

Pre-Calculus 11 Chapter 6 Test Practice.

Name: KEY

1. What are the non-permissible values for the rational expression $\frac{x(x+2)}{(x-3)(x+1)}$?

- A 0 and -2 B -3 and 1 C 0 and 2 **D 3 and -1**

2. Simplify the rational expression $\frac{x^2 - 7x + 6}{x^2 - 2x - 24}$ for all permissible values of x.
 $(x-1)(x-6)$
 $(x+4)(x-6)$

- A $\frac{x+1}{x-4}$ **B $\frac{x-1}{x+4}$** C $\frac{x+1}{x+4}$ D $\frac{x-1}{x-4}$

3. Simplify $\frac{8}{3y} + \frac{5y}{4} - \frac{5}{8}$ for all permissible values of y.

- A $\frac{30y^2 - 15y + 64}{24y}$** B $\frac{30y^2 + 79}{24y}$ C $\frac{15y^2 + 64}{24y}$ D $\frac{5y + 3}{24y}$

4. Simplify $\frac{3x-12}{9x^2} \div \frac{x-4}{3x}$, $x \neq 0$ and $x \neq 4$.
 $\frac{\cancel{3}(x-4)}{9x \cdot x} \cdot \frac{\cancel{3}x}{x-4} = \frac{1}{x}$

- A $\frac{1}{x}$** B $\frac{16}{3x}$ C x D $\frac{-12}{x-4}$

5. Solve $\frac{6}{t-3} = \frac{4}{t+4}$, $t \neq 3$ and $t \neq -4$.
 $LCD = (t-3)(t+4)$ $6(t+4) = 4(t-3)$ $2t = -36$
 $6t+24 = 4t-12$ $t = -18$

- A $-\frac{1}{2}$ B -1 C -6 **D -18**

6. Identify all non-permissible values. and Simplify.

$$\frac{3x-5}{x^2-9} \times \frac{2x-6}{3x^2-2x-5} \div \frac{x-3}{x+3}$$

$$= \frac{\cancel{(3x-5)}}{\cancel{(x-3)}(x+3)} \cdot \frac{2\cancel{(x-3)}}{\cancel{(3x-5)}(x+1)} \cdot \frac{\cancel{x+3}}{x-3}$$

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

$x \neq \pm 3, \frac{5}{3}$

7. If both rational expressions are defined and equivalent, what is the value of k ?

$$\frac{2x^2 + kx - 10}{2x^2 + 7x + 6} = \frac{2x - 5}{2x + 3}$$

$$\frac{(X+2)(2X-5)}{(X+2)(2X+3)} = \frac{(2X-5)}{(2X+3)}$$

$$2X^2 - X - 10 \quad \boxed{k = -1}$$

8. Add or subtract as indicated. Give your answer in simplest form.

$$\frac{5y}{6} + \frac{1}{y-2} - \frac{y+1}{3y-6}$$

$LCD = 6(y-2)$

$$\frac{5y(y-2)}{6(y-2)} + \frac{6}{6(y-2)} - \frac{2y+2}{6(y-2)}$$

$$= \frac{(5y-2)(y-2)}{6(y-2)} = \frac{5y^2 - 10y + 6 - 2y - 2}{6(y-2)} = \frac{5y^2 - 12y + 4}{6(y-2)} = \boxed{\frac{5y-2}{6}}$$

9. Create an equation you could use to solve the following problem. Indicate what your variable represents. Do not solve your equation. A large auger can fill a grain bin in 5 h less time than a smaller auger. Together they fill the bin in 6 h. How long would it take the larger auger, by itself, to fill the bin?

Let t_b be the time of larger auger to fill a grain bin.
 Let t_s be the time of smaller auger to fill a grain bin.

$$6 = \frac{1}{r_b + r_s}$$

$$r_b + r_s = \frac{1}{6}$$

$$\frac{1}{t_s - 5} + \frac{1}{t_s} = \frac{1}{6}$$

$$LCD = 6 t_s (t_s - 5)$$

$$\frac{6 t_s + 6 t_s - 30}{6 t_s (t_s - 5)} = \frac{t_s (t_s - 5)}{6 t_s (t_s - 5)}$$

$$12 t_s - 30 = t_s^2 - 5 t_s \Rightarrow t_s^2 - 17 t_s + 30 = 0$$

$$(t_s - 2)(t_s - 15) = 0$$

$$t_b = t_s - 5 = 15 - 5 = \boxed{10 \text{ hours}}$$

~~$t_s = 2$~~ or $t_s = 15$
 reject.

10. Solve $2 - \frac{5}{x^2 - x - 6} = \frac{x+3}{x+2}$. Identify all non-permissible values.

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

$$\cancel{LCD} \cdot \frac{2(x+2)(x-3) - 5}{LCD} = \frac{(x+3)(x-3)}{LCD} \cdot \cancel{LCD}$$

$$2(x^2 - x - 6) - 5 = x^2 - 9$$

$$2x^2 - 2x - 11 = x^2 - 9$$

$$x^2 - 2x - 2 = 0$$

$$x = \frac{2 \pm \sqrt{4 - 4(1)(-2)}}{2}$$

$$x = \frac{2 \pm 2\sqrt{3}}{2} \rightarrow \begin{cases} 1 + \sqrt{3} \\ 1 - \sqrt{3} \end{cases}$$

$x \neq -2, 3$

11. The following rational expressions form an arithmetic sequence:

non permissible value $x \neq 0$

$\frac{3-x}{x}, \frac{2x-1}{2x}, \frac{5x+3}{5x}$

$$d = \frac{2x-1}{2x} - \frac{3-x}{x} = \frac{5x+3}{5x} - \frac{2x-1}{2x}$$

Use common differences to create a rational equation. Solve for x.

$$\frac{2x-1-6+2x}{2x} = \frac{10x+6-10x+5}{10x}$$

$$\frac{4x-7}{2x} \neq \frac{11}{10x} \Rightarrow 22x = 40x^2 - 70x$$

$$0 = 40x^2 - 92x$$

$$0 = 4x(10x - 23)$$

A.S. $\Rightarrow \frac{0.7}{2.3}, \frac{1.8}{2.3}, \frac{2.9}{2.3}$

$d = \frac{1.1}{2.3}$ ✓

$x = 0$ or $x = 2.3$
rejected!

13. A plane is flying from Winnipeg to Calgary against a strong headwind of 50 km/h.

The plane takes $\frac{1}{2}$ h longer for this flight than it would take in calm air. If the

distance from Winnipeg to Calgary is 1200 km, what is the speed of the plane in calm air, to the nearest km/h?

	d	v	t
no wind trip ①	1200	v	$\frac{1200}{v}$
against trip ② of the wind	1200	v-50	$\frac{1200}{v-50}$

$$v = \frac{50 \pm \sqrt{50^2 - 4(1)(-120000)}}{2}$$

$= 372 \text{ km/h}$

negative speed will be rejected

$$\frac{1200}{v-50} - \frac{1}{2} = \frac{1200}{v}$$

$$\frac{2400v - v^2 + 50v}{2v(v-50)} = \frac{2400v - 120000}{2v(v-50)}$$

$$v^2 - 50v - 120000 = 0$$

Use quadratic formula.