

# YEAR-END SAMPLE TEST - GRADE 9 MATH

• Show all work on looseleaf paper

## (\*) RATIONAL NUMBERS

(1) Which is larger  $-\frac{3}{4}$  or  $-\frac{9}{10}$  ?

(2) Order the following numbers from least to greatest:

$\sqrt{59}$ ,  $215\%$ ,  $-142\%$ ,  $3.2$ ,  $-\frac{7}{8}$ ,  $-1.9$ ,  $1\frac{4}{5}$ ,  $-\sqrt{147}$

(3) Add

- a)  $-4.25 + 7.76$
- b)  $-19.64 + (-8.4)$
- c)  $\frac{7}{8} + -\frac{9}{10}$
- d)  $-2\frac{3}{4} + -5\frac{5}{6}$

(4) Subtract

- a)  $-7.25 - 8.93$
- b)  $9\frac{4}{5} - (+6\frac{2}{3})$
- c)  $-\frac{7}{10} - (-\frac{3}{5})$

(5) Multiply

- a)  $-9.75 \times 3.2$
- b)  $-\frac{3}{4} \times -\frac{8}{21}$
- c)  $-1\frac{1}{2} \times -2\frac{4}{5}$

(6) Divide

- a)  $\frac{5}{8} \div -\frac{9}{16}$
- b)  $-4\frac{1}{2} \div 2\frac{2}{3}$
- c)  $-13.85 \div -2.6$

Fraction Questions must have fraction answers

(7) Mark made  $1\frac{3}{4}$  cups of soup. The next day he made  $2\frac{2}{3}$  cups of soup. His mom ate  $\frac{2}{5}$  of all this soup. Mark divided the remaining soup into 2 bowls. How much soup is in each bowl?

(8) Estimate  $\sqrt{48}$  without a calculator.

(9) What is the square of 11?

(10) The square root of what number is 15?

(11) Tony's square bedroom has an area of  $208\text{ m}^2$ . What is the perimeter of this room?

(12) What is the square root of:

a)  $\frac{100}{169}$       b)  $\frac{1}{144}$       c) 0.49

\* Answers must be fractions.

(13) Complete this grade 9 square root # line:

$$\sqrt{0} = 0, \quad \sqrt{0.01} = 0.1, \quad \sqrt{0.04} = 0.2 \rightarrow \sqrt{1} = 1$$

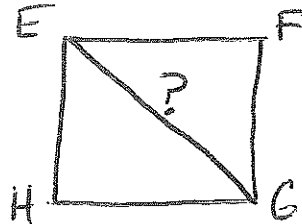
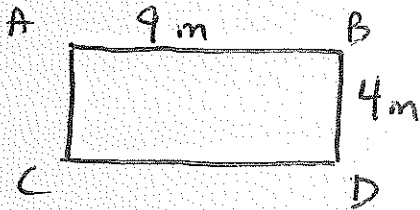
\* There are 7 more that follow

(14) Estimate the  $\sqrt{0.39}$  without a calculator

(15) Which numbers are perfect squares:

a)  $\frac{5}{16}$       b) 7.8      c) 0.16      d)  $1\frac{21}{100}$

- ⑫ The area of rectangle ABCD is equal to the area of square EFGH. The rectangle is 9m long and 4m wide. How long is EG?



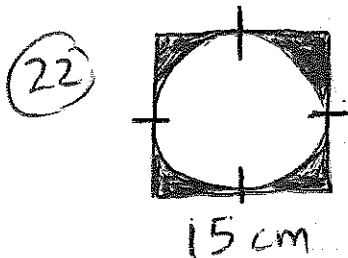
### \* POWERS AND EXPONENTS

- ⑬ Write as a power: a)  $4 \times 4 \times 4 \times 4 \times 4$   
 b)  $-(-2) \cdot (-2) \cdot (-2)$
- ⑭ Evaluate each power: a)  $3^7$     b)  $(-5)^6$   
 c)  $-3^4$     d)  $-(-7)^3$
- ⑮ Evaluate  $(-3)^5 + 6^4$
- ⑯ Simplify using the exponent laws
- a)  $(5^3)^4$     b)  $6^{12} \div 6^3$     c)  $\frac{9^{15}}{9^3}$     d)  $\left(\frac{3}{7}\right)^4$
- e)  $12^0$     f)  $-3^0$     g)  $-(-4)^0$     h)  $-(-5)^0$
- i)  $(10 \times 12)^5$     j)  $2^8 \times 2^7$     k)  $\frac{6^6 \cdot 6^3}{6^2}$
- l)  $\frac{(3^4)^5 \cdot 3^6}{3^8}$     m)  $\frac{9^{14} \div 9^3}{9^2 \times 9^4}$     n)  $\frac{4^3 \cdot (4^3)^7}{4^{16} \div 4^{10}}$

(21) Use the order of operations to solve.

a)  $\frac{3}{4} + \frac{5}{6} - 4(-2+5)^3$

b)  $\frac{9}{16} - \left(\frac{3}{10} \times \frac{5}{6}\right)^2 \div \frac{2}{3}$



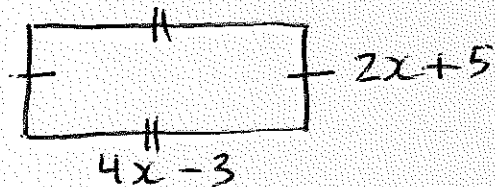
Calculate the area of the shaded region to the nearest hundredth.

(23) A cube is 9 cm long. Calculate the surface area and volume of the cube.

### (\*) POLYNOMIALS

(24) Simplify:  $4x - 5 + 12x^2 + 3 - 9x - 6x^2$

(25) Write a simplified expression for the perimeter of this rectangle:



(26) Add  $(-9x^2 + 5x - 8) + (-3x^2 - 10x + 2)$

(27) Subtract  $(12x^2 - 7x + 3) - (-6x^2 + 5x - 2)$

(28) For the trinomial  $-x^2 - 8x + 5$ , list the:

- a) coefficients
- b) variables
- c) constant
- d) the degree of the polynomial

(29) Multiply

a)  $(-6x)(7x)$

b)  $(-2x^2 + 4)(3x)$

c)  $(-4x)(-9x^2 + 5x - 7)$

d)  $(x)(\frac{x}{3} - 2)$

e)  $(4xy)(-5x)$

f)  $(-3x^2y)(x + 2y)$

g)  $(\frac{3}{4}x)(2x - \frac{x}{2})$

(30) Divide

a)  $\frac{-56x}{8x}$

b)  $\frac{-18x^2}{-2x}$

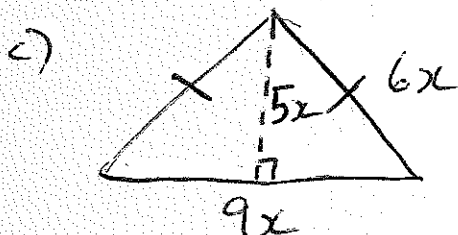
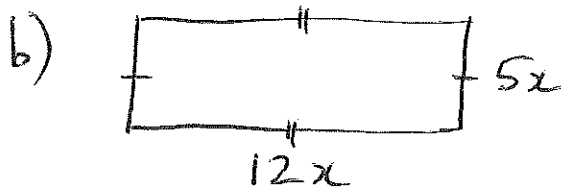
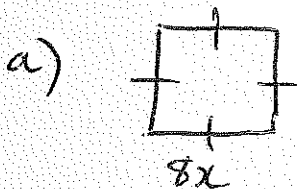
c)  $\frac{48x^2 + 24x}{3x}$

d)  $\frac{-55x^2 - 35x - 15}{-5}$

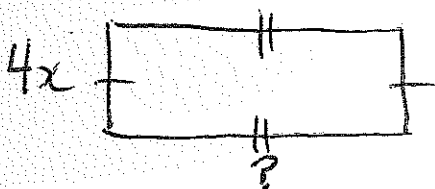
e)  $\frac{-32x^2y}{4xy}$

f)  $\frac{-16x^2y^2 - 8xy}{2x}$

(31) Write the simplified expression for the AREA of each shape:



(32) Write the expression for the length of each shape given the area:



Area =  $28x^2 - 16x$

b) ?  Area =  $7x^2 + 21x$

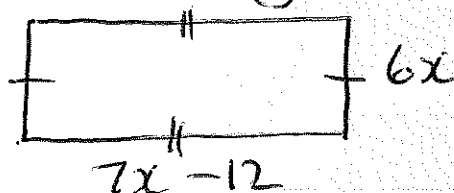
33) Use Algebra tiles to model  $(x)(x+2)$

34) Use Algebra tiles to model  $(-3x)(x+1)$

35) Use Algebra tiles to model  $\frac{-8x^2}{2x}$

36) Use Algebra tiles to model  $\frac{-9x^2 - 6x}{-3x}$

37) Write a simplified expression for the area of this rectangle:

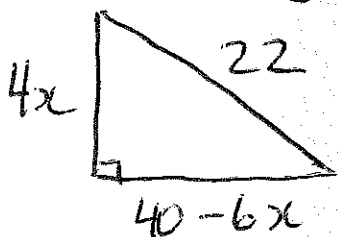


38) The length of a rectangle is 12 more than 3 times the width:

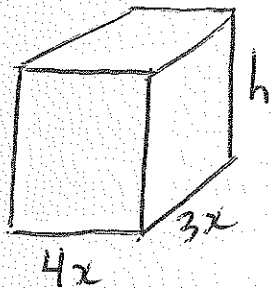
a) Write an expression for the AREA.

b) Write an expression for the PERIMETER

39) Write a simplified expression for the area of this triangle:



(40)



The volume of this rectangular prism is  $12x^3 + 36x^2$ .

Write an expression for the height.

(\*) SOLVING EQUATIONS / PATTERNS / GRAPHING EQUATIONS

(41) Solve these equations :

a)  $\frac{3x}{4} + 6 = -12$

b)  $-5(4y + 2) = -8$

c)  $\frac{4}{5} - 3x = -\frac{2}{3}$

d)  $\frac{2x-1}{4} = \frac{5x-4}{8}$

e)  $4(6x-3) = 2(3x+18)$

f)  $\frac{4}{5}(x+2) = \frac{2}{3}(x-6)$

(42) If you take 5 away from a number and then double it, the answer is 80. What is the number? Write an equation and solve.

(43) Mike, Barry and Joe collect model cars. Mike has 4 more than 5 times what Barry has. Joe has 3 less than Barry. They have 50 model cars altogether. How many does Mike have?

(44)

Figure #	1	2	3	4	5
# of Squares	5	13	21	29	37

a) Write an equation that represents the relationship between the Figure # and the # of squares.

b) Use your equation to calculate how many squares are in Figure 35.

(45) 

$x$	0	3	6	9	12
$y$	2	17	32	47	62

 Write an equation to describe the relation between  $x$  and  $y$ .

(46) a) Graph the equation  $y = 12x + 25$  by completing this table of values:

$x$	0	2	4	6	8
$y$					

b) Use the graph to interpolate the value of  $y$  when  $x$  is 7

c) Use the graph to extrapolate the value of  $x$  when  $y = 205$

### (\*) INEQUALITIES

(47) Represent these inequalities graphically on a number line

- a)  $x > -1$       b)  $x \leq 6$       c)  $x \neq 5$   
 d)  $-2 < x \leq 6$

(47) Solve these inequalities

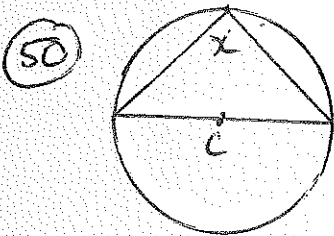
- a)  $4x \leq 28$       b)  $-5x > 30$       c)  $\frac{x}{-4} + 5 \leq -2$   
 d)  $-x + 1 \geq 5$       e)  $-2x + 10 < -8$   
 f)  $3(5x - 4) > 4(6x + 1)$

(48) Sophia needs to save \$2500 for her high school trip to Rome. She already has \$350 but she will save \$150 per week working at the Half Moon Restaurant. How many weeks will she need to work to be able to pay for her trip? Write an inequality and solve. Interpret the solution.

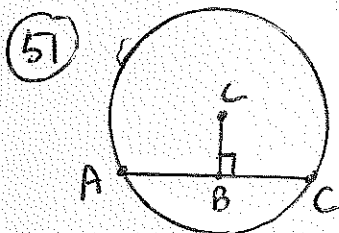


(49) Stephanie likes to download music from a website that charges \$24 per month plus \$1.25 per download. She wants to spend no more than \$170 which is all that she has saved. How many songs can she download that month so she stays within her budget?

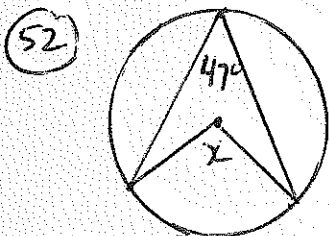
(X) CIRCLES



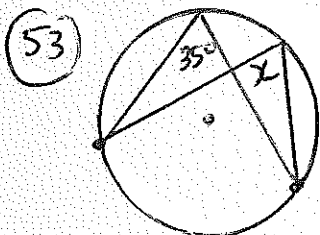
What is the measure of angle  $x$ ?



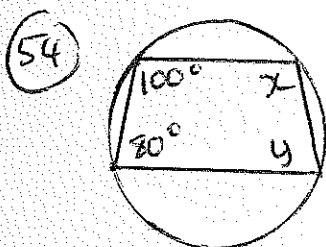
If  $AC$  is 18 cm, how long is  $AB$ ?



What is the measure of angle  $x$ ?

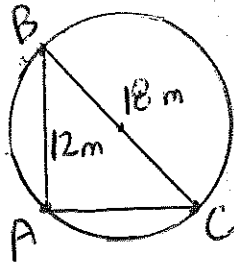


What is the measure of angle  $x$ ?



What is the measure of angles  $x$  and  $y$ ?

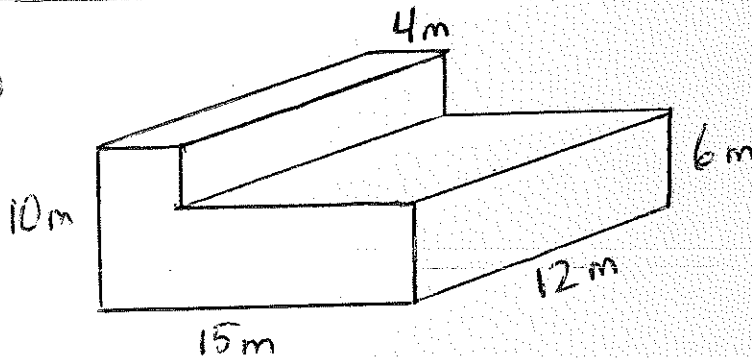
(55)



BC is the diameter of the circle  
 What is the length of chord AC?

(\*) SURFACE AREA

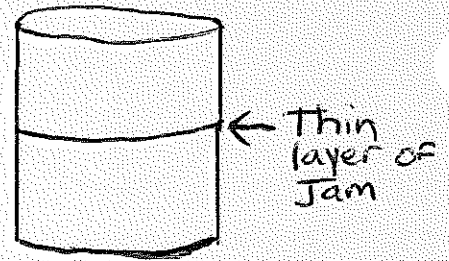
(56)



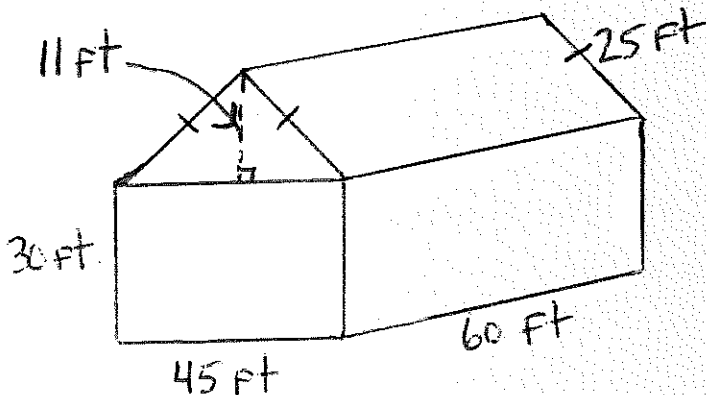
Calculate the surface area of this figure

(57)

Daniel bakes 2 cylindrical cakes. Each cake has a diameter of 30 cm and a height of 8 cm. He stacks them together with a thin layer of jam between them. How much icing will Daniel need to ice the top and sides of the cake?

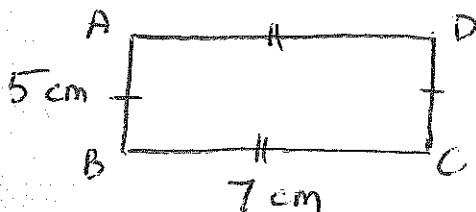


(58) Calculate the surface area of this building. (don't count the floor).

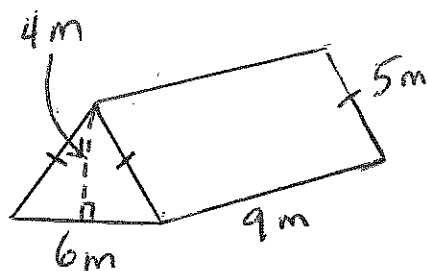


## (\*) SCALE and SIMILARITY

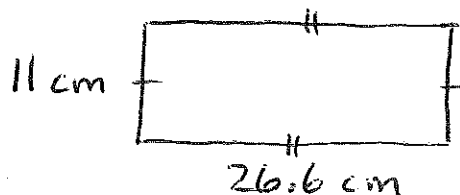
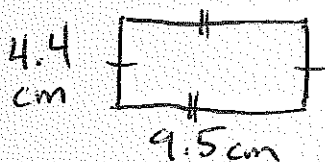
- (59) Rectangle ABCD is enlarged by a scale factor of 6. What is the perimeter of the new rectangle



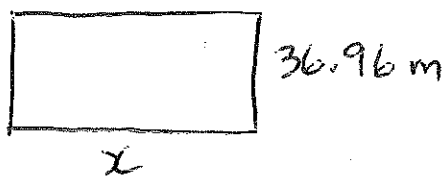
- (60) This triangle Prism will be enlarged so that every dimension is tripled. Calculate the volume of the new prism.



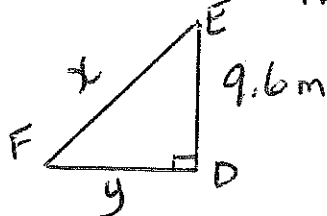
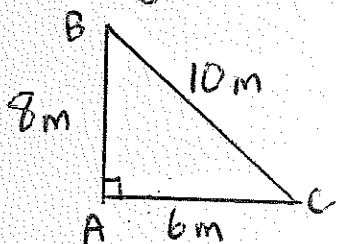
- (61) Are these rectangles similar?



- (62) IF the 2 rectangles below are similar, what is the length of  $x$ ?



- (72) Triangle ABC  $\sim$  Triangle DEF. How long is  $x$ ?  
How long is  $y$ ?



(73) Tim has a square painting that is  $6400 \text{ cm}^2$ . He wants to create a new painting that is half as long as this original. What is the area of this new painting.

(74) How many lines of Symmetry does a square have?

- (75)
- What is the order of rotation of the letter X?
  - What is the angle of rotation of the letter X?
  - What is the angle and order of rotation of the capital letter A?