

Math 8 Final Exam Prep – Written Section

Please attempt *all* questions without a calculator!!! You must show all steps to complete each question.

• **Rates and Ratios**

- Reduce or simplify a two-term and three-term ratio
- Solve a missing term in a two-term and three-term ratio
- Determine unit rate
- Proportional reasoning

1. a) $6:20 \xrightarrow{\div 2 \div 2} 3:10$ b) $18:12:24 \xrightarrow{\div 6 \div 6 \div 6} 3:2:4$

2. a) $\frac{3}{4} = \frac{x}{12} \xrightarrow{\times 3} \frac{9}{4} = \frac{x}{12} \xrightarrow{\times 4} x = 9$ b) $5:7:4 = x:21:y \xrightarrow{\times 3} 15:21:12 \xrightarrow{\div 3} 5:7:4$

3. A polar bear gains 450 kg in 9 years.

$$\frac{450\text{kg}}{9\text{ years}} = \frac{50\text{kg}}{1\text{ year}}$$

4. If 3 bars of soap cost \$1.80, how much does 7 bars of soap cost?

$$\frac{\$1.80}{3\text{ bars}} = \frac{\$?}{7\text{ bars}} \quad \$4.20$$

• **Percents**

- Convert between percents, fractions and decimals.

5. a) What is 0.235 as a percent? $\times 100\% = 23.5\%$
- b) What is 135% as a decimal? $\div 100\% = 1.35$
- c) What is 15% as a fraction in lowest terms? $\frac{15}{100} = \frac{3}{20}$
- d) What is 1.24 as a fraction in lowest terms? $\frac{124}{100} = \frac{31}{25}$
- e) What is $\frac{15}{20}$ as a decimal? As a percent? $\frac{15}{20} = \frac{3}{4} = 0.75 = 75\%$

- Calculate percent of a number

6. 20% of 60
 $2 \times 6 = 12$

- Calculate discount, sale price and tax.

7. A \$40 t-shirt is 15% off.

a) What is the discount?

$$15\% \text{ of } 40 = \frac{15}{100} \times 40 = \frac{600}{100} = 6$$

b) What is the sale price of the t-shirt?

$$40 - 6 = \$34$$

c) What is the total cost of the t-shirt with 5% GST and 7% PST?

$$12 + 100 = 112\% \text{ of } 34 \rightarrow 1.12 \times 34$$

$$\rightarrow \$38.08 \text{ with tax}$$

$$\begin{array}{r} 1.12 \\ \times 34 \\ \hline 448 \\ 3360 \\ \hline 38.08 \end{array}$$

• Squares, Square roots and the Pythagorean Theorem

-Determine the square of a number

8. $8^2 = 8 \times 8 = 64$

-Determine the area of a square

9. Determine the area of a square with side length of 12 cm.

$A = s^2 = 12^2 = 144 \text{ unit}^2$

-Determine the square root of a number

10. $\sqrt{36} = 6$

-Determine the side length of a square

11. Determine the side length of a square with an area of 81 m².

$A = 81 \text{ side length} = \sqrt{81} = 9 \text{ m}$

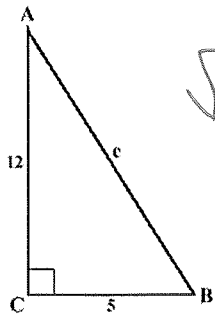
-Determine the cube of a number

12. $4^3 = 64$

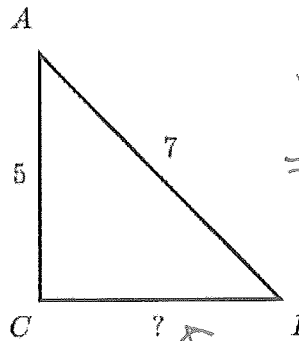
-Determine the cube root of a number

13. $\sqrt[3]{216} = 6$
 $\sqrt[3]{6 \times 6 \times 6} = \sqrt[3]{216}$

-14. Use the Pythagorean Theorem to determine the length of a missing side of a right triangle



$\sqrt{(12^2 + 5^2)}$
 $= \sqrt{144 + 25}$
 $= \sqrt{169}$
 $= 13$



$\sqrt{(7^2 - 5^2)}$
 $= \sqrt{49 - 25}$
 $= \sqrt{24}$
 ≈ 4.9

• Fractions

15. Calculate

a) $4\frac{1}{2} \times 2\frac{1}{2}$

$\frac{9}{2} \times \frac{5}{2} = \frac{45}{4}$
 $= 11\frac{1}{4}$

b) $\frac{15}{16} \div \frac{3}{2}$

$\frac{5 \cancel{15}}{16} \times \frac{2^1}{3} = \frac{5}{8}$

c) $3\frac{1}{5} \div 1\frac{1}{3} + \frac{3}{4} \times \frac{4}{5}$

① $\frac{16}{5} \div \frac{4}{3}$
 $\frac{4 \cancel{16}}{5} \times \frac{3}{4}$

② $\frac{3}{5}$

$\frac{12}{5} + \frac{3}{5} = \frac{15}{5}$

$= 3$

d) $\frac{7 \times 5}{8 \times 5} - \frac{3 \times 8}{5 \times 8} = \frac{35}{40} - \frac{24}{40} = \frac{11}{40}$

• Algebra

16. Solve the following equations: Show all steps!

a) $-4m = 4$

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

$$m = -1$$

b) $\frac{t}{6} + 2 = -2$

$$\frac{t}{6} - 2 = -4$$

$$t = -24$$

c) $4y + 6y - 5y + 5 + 3 = 23$

$$10y - 5y + 8 = 23$$

$$5y + 8 = 23$$

$$-8 \quad -8$$

$$5y = 15$$

$$\frac{5y}{5} = \frac{15}{5}$$

$$y = 3$$

17. Simplify and Evaluate the Following Expressions if $x = -3$ and $y = 5$

a) $-18 + 6xy - 10xy - 22 - 3y + 7y$

$$-4xy - 40 + 4y$$

$$-4(-3)(5) - 40 + 4(5)$$

$$60 - 40 + 20$$

$$80 - 40 = 40$$

b) $-4x^2 + 9x^2 - y - 3y$

$$5x^2 - 4y$$

$$5(-3)^2 - 4(5)$$

$$5(-3)(-3) - 4(5)$$

$$45 - 20$$

$$= 25$$

• Graphing Linear Relations

18. Show all steps to complete the table of values. Plot and label the points on the graph. Then connect points with a ruler.

x	$y = -3x + 5$	Coordinates (x, y)
-2	$-3(-2) + 5 = 6 + 5 = 11$	$(-2, 11)$
1	$-3(1) + 5 = -3 + 5 = 2$	$(1, 2)$
2	$-3(2) + 5 = -6 + 5 = -1$	$(2, -1)$
4	-7 $-7 = -3x + 5$ $-5 \quad -5$	$(4, -7)$

$$-7 = -3x + 5$$

$$-12 = -3x$$

$$\frac{-12}{-3} = \frac{-3x}{-3}$$

$$x = 4$$

