Sample Provincial Achievement Test 1 — PART A – 2019

Use the following information to answer the next question.

$\sqrt{99}$	$\sqrt{109}$	$\sqrt{100}$	$\sqrt{119}$
$\sqrt{129}$	$\sqrt{139}$	$\sqrt{149}$	$\sqrt{159}$

1. How many of the given square roots have a value between 11 and 12?

Answer: 2

(Record your answer on the answer sheet.)

- Given that $11^2 = 121$ and $12^2 = 144$ and $\sqrt{121} = 11$ and $\sqrt{144} = 12$, you are looking for the square root of any number between 121 and 144

∴ Between 11 and 12 → $\sqrt{121}$ and $\sqrt{144}$
↳ $\sqrt{129}$ and $\sqrt{139}$

Note: Be careful to read the question completely
↳ "How many", not "which"

2. What is the value of $\sqrt{3.24}$ to one decimal place?

Answer: 1.8

(Record your answer on the answer sheet.)

- Recall that: • If the number (without the decimal point), is a perfect square and • there are an even number of decimal places, then → the decimal is a perfect square!

∴ 1.8 → Proof: 1.8 × 1.8 ↓ 3.24

- Since $20 \times 20 = 400$, $\sqrt{324}$ has to be less than 20.

- the number ends in 4, so the square root ends on 2 or 8 ↳ $2^2 = 4$, $8^2 = 64$

- try both:

this means our choices are: 14 or 18

$$\begin{array}{r} 14\times \\ 14 \\ \hline 56+ \\ 14 \\ \hline 196 \end{array} \qquad \begin{array}{r} 18\times \\ 18 \\ \hline 144+ \\ 18 \\ \hline 324 \end{array}$$

Now: 3.24 has 2 decimals, so $\boxed{\sqrt{3.24} = 1.8}$

3. What is the difference between the values of the second power of 3 and the third power of 2?

Answer: 1

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

Note the vocabulary:

"Difference" → Subtraction

"Second power" → x^{2}

"Third power" → x^{3}

- In this problem, we must calculate both powers, and then subtract.

$3^2 = 3 \times 3 = 9$

$2^3 = 2 \times 2 \times 2 = 8$

the difference is → $3^2 - 2^3 = 9 - 8 = \boxed{1}$

4. What is the value of $-3^4 + 5^2 + (-12)^2$?

Answer: 88

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

- Let's Break the terms down:
- -3^4 is a positive base, so $-3^4 = -(3 \times 3 \times 3 \times 3) = -81$
- $+5^2 = 5 \times 5 = 25$
- $(-12)^2 =$ negative base, even exponent → +
- so $(-12)^2 = (-12)(-12) = +144$

So: $= -81 + 25 + 144$

$= -81 + 169$

↓

(Here is one strategy to subtract) (Remember that opposite signs subtract)

↓

$-80 + 170 = +90 - 1 - 1 = \boxed{+88}$

$-1 \quad -1$

5. Evaluate $(15^0)(15^2)$.

Answer: 225

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

- Remember that:

$x^0 = 1$ (any number)

- So: $(15^0) = 1$

and: $(15^0)(15^2) = (1)(15^2)$

$= 15^2$

- as an integer is

$$\begin{array}{r} 15 \\ \times\ 15 \\ \hline 75 \\ 15 \\ \hline \boxed{225} \end{array}$$

∴ 225

6. What is the value of $\left(\frac{2}{5}\right)^2$?

Express your answer as a decimal to the hundredth.

Answer: 0.16

(Record your answer on the answer sheet.)

- Notice the vocabulary
  "to the hundredth" → 2 decimal places
- Strategy:
  When trying to convert to decimals, try to make the denominator 100 or 10.

- $\left(\frac{2}{5}\right)^2 = \frac{2}{5} \times \frac{2}{5} = \frac{4}{25}$
- to convert to decimals → $\left(\frac{4}{25}\right)\frac{4}{4} = \frac{16}{100} = \boxed{0.16}$

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: 1 3 2 4

-2.5 $\frac{4}{6}$ $-\frac{1}{3}$ $1\frac{8}{12}$

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

- When ordering numbers:
  ① Determine whether the order is from smallest to biggest, or biggest to smallest
- Remember that negative numbers are always smaller than positive numbers
  - also negative numbers are bigger closer to 0.

- So, the smallest numbers are → -2.5 and $-\frac{1}{3}$

  smallest 2nd smallest

- We know that $-\frac{1}{3} = -0.\overline{3}$, so $-2.5 < -0.\overline{3}$
- Positive numbers
  ↳ Simplify → $\frac{4}{6} = \frac{2}{3} = 0.\overline{6}$ → 3rd smallest
  → $1\frac{8}{12} = 1\frac{2}{3} = 1.\overline{6}$ → greatest
- From smallest to greatest:

$$\boxed{-2.5 < -\frac{1}{3} < \frac{4}{6} < 1\frac{8}{12}}$$

1 2 3 4

8. What is the value of $217 - 12(5-3)^3$?

Answer: 121

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

- When more than one operation, always use BEDMAS

① Brackets → $12(5-3)^3 = 12(2)^3$
② Exponent → $2^3 = 2 \times 2 \times 2 = 8$
③ Multiplication → $12(8) = 96$
④ Subs: $217 - 96$
$+4$
$= 217 - 100 = 117 + 4 = \boxed{}$ → $\boxed{121}$
$+4$

9. What is the value of $2-\frac{1}{3}+\frac{1}{4}-\frac{2}{3}+4\times\frac{1}{2}$ expressed as a fraction in simplest form?

Answer: 13 (Record the numerator in the first column) / (Record the fraction bar in the second column) / 4 (Record the denominator in the third column)

(Record your answer on the answer sheet.)

- Notice the vocabulary: "Simplest form" → Reduced or Simplified
- Follow BEDMAS

① Multiply → $4\times\frac{1}{2}=\frac{4}{2}=2$

- So: $2-\frac{1}{3}+\frac{1}{4}-\frac{2}{3}+2$ → Remember that adding and subtraction are on same level, so you can do them in whatever order
- Rearrange to make easier.

$$=\underbrace{2+2}\underbrace{-\frac{1}{3}-\frac{2}{3}}+\frac{1}{4}$$

$$=4\underbrace{-\frac{3}{3}}+\frac{1}{4}$$

$$=4-1+\frac{1}{4}$$

$$3+\frac{1}{4}=\left(\frac{3}{1}\right)\frac{4}{4}+\left(\frac{1}{4}\right)$$

$$=\frac{12}{4}+\frac{1}{4}=\boxed{\frac{13}{4}}$$

$$=3\frac{1}{4}$$

10. What is the square root of $\sqrt{3^2+4^2}$?

Answer: 5

(Record your answer as a whole number on the answer sheet.)

- Always use order of operation!
- $3^2=3\times3=9$
- $4^2=4\times4=16$

Because these powers have different bases, you cannot group them together!

- So: $\sqrt{3^2+4^2}=\sqrt{9+16}=\sqrt{25}=\boxed{5}$

Use the following information to answer the next question.

Jason's garage has a square shape. He measured the total area to be 6.25 m².

11. What is the length of one side of the garage?

Answer: _____ m 2.5 m

(Record your answer on the answer sheet.)

- Remember that: Side length = $\sqrt{\text{area}}$
- Notice that 6.25:
  - If we remove the decimal point, 625 is a square number
  - 6.25 has an even number of decimals, so 6.25 is also a perfect square number

So → $\sqrt{625}$ → above 400, below 900

→ Since it ends in 5, → options are 25, 35 → too high!

→ only option

So → $\sqrt{6.25}=\boxed{2.5}$

12. Evaluate 13^2.

Answer: 169

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

- Evaluate means solve
- Number (squared) MUST end in 9
- above 100 → $11^2 = 121$
  $12^2 = 144$
  $13^3 = 169$

13. Solve for x in the following equation.

$7x + 3 = 4x - 18$

Answer: $x =$ -7

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

- Use whichever method you prefer
- $7x + 3 = 4x - 18$

$7x - 4x = -18 - 3$

$3x = -21$ → $\boxed{x = -\frac{21}{3} = -7}$

Check

$7(-7) + 3 = 4(-7) - 18$

$-49 + 3 = -28 - 18$

$\boxed{-46 = -46}$

14. What is the value of r in $4r + 2 = 7r + 11$?

Answer: -3

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

- Use whichever method you prefer

$4r + 2 = 7r + 11$

$2 - 11 = 7r - 4r$

$-9 = 3r$ → $\boxed{\frac{-9}{3} = r = -3}$

Check

$4(-3) + 2 = 7(-3) + 11$

$-12 + 2 = -21 + 11$

$-10 = -10$

* DIFFICULT *

15. Solve for x in the following equation.

$\frac{x}{6} = \frac{x}{2} + \frac{5}{4}$

Express your answer as a decimal to the nearest tenth.

Answer: $x =$ -3.8

(Record your answer on the answer sheet.)

- "decimal to nearest tenth" → 1 decimal

$\frac{x}{6} - \frac{x}{2} = \frac{5}{4}$

↳ $\left(\frac{x}{6}\right) - \left(\frac{x}{2}\right)\frac{3}{3} = \frac{5}{4}$

↳ $\frac{x}{6} - \frac{3x}{6} = \frac{5}{4}$

↳ $\frac{x - 3x}{6} = \frac{5}{4}$

↳ $-\frac{2x}{6} = \frac{5}{4}$

$-\frac{2x}{6} = \frac{5}{4}$

$-2x = \left(\frac{5}{4}\right)6$ → $-2x = \frac{30}{4}$ → $x = \frac{30}{-2(4)}$

$x = -\frac{30}{8}$ → $\boxed{x = -3\frac{6}{8}}$

$\therefore x = -3\frac{6}{8}$

$-3\frac{3}{4}$ → 0.

$\boxed{-3.75}$

$\boxed{-3.8}$

16. Solve for x in the equation $\frac{-36}{2x} = 1$.

Answer: $x =$ -18

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

- Since a number divided by itself is 1, this means that

$2x$ must be $= -36$

- this also means that:

$2x = -36 \rightarrow x = -\frac{36}{2} = -18$

17. Solve for x in the following equation.
$3x + 9 = 7x - 19$

Answer: 7

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

- $3x + 9 = 7x - 19$ $\quad 7x - 3x = +19 + 9$

$3x - 7x = -19 - 9$

$-4x = -28$

$x = \frac{-28}{-4} = 7$

Check:

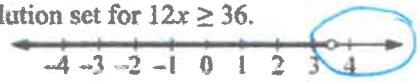
$3(7) + 9 = 7(7) - 19$

$21 + 9 = 49 - 19$

$30 = 30$

Use the following information to answer the next question.

The following number line shows the solution set for $12x \geq 36$.



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

Answer: 1 → Because 4 are answers

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

- Inequalities are solved as if they were equations.
- Remember that if you divide or multiply by a negative number, the direction of the inequality sign changes
- Notice that → you are asked HOW MANY points

Solve the inequality → $12x \geq 36$

$x \geq \frac{36}{12}$

$x \geq 3$

4

this means that Any number GREATER than 3, including 3

IMPORTANT: the shading of the inequality graph is the opposite of what it is on the textbook

19. What is the sum of the coefficients in the simplified expression $2x(3x+1)+2x(x+2)$?

Answer: $x =$ 14

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

- Because of BEDMAS you must perform the distributive property first
- "SUM OF COEFFICIENTS"
  ↳ the coefficient is the integer attached to the variable

$2x(3x+1) = (2x \cdot 3x) + (2x \cdot 1)$
$= 6x^2 + 2x$

$2x(x+2) = (2x \cdot x) + (2x \cdot 2)$
$2x^2 + 4x$

$\rightarrow = 6x^2 + 2x + 2x^2 + 4x$
$= 6x^2 + 2x^2 + 2x + 4x$
$= 8x^2 + 6x$

- Sum of Coefficients:

$\boxed{8 + 6 = 14}$

20. What is the coefficient of x^2 when $-4x-6$ is multiplied by $-5x$?

Answer: 20

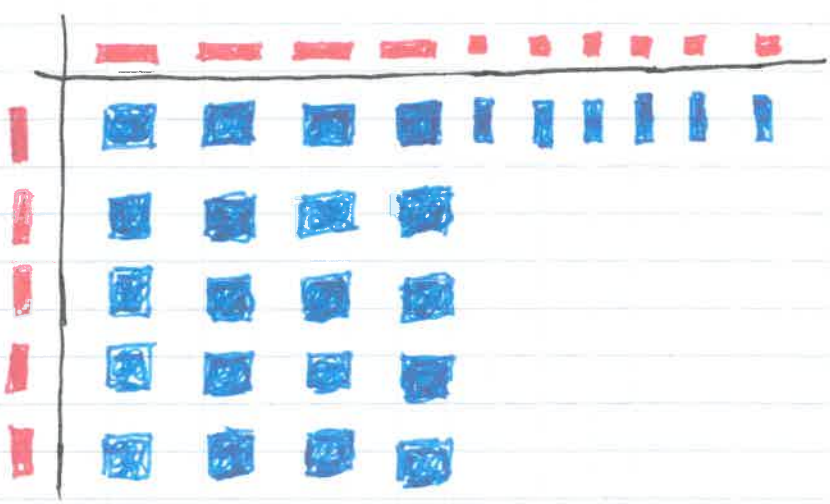
(Record your answer as an **integer** value on the answer sheet.)

- Vocabulary → Coefficient → number with variable x^2
- multiply

$-5x(-4x-6) =$

$20x^2 + 30x$

With tiles:



→ 20