Rationals Review Supplement

1. The Student Government Association is planning a dance. The Association spends \$450 for supplies and will charge \$7 per ticket. The expression for profit (total sales minus total costs) is $7x - 450$, where x is the number of tickets that are sold. Which of these expressions represents the profit per ticket?

   A. $7x^2 - 450$ B. $x(7x - 450)$

   C. $\dfrac{x}{7x - 450}, x \neq \dfrac{450}{7}$ D. $\dfrac{7x - 450}{x}, x \neq 0$

2. Solve: $\dfrac{7}{5x - 5} = \dfrac{3}{(x + 1)(x - 1)}$

Step 1	$\dfrac{7}{5x - 5} = \dfrac{3}{(x + 1)(x - 1)}$
Step 2	$7(x + 1)(x - 1) = 3(5x - 5)$
Step 3	$7x^2 - 7 = 15x - 15$
Step 4	$7x^2 - 15x + 8 = 0$
Step 5	$(7x - 8) = 0$
Step 6	$x = \frac{8}{7}$ or $x = 1$
Step 7	$x = \frac{8}{7}$

   What justifies going from step 6 to step 7 in the solution?

   A. The original equation is defined at $x = \frac{8}{7}$ and $x = 1$

   B. The original equation is not defined at $x = \frac{8}{7}$

   C. The original equation is defined at $x = 1$

   D. The original equation is not defined at $x = 1$

3. Subtract and simplify: $\dfrac{x + 4}{x^2 + 3x - 10} - \dfrac{x - 4}{x^2 - 6x + 8}$

   A. $-\dfrac{1}{x^2 + 3x - 10}$ B. $-\dfrac{1}{x^2 - 3x - 8}$

   C. $-\dfrac{2x}{2x^2 - 3x - 2}$ D. $-\dfrac{x^2 - 16}{x + 5}x - 2$

4. Let $f(x) = \dfrac{(x - b)}{(x + a)(x + b)}$, where a and b are positive constants and $a \neq b \neq 0$. Identify all important features of the graph, such as intercepts, asymptotes, holes, etc. *You do not need to sketch a graph of* $f(x)$.

5. Consider this expression:

   $$\frac{a - c}{a + b} - \frac{b + c}{a + b} - \frac{a - b}{a + b}$$

   By changing *one* minus sign to plus, you can make the expression simplify to zero, assuming that $a + b \neq 0$. Left to right, which "−" would you change?

6. An office has 3 copying machines, 2 of which can make a copy in 4 seconds and one of which can make a copy in 6 seconds. How long will it take to make 500 copies if all 3 machines work together?

   A. 750 seconds B. 1200 seconds

   C. $2\frac{2}{5}$ minutes D. $1\frac{1}{2}$ minutes

7. Jim can build a boat in 18 days. If Harry helps, they can do it in 12 days. How long would it take Harry alone to build the boat?

   A. 20 days B. 15 days C. 36 days

   D. 25 days

8. A boat can go 24 miles upstream and 24 miles back in 5 hours. If its rate upstream is 4 miles per hour less than its rate downstream, then it travels downstream at a rate (mph) of

   A. 8 B. 9.6 C. 11.6 D. 12

9. An athlete covers three consecutive miles by swimming the first, running the second and cycling the third. He runs twice as fast as he swims and cycles one and a half times as fast as he runs. He takes ten minutes longer than he would do if he cycled the whole three miles. How many minutes does he take?

   A. 16 B. 22 C. 30 D. 46

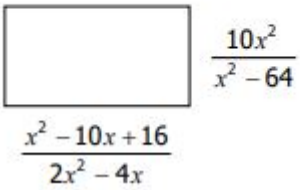
10. If $\dfrac{a}{x^2 - 4} + \dfrac{b}{x + 2} = \dfrac{5x + 3}{x^2 - 4}$ is an identity in x, then $a + b$ is equal to:

    A. $5x + 3$ B. 8 C. 18

    D. 4

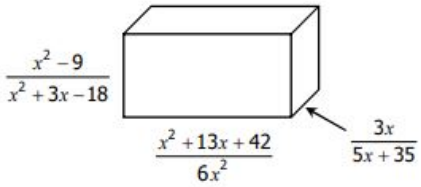
11. Use an appropriate formula to create a rational expression problem and simplify:

Find the **area** of the rectangle below.



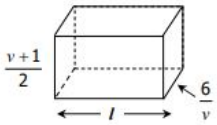
12. Use an appropriate formula to create a rational expression problem and simplify:

Find the **volume** of the rectangular prism below.



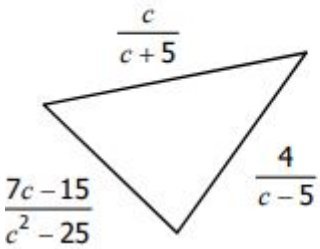
13. Solve the following:

If the rectangular prism below has a **volume** of $\frac{2v^2-3v-5}{8v-20}$, find its **length**.



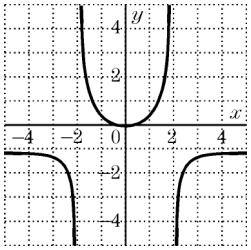
14. Use an appropriate formula to create a rational expression problem and simplify:

Find the **perimeter** of the triangle below.

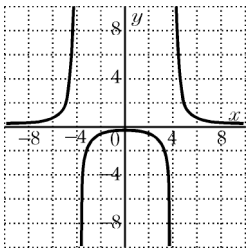


15. Which of the following represents the graph of $y = -\frac{x^2}{x^2-4}$?

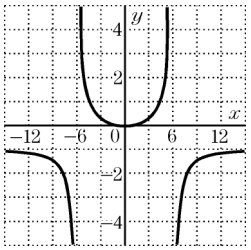
A.



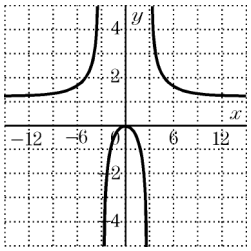
B.



C.



D.



Rationals Review Supplement 3/7/2018

1.
Answer: D

2.
Answer: D

3.
Answer: A
Objective: A.APR.7

4.
Answer: zero: $x = b$, vertical asymptotes: $x = -b$ and $x = -a$, horizontal asymptote: $y = 0$, y-intercept: $-\frac{1}{a}$
Objective: F.IF.7D

5.
Answer: the 1st

6.
Answer: A

7.
Answer: C

8.
Answer: D

9.
Answer: B

10.
Answer: C

11.
Answer:

12.
Answer:

13.
Answer:

14.
Answer:

15.
Answer: A
Objective: F.IF.7D