

# Final Exam Review

Name: \_\_\_\_\_

## 7<sup>th</sup> Grade Math

1) Simplify.

a.  $-12 + 20$   
 $\boxed{8}$

b.  $10 - 4$   
 $\boxed{14}$

c.  $-40 + -23$   
 $\boxed{-63}$

d.  $9 \div -3$   
 $\boxed{-3}$

e.  $(-5)^2$   
 $-5 \cdot -5 = \boxed{25}$

f.  $-3^2$   
 $-3 \cdot 3 = \boxed{-9}$

g.  $-8 - a$   
 if  $a = -8$   
 $-8 - (-8) = \boxed{0}$

h.  $10 - a$   
 if  $a = -12$   
 $10 - (-12) = \boxed{22}$

i.  $-a + -6$   
 if  $a = -11$   
 $-(-11) + -6 = \boxed{5}$

j.  $-4 - a$   
 if  $a = |4|$   
 $-4 - |4| = \boxed{-8}$

k.  $-10 \cdot a$   
 if  $a = |-5|$   
 $-10 \cdot |-5| = \boxed{-50}$

l.  $-3 \cdot a$   
 if  $a = -|3|$   
 $-3 \cdot -|3| = \boxed{9}$

2) Which is greater?

a.  $\frac{5}{8}$  or  $\boxed{0.7}$   
 $0.625$  or  $0.7$

b.  $-0.3$  or  $\boxed{-\frac{1}{4}}$   
 $-0.25$

$8 \overline{) 5.0}$   
 $\underline{-48}$   
 $20$   
 $\underline{-16}$   
 $40$

$4 \overline{) 1.00}$   
 $\underline{-80}$   
 $20$   
 $\underline{-20}$   
 $0$

3) Compute each of the following...

a.  $4\frac{1}{2} - 3\frac{6}{7}$   
 $\frac{9}{2} - \frac{27}{7}$   
 $\frac{63}{14} - \frac{54}{14} = \boxed{\frac{9}{14}}$

b.  $5 \cdot -3\frac{2}{5}$   
 $\frac{5}{1} \cdot \frac{-17}{5} = \frac{-17}{1} = \boxed{-17}$

c.  $\frac{443}{54} - \frac{3}{4.5}$   
 $\frac{16}{20} - \frac{15}{20} = \frac{-31}{20} = \boxed{-\frac{11}{20}}$

d.  $-4\frac{1}{2} \div -3\frac{6}{7}$

$\frac{-9}{2} \div \frac{27}{7}$   
 $\frac{-9}{2} \cdot \frac{7}{27} = \frac{-7}{6}$   
 $\boxed{-\frac{1}{6}}$

e.  $\frac{4}{5} - 1\frac{2}{3}$

$\frac{4}{5} - \frac{5}{3}$   
 $\frac{12}{15} - \frac{25}{15} = \frac{-13}{15}$   
 $\boxed{-\frac{13}{15}}$

f.  $-1\frac{1}{3} + 3\frac{3}{4}$

$-\frac{4}{3} + \frac{15}{4}$   
 $-\frac{16}{12} + \frac{45}{12} = \frac{29}{12}$   
 $\boxed{2\frac{5}{12}}$

4) Mr Cravatta's truck gets 18 miles/gallon and he has  $5\frac{5}{9}$  gallons of gas in his tank. How far can he drive?

$18 \cdot 5\frac{5}{9}$   
 $2 \frac{18}{1} \cdot \frac{50}{9} = \frac{100}{1} = \boxed{100 \text{ miles}}$

5) Simplify the following

a.  $-3(x + 9) - 2 + 5x$

$-3x - 27 - 2 + 5x$   
 $\boxed{2x - 29}$

b.  $22x - 7 + -2(x - 5) + 13x$

$22x - 7 + -2x + 10 + 13x$   
 $\boxed{33x + 3}$

6) Solve the equations. Don't forget to SHOW ALL YOUR STEPS!

a.  $a - 6 = -21$

$\frac{+6}{+6} \quad \frac{+6}{+6}$   
 $\boxed{a = -14}$

b.  $-6 - d = 7$

$\frac{+6}{+6} \quad \frac{+6}{+6}$   
 $\frac{+6}{+6} \quad \frac{+6}{+6}$   
 $\boxed{d = -13}$

c.  $6f = -54$

$\frac{\div 6}{\div 6}$   
 $\boxed{f = -9}$

d.  $-7 = -\frac{g}{2} \cdot -2$

$\boxed{14 = g}$

$$e. \quad \begin{array}{r} -2 = \frac{3}{4}n - 6 \\ +6 \quad +6 \end{array}$$

$$\frac{4}{3} \cdot 4 = \frac{3}{4}n \cdot \frac{4}{3}$$

$$\frac{16}{3} = n$$

$$\boxed{\frac{16}{3} = n}$$

$$f. \quad 3k - 7 = 16$$

$$+7 \quad +7$$

$$\frac{3k}{3} = \frac{23}{3}$$

$$\boxed{k = 7\frac{2}{3}}$$

$$g. \quad 2m + 12 + 6m = -4$$

$$\begin{array}{r} 8m + 12 = -4 \\ -12 \quad -12 \end{array}$$

$$\frac{8m}{8} = \frac{-16}{8}$$

$$\boxed{m = -2}$$

$$h. \quad -2(3x + 6) = 5$$

$$\begin{array}{r} -6x - 12 = 5 \\ +12 \quad +12 \end{array}$$

$$\frac{-6x}{-6} = \frac{17}{-6}$$

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

$$i. \quad 4x - (x - 6) = 30$$

$$4x - x + 6 = 30$$

$$\begin{array}{r} 3x + 6 = 30 \\ -6 \quad -6 \end{array}$$

$$\frac{3x}{3} = \frac{24}{3}$$

$$\boxed{x = 8}$$

$$j. \quad 4x - 1 = 6x - 5$$

$$\begin{array}{r} -4x \quad -4x \end{array}$$

$$\begin{array}{r} -1 = 2x - 5 \\ +5 \quad +5 \end{array}$$

$$\frac{4}{2} = \frac{2x}{2}$$

$$\boxed{2 = x}$$

7) Determine whether each number is a solution of the given inequality.

$$2z + 1 \geq -5$$

a. -4 No

$$2(-4) + 1 \geq -5$$

$$-8 + 1 \geq -5$$

$$-7 \not\geq -5$$

b. 2 Yes

$$2(-2) + 1 \geq -5$$

$$-4 + 1 \geq -5$$

$$-3 \geq -5$$

c. 4

$$2(4) + 1 \geq -5$$

$$8 + 1 \geq -5$$

$$9 \geq -5$$

8) Write an inequality to model the situation:

At least 35 students needed their schedule changed before school started.

$$x \geq 35$$

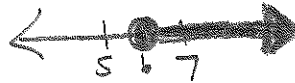
9) Write an inequality for the graph.



$$x < 4$$

10) Solve each inequality and graph the solution.

a. 
$$\begin{aligned} -5x + 12 &\leq -18 \\ -12 &\quad -12 \\ \hline -5x &\leq -30 \\ \frac{-5x}{-5} &\quad \frac{-30}{-5} \\ x &\geq 6 \end{aligned}$$



b. 
$$\begin{aligned} 16 - u &> 10 \\ -16 &\quad -16 \\ \hline -u &> -6 \\ \frac{-u}{-1} &\quad \frac{-6}{-1} \\ u &< 6 \end{aligned}$$



11) Convert to a percentage:

$$\begin{array}{r} .6625 \\ 80 \overline{) 53.0000} \\ \underline{-480} \phantom{00} \\ 500 \phantom{00} \\ \underline{-480} \phantom{00} \\ 200 \phantom{00} \\ \underline{-160} \phantom{00} \\ 400 \phantom{00} \\ \underline{-400} \phantom{00} \\ 0 \phantom{00} \end{array}$$

a.  $\frac{53}{80} = 0.6625$

$$66.25\%$$

$$\begin{array}{r} .6363 \\ 11 \overline{) 7.0000} \\ \underline{-66} \phantom{00} \\ 40 \phantom{00} \\ \underline{-33} \phantom{00} \\ 70 \phantom{00} \\ \underline{-66} \phantom{00} \\ 40 \phantom{00} \end{array}$$

b.  $\frac{7}{11} = 0.6363\dots$

$$63.\overline{63}\%$$

12) Solving Percent Problems.

a. How much is 45% of 70?

$$\frac{45}{100} \times \frac{x}{70}$$

$$\frac{100x}{100} = \frac{3150}{100}$$

$$x = 31.5$$

b. 67% of 20 is how much?

$$\frac{67}{100} \times \frac{x}{20}$$

$$\frac{100x}{100} = \frac{1340}{100}$$

$$x = 13.4$$

c. What percent of 45 is 5?

$$\frac{x}{100} \times \frac{5}{45}$$

$$\frac{45x}{45} = \frac{500}{45}$$

$$x = 11.1\%$$

d. 20 is what percent of 105?

$$\frac{x}{100} = \frac{20}{105}$$

$$\frac{105x}{105} = \frac{2000}{105}$$

$$x = 19.05$$

$$19.05\%$$

13) Calculate the percent increase or decrease.

a. 24 to 20

$$24 - 20 = 4$$

$$\frac{\text{change}}{\text{original}} = \frac{4}{24} = 0.1\bar{6} = \boxed{16.\bar{6}\% \text{ decrease}}$$

b. 56 to 78

$$78 - 56 = 22$$

$$\frac{\text{change}}{\text{original}} = \frac{22}{56} = .39 = \boxed{39\% \text{ increase}}$$

14) Jessica had \$500 in her savings account last month. This month, she has \$530. What is the percent increase?

$$530 - 500 = 30$$

$$\frac{\text{change}}{\text{original}} = \frac{30}{500} = 0.06 = \boxed{6\% \text{ increase}}$$

15) There is a sale at your favorite clothing store. Everything is 30% off! You pick out a shirt, a pair of jeans, and a belt. Your total is \$126 before the sale. When you get to the register, the salesperson asks you if you'd like to open up a store credit card for an additional 10% off. You agree.

a. What is your final cost (without tax)?

$$\begin{aligned} &70\% \text{ of } 126 \\ &.7 \times 126 \\ &= \$88.20 \end{aligned}$$

$$\begin{aligned} &90\% \text{ of } 88.20 \\ &.9 \times 88.20 \\ &= \boxed{\$79.38} \end{aligned}$$

b. If the tax rate is 6%, what is your final cost including tax?

$$\begin{aligned} &106\% \text{ of } 79.38 \\ &1.06 \times 79.38 \\ &= \boxed{\$84.14} \end{aligned}$$

16) Calculate the total balance for an initial investment of \$4,000 that grows with simple interest at a rate of 7% for 15 years.

$$I = prt$$

$$I = 4000 \cdot .07 \cdot 15$$

$$I = \$4200$$

$$4000 + 4200 = \boxed{\$8200}$$

17) A teacher counts tests as 60% of a student's final grade and homework as 40%. If a student has an average of 92% for tests and 76% on homework, what percent will the student receive for their final grade?

$$\begin{array}{r}
 \text{tests } 60\% \times 92\% = .552 \\
 \text{hw } 40\% \times 76\% = +.304 \\
 \hline
 .856 \\
 \hline
 \boxed{85.6\%}
 \end{array}$$

18) Calculate the following student's GPA.  
 (On a "4.0 scale" A = 4.0, B = 3.0, C = 2.0, D = 1.0)

College Algebra	3 credits	A- x 3.7 = 11.1	
Writing	3 credits	B x 3.0 = 9	
Humanities	2 credits	A x 4.0 = 8	
Biology	3 credits	A x 4.0 = 12	
Organic Chem.	4 credits	D+ x 1.3 = 5.2	
	<u>15 credits</u>	<u>45.3</u>	

$\frac{45.3}{15} = \boxed{3.02 \text{ GPA}}$

19) Find the greatest possible error for each measurement below.

- a. 14.2 ft    .05                      b. 3.00 cm    .005

20) Find the percent error for each measurement below.

a. 0.0045 g                      b. 13.11 m

$$\frac{.00005}{.0045} = .01 \quad \boxed{1.7\%}$$

$$\frac{.005}{13.11} = .00038139 \quad \boxed{.04\%}$$

21) Tell whether each of the following pairs of ratios form a proportion. Justify your answer with work!

a.  $\frac{3}{5} \neq \frac{7}{9}$

$27 \neq 35$

No this is not a proportion.

b.  $\frac{5}{20} = \frac{2}{8}$

$40 = 40$

Yes this is a proportion.

22) Solve each of the following proportions.

a.  $\frac{7}{12} = \frac{x}{11}$

$$\frac{77}{12} = \frac{12x}{12}$$

$$6.4 = x$$

b.  $\frac{4}{x} = \frac{7}{8}$

$$\frac{32}{7} = \frac{7x}{7}$$

$$4.6 = x$$

c.  $\frac{x+1}{3} = \frac{x-4}{2}$

$$2(x+1) = 3(x-4)$$

$$2x + 2 = 3x - 12$$

$$-2x \quad -2x$$

$$2 = x - 12$$

$$+12 \quad +12$$

$$14 = x$$

23) In 2004, Kobayashi (the famous hot dog eater) ate 54 hot dogs in 12 minutes (a new world record). At this rate, how many hot dogs could he eat in 15 minutes? Round to the nearest hot dog.

$$\frac{54 \text{ hd}}{12 \text{ min}} = \frac{x}{15 \text{ min}}$$

$$12x = 810$$

$$\frac{12x}{12} = \frac{810}{12}$$

$$x = 67.5 \text{ hd}$$

$$68 \text{ hot dogs}$$

24) Store A is selling 10 rolls of toilet paper for \$5.50, while store B is selling 32 rolls for \$17.00. Show a unit rate for each store and determine which store has the better deal?

A

$$\frac{10 \text{ rolls}}{\$5.50} = \frac{1.82 \text{ rolls}}{\$}$$

B

$$\frac{32 \text{ rolls}}{\$17.00} = \frac{1.88 \text{ rolls}}{\$}$$

Store B is the better deal.

25) Convert the following units using the information provided below. Show work!

2.21 lbs = 1 kg

1,000 g = 1 kg

1 mile = 5,280 ft

a. How many miles is 17,200 ft?

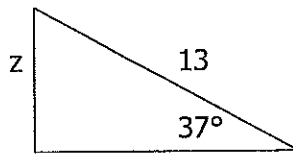
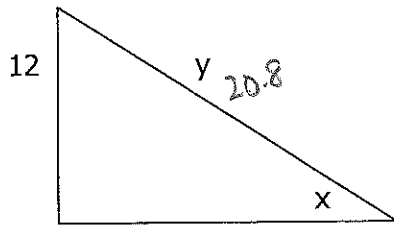
b. 24 lbs = \_\_\_\_\_ g

$$\frac{17,200 \text{ ft}}{1} \cdot \frac{1 \text{ mile}}{5,280 \text{ ft}} = \frac{17,200}{5,280}$$

$$= 3.26 \text{ miles}$$

$$\frac{24 \text{ lbs}}{1} \cdot \frac{1 \text{ kg}}{2.21 \text{ lbs}} \cdot \frac{1,000 \text{ g}}{1 \text{ kg}} = \frac{24,000}{2.21} = 10,859.7 \text{ grams}$$

26) The triangles are similar. Find  $x$ ,  $y$  and  $z$ .



$$\begin{aligned} x &= 37^\circ \\ y &= 20.8 \\ z &= 7.5 \end{aligned}$$

$$\frac{y}{13} \neq \frac{16}{10}$$

$$\begin{aligned} \frac{10y}{10} &= \frac{208}{10} \\ y &= 20.8 \end{aligned}$$

$$\frac{z}{12} \neq \frac{10}{16}$$

$$\begin{aligned} \frac{16z}{16} &= \frac{120}{16} \\ z &= 7.5 \end{aligned}$$

27) Mrs Hodges graded the following test scores in her class: ~~94~~, 80, ~~78~~, ~~83~~, ~~95~~, ~~82~~, ~~68~~, ~~85~~, 78, ~~66~~, ~~90~~, ~~74~~, ~~55~~

a) Find the mean score on the test

$$\begin{aligned} 94 + 80 + 78 + 82 + 95 + 82 + 68 + 85 + 78 + 66 + 90 + 74 + 55 \\ = 1028 \\ \frac{1028}{13} = \boxed{79.08} \end{aligned}$$

b) Find the median score on the test

$$\begin{aligned} \cancel{55}, \cancel{66}, \cancel{68}, \cancel{74}, \cancel{78}, \cancel{78}, \boxed{80}, \cancel{82}, \cancel{83}, \cancel{85}, \cancel{90}, \cancel{94}, \cancel{95} \\ \boxed{80} \end{aligned}$$

c) Find the mode(s)

$$\boxed{78}$$

d) Find the range

$$95 - 55 = \boxed{40}$$

e) Which of the above is the best way to represent this data (the best measure of central tendency)? WHY?

Mean because there are no outliers.

28) Anthony scores 8, 8, 5, 8, 7, 10, 7, 9 and 6 points in his first 9 basketball games. In order to average 10 points for the season, how many points will he have to score in his 10<sup>th</sup> game?

$$\frac{8 + 8 + 5 + 8 + 7 + 10 + 7 + 9 + 6 + x}{10} = 10 \cdot 10$$

$$8 + 8 + 5 + 8 + 7 + 10 + 7 + 9 + 6 + x = 100$$

$$\begin{aligned} 68 + x &= 100 \\ -68 & \\ \hline \end{aligned}$$

$$\boxed{x = 32 \text{ points}}$$



29) You decide you want to find out how many deer are in your woods in your back yard. You tag 345 deer and release them back in the wild. A year later, you collect a sample of 980 deer, 120 of which are tagged. Estimate the total deer population in that area.

$$\frac{120}{980} = \frac{345}{x}$$

$$\frac{120x}{120} = \frac{338,100}{120}$$

$$x = 2817.5 \text{ deer}$$

30) In a new board game, players have to roll a fair, six sided die and flip a coin.

a. What is the probability that a player will roll the #1 and flip tails in the same turn?

$$\frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12} = 8.\bar{3}\%$$

b. What is the probability that a player will roll an even number and flip heads in the same turn?

$$\frac{3}{6} \cdot \frac{1}{2} = \frac{3}{12} = \frac{1}{4} = 25\%$$

31) On the last test, there were 3 A's, 6 B's, 3 C's, 2 D's, and 2 F's. If I grab one test at random, what is the probability I will grab an A or B?

$$\frac{3}{16} = 18.75\%$$

32) A container initially contains 18 titles for a game of charades: 8 movie titles, 3 book titles, 4 TV shows, and 3 plays. Titles are not replaced once used.  $8+3+4+3 = 18$

a. What is the probability that Susan draws a book title, Ted draws a movie title, and Ann randomly selects a movie title in that order?

$$\frac{3}{18} \cdot \frac{8}{17} \cdot \frac{7}{16} = \frac{7}{204} = 3.4\%$$

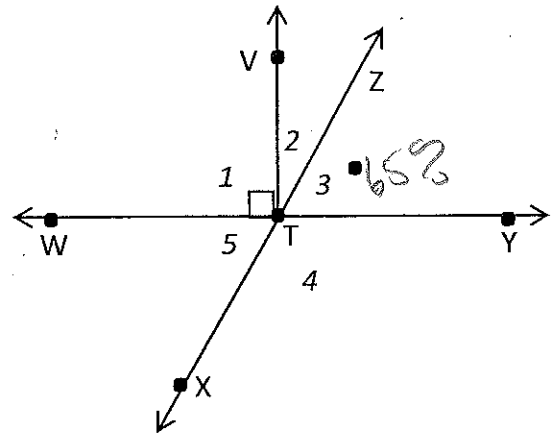
33) If I flip a coin 6 times, find the probability that they all will land on heads.

$$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{64} = 1.6\%$$

34) You have 3 pairs of red socks, 2 pairs of green socks, and 7 pairs of white socks. What is the probability of pulling out one red pair and then pulling out one white pair without replacement?

$$\frac{3}{12} \cdot \frac{7}{11} = \frac{7}{44} = 16\%$$

35) Use the picture to the right to answer the following:



- a) What angle is complementary to  $\angle 2$ ?  $\angle 3$
- b) What angle is vertical to  $\angle 5$ ?  $\angle 3$
- c) What angle is supplementary to  $\angle 3$ ?  $\angle 4$
- d) What 2 angles are adjacent to  $\angle 5$ ?  $\angle 1$  and  $\angle 4$
- e) What angle is complementary to  $\angle 5$ ?  $\angle 2$
- f) What angle is vertical to  $\angle 4$ ?  $\angle WTX$

$m\angle 3 = 65^\circ$ . Write  $65^\circ$  in the picture and use it to answer the following questions. DO NOT use a protractor!

g) What is  $m\angle 1$ ?

$$\boxed{90^\circ}$$

h) What is  $m\angle 2$ ?

$$\frac{90^\circ - 65^\circ}{25^\circ} \quad \boxed{25^\circ}$$

i) What is  $m\angle 4$ ?

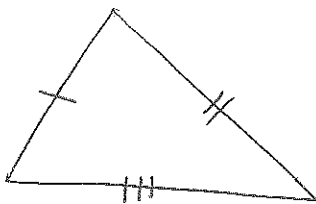
$$\frac{180^\circ - 65^\circ}{115^\circ} \quad \boxed{115^\circ}$$

j) What is  $m\angle 5$ ?

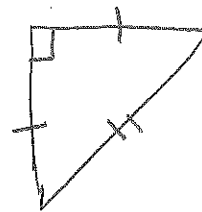
$$\boxed{65^\circ}$$

36) Sketch the following triangles. Use hash marks on the triangle's sides to show if they are congruent or not.

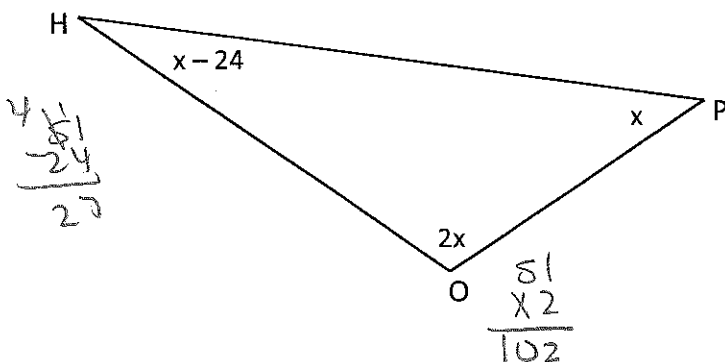
a) acute and scalene



b) right and isosceles



37) Find "x" and the missing angles.



$$x - 24 + x + 2x = 180$$

$$4x - 24 = 180$$

$$+24 \quad +24$$

$$\frac{4x = 204}{4 \quad 4}$$

$$x = 51^\circ$$

$$x = \underline{51^\circ}$$

$$m\angle H = \underline{27^\circ}$$

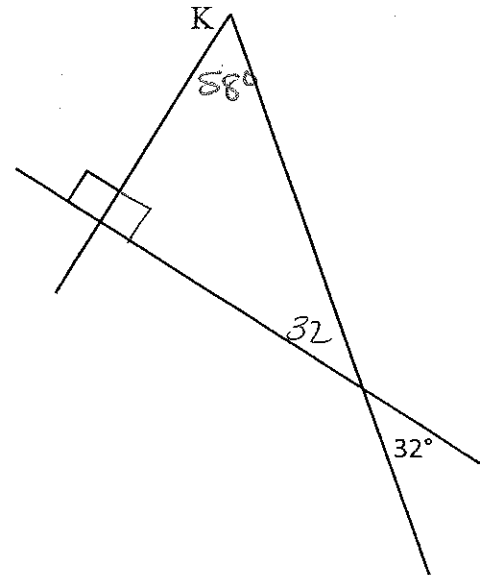
$$m\angle O = \underline{102^\circ}$$

$$m\angle P = \underline{51^\circ}$$

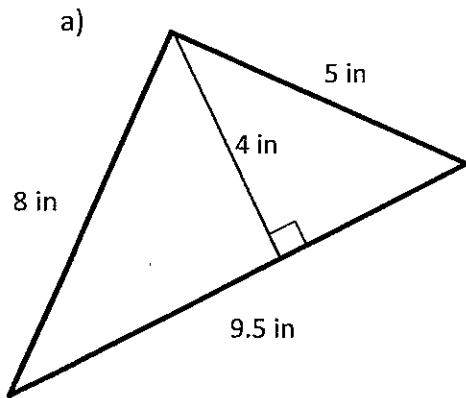
38) Using the picture to the right, find  $m\angle K$

$$\begin{array}{r} 90 \\ + 32 \\ \hline 122 \end{array}$$

$$\begin{array}{r} 7 \\ 180 \\ - 122 \\ \hline 58^\circ \end{array}$$



39) Find the area and perimeter of the following triangles.



Area

$$\frac{1}{2} b \cdot h$$

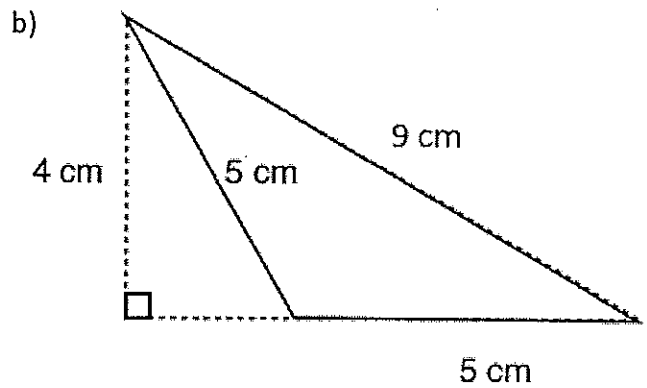
$$\frac{1}{2} \cdot 9.5 \cdot 4$$

$$19 \text{ in}^2$$

Perimeter

$$9.5 + 5 + 8$$

$$22.5 \text{ in}$$



Area

$$\frac{1}{2} \cdot 5 \cdot 4$$

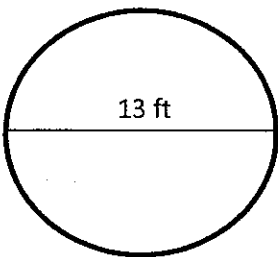
$$10 \text{ cm}^2$$

Perimeter

$$5 + 5 + 9$$

$$19 \text{ cm}$$

40) Find the area and circumference of the circle.



Area

$$A = \pi r^2$$

$$A = 3.14 \cdot 6.5 \cdot 6.5$$

$$A = 132.665 \text{ ft}^2$$

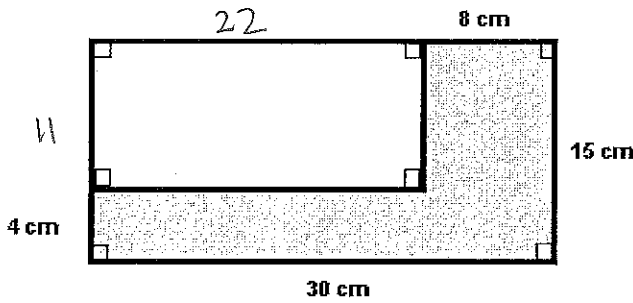
Circumference

$$C = 2\pi r$$

$$C = 2 \cdot 3.14 \cdot 6.5$$

$$C = 40.82 \text{ ft}$$

41) Find the area of the shaded region.



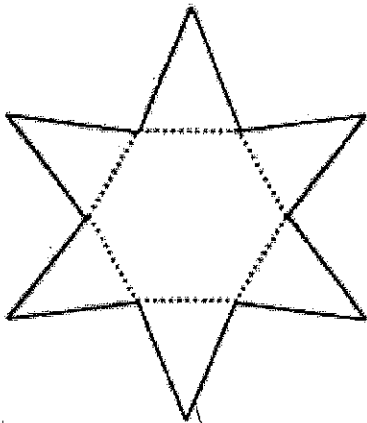
BIG  
 $15 \cdot 30 = 450$

SMALL  
 $11 \cdot 22 = 242$

$450$   
 $- 242$   
 $\hline 208 \text{ cm}^2$

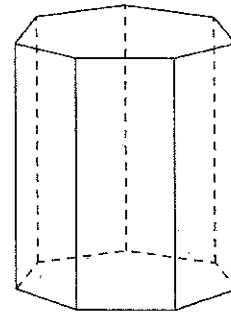
42) Name the following figures

a)



hexagonal pyramid

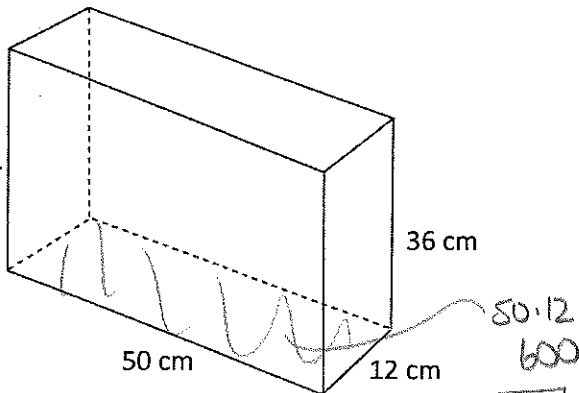
b)



heptagonal prism

43) Find the **surface area** AND **volume** of the following shapes. Show all of your work and include units with your answer!

a)



SA

TB

$50 \cdot 12$   
 $600$

LR

$12 \cdot 36$   
 $432$

FB

$50 \cdot 36$   
 $1800$

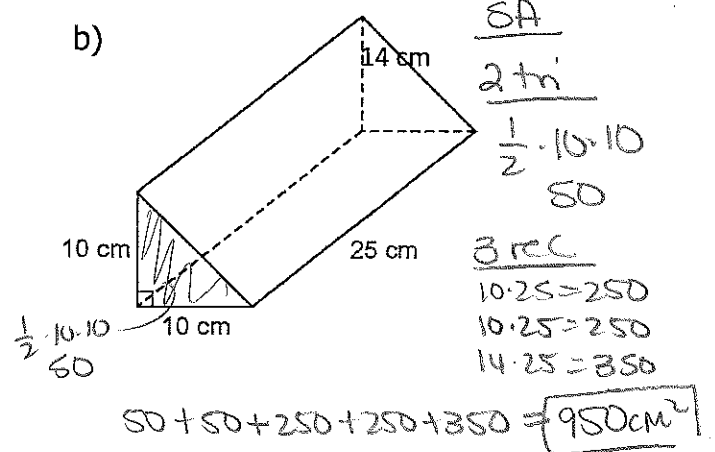
$600 + 600 + 432 + 432 + 1800 + 1800 = 5664 \text{ cm}^2$

Volume

$\text{Aof B} \cdot h$

$600 \cdot 36 = 21,600 \text{ cm}^3$

b)



SA

2 tri

$\frac{1}{2} \cdot 10 \cdot 10$   
 $50$

3 rec

$10 \cdot 25 = 250$   
 $10 \cdot 25 = 250$   
 $14 \cdot 25 = 350$

$50 + 50 + 250 + 250 + 350 = 950 \text{ cm}^2$

Volume

$\text{Aof B} \cdot h$

$50 \cdot 25 = 1250 \text{ cm}^3$