

# Part 2 - 2019 Key (ALBERTA Key)

Use the following information to answer the next question.

$$\sqrt{80} \sqrt{95} \sqrt{91} \sqrt{83} \sqrt{101} \sqrt{105} \sqrt{89} \sqrt{92}$$

1. How many of the given square roots have a value between 9 and 10?

Answer: 5

(Record your answer on the answer sheet.)

Use the following information to answer the next question.

When simplified,  $5^{13} \div 5^8$  can be written in the form  $a^b$ .

2. What is the value of  $a + b$ ?

Answer:  $a + b =$  10

(Record your answer as an integer value on the answer sheet.)

3. What is the value of  $(-9)^2 + (-2)^3$ ?

Answer: 73

(Record your answer as an integer value on the answer sheet.)

Use the following information to answer the next question.

Equation 1  $6^0 + 7^0 + 9^0 = 3$

Equation 2  $(2^5 \times 2^7)^3 = 2^{36}$

Equation 3  $2^6 - 2^3 = 2^3$

Equation 4  $\frac{2^0 \times 2^2}{2} = 2$

4. Which of the equations are true? Write the equation numbers in numerical order.

Answer: 124

(Record your answer on the answer sheet.)

- Remember that  $x^0 = 1$

- Law of exponents

$$(a^b \times c^d)^e = a^{b \times e} \times c^{d \times e}$$

- $9^2 = 81$  and  $10^2 = 100$

so any number between 81 and 100 have a square root between 9 and 10

- 95, 91, 83, 89 and 92

(Note that you are asked how many)

Law of exponents  $\rightarrow$  When dividing, subtract exponents

- $\frac{5^{13}}{5^8} = 5^5$  where  $a = 5$ ,  $b = 5$

- $a + b = 5 + 5 =$  10

When the base is negative, and the exponent is even,  $\rightarrow (+)$

- $(-9)^2 = (-9)(-9) = 81$

When base is negative and the exponent is odd  $\rightarrow (-)$

- $(-2)^3 = (-2)(-2)(-2) = -8$

- $81 - 8 =$  73

Equation 1 =  $6^0 + 7^0 + 9^0 = 3$  ✓  
 $1 + 1 + 1 = 3$

Equation 2 =  $(2^5 \times 2^7)^3 = 2^{15} \times 2^{21} = 2^{36}$  ✓  
 $2^{36} = 2^{36}$

Equation 3 =  $2^6 - 2^3 = 2^3 \rightarrow 64 - 8 = 56$  ✓

(Remember that when adding or subtracting powers you have to deal with standard form and the law of exponents do not apply)

$56 \neq 2^3$  ✓

Equation 4

$\frac{2^0 \times 2^2}{2} = \frac{1 \times 4}{2} = \frac{4}{2} = 2$  ✓

5. What is the value of  $x$  in the equation  $0.4 = \sqrt{x}$ ?

Answer:  $x = 0.16$

(Record your answer on the answer sheet.)

• Remember that:  $\sqrt{9} = 3$  because  $3 \times 3 = 9$

• If  $\sqrt{x} = 0.4$ , then  $x$  must be  $(0.4)^2 = 0.16$

6. What is the value of  $\frac{3}{4} \div \frac{5}{6}$  expressed as a fraction in simplest form?

Answer:  $\frac{9}{10}$  (Record the numerator in the first column)  
(Record the denominator in the third column)

(Record your answer on the answer sheet.)

$$\begin{array}{r} 0.4 \\ 0.4 \\ \hline 16 \\ 00 \\ \hline 0.16 \end{array}$$

$$\frac{3}{4} \div \frac{5}{6}$$

Method 1 Cross-multiply

$$\frac{3}{4} \times \frac{6}{5} = \frac{18}{20} = \frac{9}{10}$$

Method 2: Reciprocal

$$\frac{3}{4} \times \frac{6}{5} = \frac{18}{20} = \frac{9}{10}$$

Method 3

$$\left( \frac{3}{4} \right) \left( \frac{6}{5} \right) = \frac{3 \times 6}{4 \times 5} = \frac{18}{20} = \frac{9}{10}$$

7. Order the following rational numbers from smallest value to greatest value, using the numbers 1, 2, 3 and 4.

Use the number 1 to represent the smallest value and the number 4 to represent the greatest value.

Answer:  $\frac{32}{40}$   $\frac{1}{5}$   $\frac{4}{10}$   $\frac{21}{35}$

(Record all four digits of your answer on the answer sheet.)

• Smallest to biggest

Strategy 1: Convert to mixed numbers

Strategy 2: Convert to decimals

Strategy 3: Simplify - Reduce

• Let's group them:

$$\left( \frac{1}{5} \right)^{\frac{1}{5}} \text{ and } \frac{21}{35} = \frac{7}{35} \text{ and } \frac{21}{35}$$

8. What is the value of  $0.5 \times 0.5 + 2.7 \div 0.9$ ?

Express your answer to the nearest hundredth.

Answer:  $3.25$

(Record your answer on the answer sheet.)

$$-\frac{32}{40} \text{ and } \left( \frac{4}{10} \right)^4$$

$$\frac{21}{35} > \frac{1}{5}$$

$$\frac{32}{40} \text{ and } \frac{16}{40} \rightarrow \frac{32}{40} > \frac{16}{40} \text{ or } \frac{32}{40} > \frac{4}{10}$$

$$\frac{21}{35} \rightarrow \frac{3}{5}$$

$$\frac{32}{40} = \frac{4}{5}$$

$$\frac{42}{102} = \frac{7}{17}$$

$$\frac{1}{5} < \frac{2}{5} < \frac{3}{5} < \frac{4}{5}$$

$$\frac{1}{5} < \frac{4}{10} < \frac{21}{35} < \frac{32}{40}$$

9. What is the value of the expression  $34 - 7(4 - 2)^2$ ?

Answer:  $6$

(Record your answer as an integer value on the answer sheet.)

Strategy → Convert to Fractions

• Use BEDMAS

$$\textcircled{1} 2.7 \div 0.9 \rightarrow \frac{27}{10} \div \frac{9}{10} = \frac{270}{90} = 3$$

$$\textcircled{2} \text{Mult.} \rightarrow 0.5 \times 0.5 = 0.25$$

$$\textcircled{3} 0.25 + 3 = 3.25$$

• BEDMAS

$$\textcircled{1} 4 - 2 = 2$$

$$\textcircled{2} 2^2 = 4$$

$$\textcircled{3} 7(4) = 28$$

$$\textcircled{4} 34 - 28 = 6$$

10. What is  $4^2 + 5 \times 4 - 11$ ?

Answer: 25

(Record your answer as an integer value on the answer sheet.)

• BEDMAS

↳ ①  $4^2 = 4 \times 4 = 16$

②  $5 \times 4 = 20$

• then

$16 + 20 - 11 = 36 - 11 = 25$

12. What is the approximate square root of

$\sqrt{\frac{143}{9}}$  to the nearest whole number?

Answer: 4

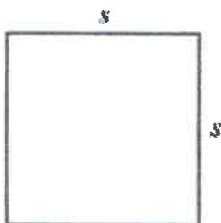
(Record your answer on the answer sheet.)

• When approximating → use perfect squares that are close to the numbers

•  $143 \approx 144 \rightarrow \sqrt{\frac{144}{9}} = \frac{\sqrt{144}}{\sqrt{9}} = \frac{12}{3} \approx 4$

Use the following information to answer the next question.

Alberto's living room has a square shape. He measured the length of one wall to be 4.3 m.



11. What is the area of Alberto's living room expressed to the nearest tenth?

Answer: 18.5 m<sup>2</sup>

(Record your answer on the answer sheet.)

• If  $s = 4.3$  m, then

Area =  $s \times s = (4.3)(4.3) = (4.3)^2$

$$\begin{array}{r} 4.3 \\ 4.3 \\ \hline 129 + \\ 172 \\ \hline 18.49 \end{array}$$

Area =  $18.49$  m<sup>2</sup>

↓

18.5 m<sup>2</sup>

13. What is the value of  $\sqrt{\frac{25}{9}} \times 1\frac{1}{2}$  to the nearest tenth?

Answer: 2.5

(Record your answer on the answer sheet.)

•  $\sqrt{\frac{25}{9}} = \frac{\sqrt{25}}{\sqrt{9}} = \frac{5}{3}$

•  $1\frac{1}{2} = \frac{3}{2}$

→  $\frac{5}{3} \times \frac{3}{2} = \frac{5}{2}$

↓

2.5

14. Solve for  $x$  in the following equation.

$-3(x + 10) = 2(x - 20)$

Answer: 2

(Record your answer as an integer value on the answer sheet.)

• BEDMAS → Distributive Property

$-3(x + 10) = -3x - 30$

$2(x - 20) = 2x - 40$

so  $x = \frac{10}{5} = 2$

check:  $-3(12) = 2(-18)$   
 $-36 = -36$

$-3x - 30 = 2x - 40 \rightarrow 40 - 30 = 2x + 3x$   
 $10 = 5x$



15. Solve for  $x$  in the following equation.

$$\frac{x}{4} + 3 = 12$$

Answer:  $x = 36$

(Record your answer as an integer value on the answer sheet.)

• Since  $\frac{x}{4} + 3 = 12$ , this means

that  $\frac{x}{4} = 9$  (Because  $9 + 3 = 12$ )

•  $x$  is the number divided by 9

$$\frac{36}{4} = 9 \therefore x = 36$$

16. Solve for  $x$  in the following equation.

$$6(2x + 1) = (2x + 3)$$

Express your answer to the nearest tenth.

Answer:  $x = -0.3$

(Record your answer on the answer sheet.)

• Do Distributive Property First

$$6(2x + 1) = 12x + 6$$

$$12x + 6 = 2x + 3 \rightarrow 12x - 2x = 3 - 6$$

$$10x = -3$$

$$x = -\frac{3}{10} = -0.3$$

Check:

$$6(2(-0.3) + 1) = (2(-0.3) + 3)$$

$$6(-0.6 + 1) = -0.6 + 3$$

$$6(0.4) = -0.6 + 3$$

$$2.4 = 2.4$$

17. Solve for  $y$  in the following equation.

$$4y - 22 = 42$$

Answer:  $y = 16$

(Record your answer as an integer value on the answer sheet.)

•  $4y - 22 = 42$  means that

$$4y = 64$$

• then  $y = \frac{64}{4} = 16$

Use the following information to answer the next question.

The following number line shows the solution set for  $4x + 6 > 3x + 5$ .



18. How many whole numbers on the given solution set will satisfy the inequality?

Answer:  $2, 3, 4$

(Record your answer on the answer sheet.)

• Solve the inequality

$$4x + 6 > 3x + 5$$

$$4x - 3x + 6 > 5$$

$$4x - 3x > 5 - 6 \rightarrow x > -1$$

• this means any number

greater than  $-1$ , not including  $-1$

• not including  $2$

19. When  $x = 2$ , what is the value of

$$(6x - 5) - (2x^2 + 3)?$$

Answer:  $x = -4$

(Record your answer as an integer value on the answer sheet.)

• Substitute

$$(6x - 5) - (2x^2 + 3)$$

$$\downarrow \quad \downarrow$$

$$(12 - 5) - (8 + 3) = 7 - 11 = -4$$

20. When the expression  $(3x - 5) - (x^2 - x)$  is written in its simplest form, what is the sum of the coefficients from the expression?

Answer: \_\_\_\_\_

(Record your answer as an integer value on the answer sheet.)

• ~~Coefficients~~  
↳ ~~Integers~~ with the variable

• Remember:  
You can only "group" like terms

• When subtracting  
↳ Add the opposite!

$$= (3x - 5) - (x^2 - x)$$

$$= 3x - 5 - x^2 + x$$

$$\begin{array}{|c} 3x + x - x^2 - 5 \end{array} \quad \text{(Rewrite in order)}$$

$$= -x^2 + 4x - 5$$

$$\begin{array}{ccc} \downarrow & \downarrow & \\ -1 & +4 & \rightarrow \boxed{3} \end{array}$$