nq}$

***Add or subtract. Identify any x-values for which the expression is undefined.***

14) $\frac{7x}{x^{2}-5x}+\frac{x^{2}}{x-5}$ 15) $\frac{2x}{x-1}-\frac{9}{x-2}$

16) $\frac{4x^{2}}{3x+4}-\frac{2}{2x-3}$ 17) $\frac{6}{x^{2}+4xz-32}-\frac{x-5}{x-4}$

18) $\frac{x+7}{x^{2}+13x+42}-\frac{10x}{x^{2}+8x+7}$ 19) $\frac{x-1}{x+2}+\frac{4}{x^{2}-4}-\frac{6x}{x-2}$

20) $\left(x+2\right)^{-2}-\left(x^{2}-4\right)^{-1}$

***Solve each equation.***

21) $\frac{4x}{x-4}=\frac{2x+8}{x-4}$ 22) $-\frac{6}{x}+1=\frac{7}{x^{2}}$

23) $\frac{2}{d+2}+\frac{8}{d-2}=\frac{14}{d^{2}-4}$

***Solve each inequality algebraically.***

24) $\frac{12}{s-5}>3$ 25) $\frac{7z}{z-4}\geq 6$

27) $\frac{-9x}{x+12}<-5$

**Word Problems:**

 28) An artist is designing a picture whose length, *l,* and width, *w,* satisfy the Golden Ratio, which is $\frac{w}{l}=\frac{l}{l+w}$. If the length of the frame is 24 inches, what is width of frame?

29) Team A can wash all the windows in the school *x* hours. It takes Team B 3 hours longer to do the same job. If the teams work together, they can complete the job in 8.5 hours. How long does it take Team B to do the job alone?

30) Vicki and Lorena motor downstream at about 6 knots (nautical miles per hour) in their boat. The return trip against the current, and they can motor at only 3 knots.

Vicki wants to find the average speed for the entire trip.

 a) Write an expression for the time it takes to travel downstream plus the time is takes for the return trip if the distance in each direction is *d.*

b) What is the total distance they travel downstream and upstream in terms of *d?*

 c) Write an expression for their average speed using the expressions for the total time and the total distance.

 d) Vicki says that the average speed is 4 knots. Lorena says that the average speed is 4.5 knots. Explain who is correct and why.