TSI Math Test Study Guide

P-TECH

Hightower High School

2023

1. Summary of key skills

This is a summary of 16 skills needed for TSI test preparation. Please make sure you understand the example and explanation thoroughly.

1. **Calculate Sales price**

Key point: You will need to understand the concept of taking a certain percentage off, and/or taking a certain amount of dollars off. Calculate the sales price. It could be a combination of both, like the example below.

Original price is $10, taking 10% off, sales price = 10x(1-10%)=9 (dollars)

Original price is $10, taking $2 off, sales price = 10-2=8 (dollars)

Original price is $10, taking 10% off, then use a coupon of $5,

sales price=10x(1-10%)-5=4(dollars)

Example: A shirt is on sale for 15 percent off the original price of x dollars, if a customer has a coupon for 5 dollars off the sales price. Which of the following represents the price, in dollars, the customer will pay, before tax, for the shirt?

A, 0.15x-5 C, 0.85(x-5)

B, 0.85x-5 D, 5-0.85x

For this example, there are two discounts applied, first use percentage off, then take $5 off on the discounted price. The final price will be x(1-15%)-5=0.85x-5

Answer: b

2. **Calculate the unit number (speed, rate) first, then calculate the amount**

Key point: For this kind of question, given two situations, you must see there is a rate or unit number remain no change, you will need to calculate this rate or unit number first, then calculate the amount by use the total/unit number

Example: it takes Bert 30 minutes longer to mow a rectangular lawn that measures 30 feet by 25 feet than it takes him to mow a rectangular lawn that measures 20 feet by 15 feet. If he mows the two lawns at the same rate per square foot, how long does it take him to mow both lawns?

A, 50 minutes C, 60 minutes

B, 70 minutes D, 80 minutes

It gives you the time difference mowing two different size lawn, the mowing speed is not changed. pay attention of the wording:" if he mows the two lawns at the same rate/square foot" to calculate time needed to mow both lawns, you need to calculate:

1. Mowing speed or rate per square foot --S
2. Total area needed to mow – A=length x width
3. Time needed to mow – Time=A/S

Time needed to mow30x25 lawn: $\frac{30x25}{S}$ Time needed to mow20x15 lawn: $\frac{20x15}{S}$

30x25/s-20x15/s=30 (mowing the bigger size need 30 min more than mowing the small size)

450/S=30 S=150 sq ft/min

Total area to mow: 30x25+20x15=750+300=1050 sq ft

Time needed= total area/speed 1050/150=70 minutes

Answer: b

3. **Identify Graph for a function**

Key point: you need to be familiar with all the standard functions and its graph. E.g. linear, quadratic, exponential……you also need to know how to identify a graph.

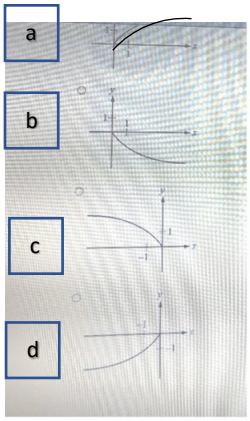
First you observe the function, find the domain and range of this function. You can eliminate some choices by doing this.

Second, you can throw in some numbers of x, to calculate y, you will use the numbers easy to calculate.

Below example, you can see domain x can only be x>=0, range y will be <=0. You can choose the right graph by figuring out domain x and range y. You can throw in x=0 , 4, 16 to verify the answer of y.

Example: which of the following could be the graph of $y=-\sqrt{x}$

Answer:b



4. **Key concepts like Average, Range, Median, Mode….**

Key point:

Range: highest number-lowest number

Median: rank the numbers from small to large, the one in the middle is the median, if the total number is even, use the average of the two numbers in the middle

Average (also called Mean): dividing the total of all the values by the number of values

Mode: the number appear the most frequently

Example1: The following are Nancy's scores on 5 math practices, 390,420,510,440,490

What is the range of her scores?

A, 100 C, 120

B, 440 D, 2250

Range equals to use the biggest number subtract the smallest number 510-390=120, Answer is c

Example2:

From below the list of used truck prices, what is the median price of the truck?

2004 chevrolet truck	$12,500
2005 Toyota truck	$14,000
2004 Ford truck	$13,500

2006 Dodge truck $13,000

2002 Mazda truck $87,00

A $12,000 B$12,340 C:$13,000 D $13,500

In order to get the median, you rank the numbers from smallest to biggest

8,700 12,500 13,000 13,500 14,000

Then you find the one in the middle is 13,000, so the answer is c

Example3:

The average of 3 numbers is 15, the average of 6 other numbers is 12, what is the average of all 9 numbers?

A 11 B 12 C: 13 D 15

Since the average of 3 number is 15, the total of these 3 numbers are 45

Since the average of 6 number is 12, the total of these 6numbers are 72

So the total of these 9 numbers is 45+72=117, so the average of these 9 numbers is 117/9=13

The answer is c

5. Factoring

Key point: You will need to know how to factoring. The question may not use x,y. they may use unfamiliar letters in the equations

You must be proficient in factoring to receive the point. You will need to verify your result, by multiply the factors.

Example 1: which of the following is a factor of $u^2+uv-2v^2$

A, (u-v) C,(2u-v)

B, (u-2v) D, (u+v)

$u^2+uv-2v^2=(u+2v)(u-v)$

Answer is A

Example 2: which of the following is a factor of $5y^2+7y-6$

A, (5y-3) C,(5y+2)

B, (y-2) D, (y+3)

How to factor?

For a standard quadratic equation ax^2+bx+c, find a,b,c a=5,b=7,c=-6

Ac=5*(-6)=-30

Split -30 to pair factors, out of the 3 pairs, likely 3 and 10 will make it to b number which is 7.

2	15
3	10
5	6

You will need -3 +10 to make it 7, and -3 x 10 = -30,

Now you will write the box as below, then you can find the factors outside

Of the box

	5y	-3
y	$5y^2$	-3y
2	10y	-6

So your factors are (5y-3)(y+2)

The answer is a

Example 3: $\mathbf{r}^2 - t^2 =$

a r(r-t) c (r-t)(r+t)

b rt(r-t) d $(r-t)^2$

There are several equations you will need to know to quickly solve this, you can also do it backwards from the choices a b d c to see which one could make the question equation valid.

You need to know below formulars by heart, to do some of the questions quickly

$\mathbf{a}^2 - b^2 = (a+b)(a-b)$

$(a+b)^2 = \mathbf{a}^2 + 2ab + b^2$

$(a-b)^2 = \mathbf{a}^2 - 2ab + b^2$

6. Basic geometry concepts

Key points: angles for straight line -180 degree, angle for a circle – 360 degree

Area of rectangle axb (length - a; width - b)

Area of triangle, circle, trapezoid

Perimeter of rectangle 2(a+b), circle

Volume of a box

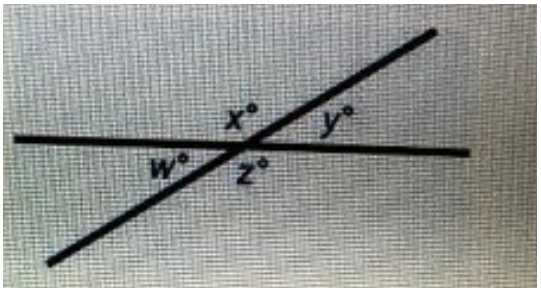
Be very careful what the question asks!!!! They may ask something special, read carefully!

Sometimes you may have to eliminate one answer doesn't comply with the real world question

Example1:

In the figure, what is the average (arithmetic mean) of x, y, w and z

A 90 B 100 C: 120 D it can't be determined from the information given

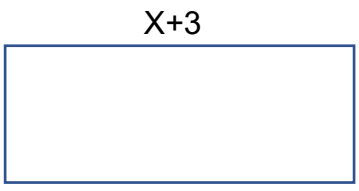


Because the total angle of x,y,w,z are 360degree, the average will be 360/4=90

Example2:

The expressions x-2 and x+3 represent the length and width of a rectangle, respectively. If the area of rectangle is 24, what is the perimeter of the rectangle?

A 20 B 22 C 24 C 28



After draw a diagram you can write:

(x+3)(x-2)=24 calculate x=5

Eliminate the negative number

Perimeter: (x+3+x-2)x2

=(8+3)x2 =22

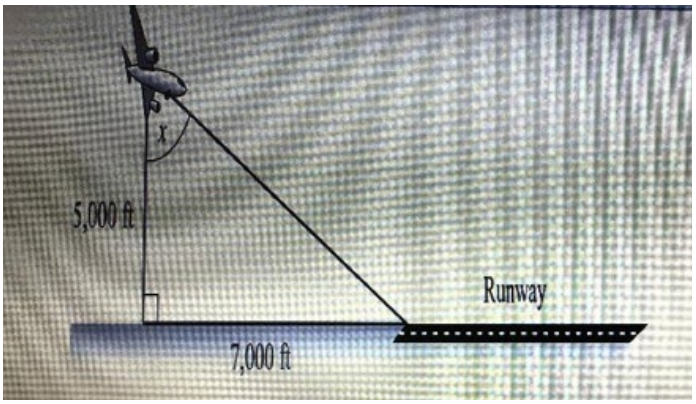
The answer is B

7. Basic trigonometric

Key points: sin, cos, tan, cot (SOH CAH TOA)

You need to understand the formular of all above trigonometry.

Example: an airplane is 5,000ft above ground and has to land on a runway that is 7,000 ft away as shown above . let x be the angle the pilot takes to land the airplane at the beginning of the runway. Which equation is a correct way to calculate x?



A sinx=5,000/,7000

B sinx=7,000/5,000

C tanx=5,000/7,000

D tanx=7,000/5,000

For angle x, you can easily tell tan x, the answer is D

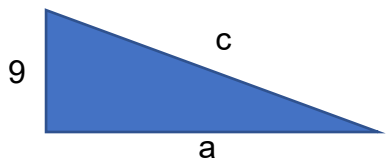
8. Simplify equation

Key points: you must know some of the basic simplification.

9. Pythagorean theorem

Kay point: $a^2+b^2=c^2$

Example: in the triangle , if c=12, what is the value of a ?



A 3

B: 9

C: $3\sqrt{7}$

D $9\sqrt{7}$

We can see $a^2+9^2=c^2$, in this question, you have to know how to solve the square root with a simple number

$a^2+81=12^2$

$a^2+81=144$

$a^2=63$ $a=\sqrt{63}$ (a won't be the negative number, so only keep the positive root)

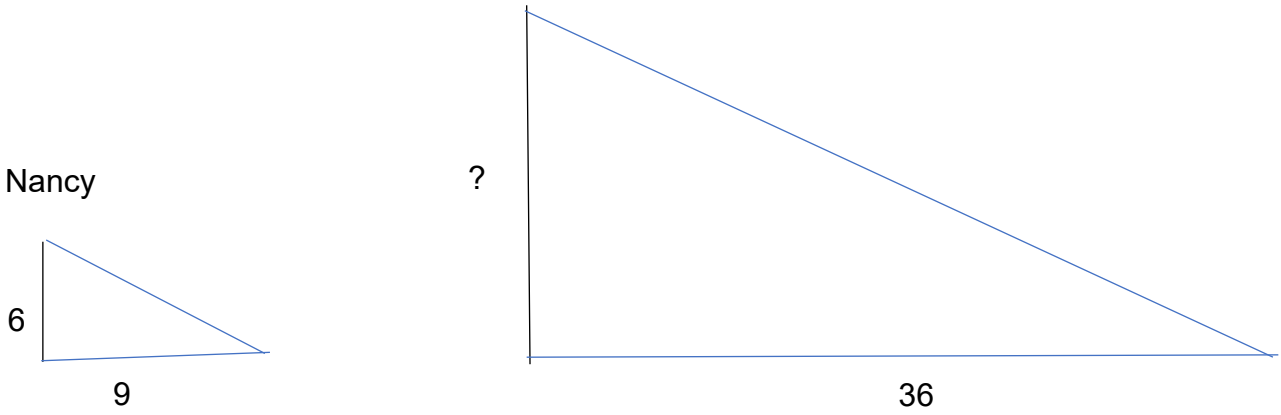
$a=\sqrt{3\ 3\ 7}=3\sqrt{7}$

10. <u>Similar triangle</u>

You need to know how to use the character of similar triangle to calculate the needed length.

Example: Nancy is 6 feet tall and cast a 9-foot shadow. If a flagpole next to him, casts a shadow that is 36 feet long. How tall is the flagpole?

A 12 feet B 24 feet C 33 feet D 54 feet



Because the Nancy and the flagpole are together, the angles will be the same, so you are looking at two similar triangle, so you know that,

$\frac{6}{9} = \frac{x}{36}$ use cross multiple you get x= 6*36/9=24, so the answer is b

11. Basic number calculation

Key points: understand the basic concept of + - x /

You will need to read the question multiple times if you are not sure of the meaning. If you need, write down the key words on the paper may help.

Example: Jill read a book at an average of p pages per minute for m minutes, the book has 160 pages, which of the following represents this context?

A p/m=160

B p+m-160

C pm=160

D 160+m=p

The answer is C

12. Quadratic graph

You need to understand the quadratic graph, find vertex, asymptote, y-intercept and what the graph should looks like given a quadratic equation, or vice versa. You know the character of the standard form and vertex form.

13. Probability

Understand the basic probability concept

$P(A \text{ and } B)=P(A)\cdot P(B)$

$P(A \text{ or } B)=P(A)+P(B)$

$P(A \text{ or } B)=P(A)+P(B)-P(A \text{ and } B)$

14. Ratio of 2 numbers

The question will give the ratio of 2 numbers, and 1 of the number, ask you to calculate the other number. You will use cross multiple rule to calculate.

15. Conversion of temperature

Make sure you know how to plug in the number and solve the equation.

(**F** − 32) × 5/9 = **C**

16. Setup system of equations and solve

You will be asked to write a system of equations based on the question, then you either choose the equations or choose the answers from the choices

a. You will define x and y, they may use different letters like m, t…. do not get confused
b. Write down equations, be clear of which one is more, which one is less
c. Solve equations by using elimination or substitution. It is likely to use elimination.

2. Practice Questions

A. Factoring

I. Factor by GCF

1. $4(x + 5) + 4x + 8$ Which of the following expression is equivalent to the expression above? a. $4(2x + 7)$ b. $8(x + 4)$ c. $5x + 17$ d. $8x + 13$	2. Which expression is not equal to $24y – 12$? a. $2(12y – 12)$ b. $2(12y – 6)$ c. $4(6y – 3)$ d. $12(2y – 1)$
3. Which below choice is equivalent to $24x – 18$? a. $6(4x −3)$ b. $6(3x-4)$ c. $4(6x – 4)$ d. $12x – 9$	4. Which is equivalent to expression $6x + 9y$? a. $6(x +3y)$ b. $3(2x + 3y)$ c. $9x + 6y$ d. $6x – 9y$

5. Which is equivalent to 12x + 8? a. 4(3x +2) b. 4(3x + 8) c. 4(3x+2x) d. 20x	6. Which is equivalent to 3x - 36? a. 3x + 36 b. 3 (12 - x) c. 3 (3x - 12) d. 3 (x - 12)
7. Which is equivalent to 12xy + 15x? a. 12xy − 15x b. 3x (4y + 5) c. 3x (5y + 4) d. 12yz + 15x	8. Which is equivalent to 2x + 4? a. 2 + 4x b. x (2 + 4) c. 2 (x + 2) d. 4 (x + 2)
9. Which below is equivalent to $x^3 – 7x$? a. $(x-7)(x^2 – x)$ b. $(x-7)(x^2 +1)$ c. $x(x^2 – 7)$ d. $x^2(x – 7)$	10. Which is equivalent to $x^3 - 13x$? a. $(x-7)(x^2 – 13)$ b. $(x-7)(x^2 +13)$ c. $x(x^2 – 13)$ d. $x^2(x – 13)$

11. Which is equivalent to $5x(4x^3 + x - 7)$? a. $20x^4 - 5x^2 - 35x$ b. $20x^4 + 5x^2 - 35x$ c. $20x^4 + x - 7$ d. $9x^4 + 6x^2 - 12x$	12. $Simplify$: $\frac{xy+y}{y} =$ a. $x + 1$ b. $\frac{x(y+1)}{y}$ c. xy d. $x + y$

II. Factor trinomials

1. Which function is equivalent to $f(x) = x^2 - 3x - 18$? A. $f(x) = (x + 3)(x - 6)$ B. $f(x) = (x + 6)(x - 3)$ C. $f(x) = (x + 6)(x + 3)$ D. $f(x) = (x - 3)(x + 6)$	2. Which function is equivalent to $f(x) = x^2 - 7x + 10$? A. $f(x) = (x - 3)(x - 7)$ B. $f(x) = (x + 7)(x + 3)$ C. $f(x) = (x - 2)(x - 5)$ D. $f(x) = (x - 2)(x + 5)$
3. Which function is equivalent to $f(x) = x^2 - 7x - 8$? A. $f(x) = (x - 1)(x - 8)$ B. $f(x) = (x + 1)(x + 8)$ C. $f(x) = (x - 1)(x + 8)$ D. $f(x) = (x + 1)(x - 8)$	4. Which expression is a factor of $x^2 - 5x - 6$? A. $x - 6$ B. $x + 6$ C. $x - 3$ D. $x - 1$

5. Which of the following is factor of $u^2 + uv - 2v^2$? A. $(u - v)$ B. $(u - 2v)$ C. $(2u + v)$ D. $(u + v)$	6. If $a^2 + n + 2b^2 = (a + b)(a + 2b)$, what is the value of n? a. a^2b b. $3ab$ c. $ab + ba$ d. $3ab^2$
7. Which function is equivalent to $f(x) = x^2 - 3x - 10$? A. $f(x) = (x - 6)(2x + 4)$ B. $f(x) = (x - 5)(x + 2)$ C. $f(x) = (2x - 3)(x + 4)$ D. $f(x) = (x + 5)(x - 2)$	8. Which function is equal to $f(x) = x^2 - 12x + 11$? A. $f(x) = (x + 11)(x + 1)$ B. $f(x) = (x - 11)(x + 1)$ C. $f(x) = (x + 11)(x - 1)$ D. $f(x) = (x - 11)(x - 1)$
9. Which expression is a factor of $2x^2 - x - 6$? A. $3x + 2$ B. $2x - 3$ C. $x + 2$ D. $2x + 3$	10. Which expression is a factor $2x^2 - 3x - 5$? A. $(2x - 1)$ B. $(x - 1)$ C. $(2x - 5)$ D. $(2x + 5)$
11. Factor $x^2 - 7x + 10$	12. Factor $x^2 + 6x + 8$

13. Factor $2x^2 - 14x + 16$?	14. Factor $2x^2 + 5x - 12$

III. Factor by formulars

$$\boldsymbol{a^2 - b^2 = (a - b)(a + b)}$$

1. Which function is equivalent to $f(x) = x^2 - 9$? A. $f(x) = (x - 9)(x + 9)$ B. $f(x) = (9 - x)(9 + x)$ C. $f(x) = (x - 3)(x + 3)$ D. $f(x) = (3 - x)(3 + x)$	2. Which expression is a factor of $x^2 - 36$? A. $3x - 6$ B. $6 - x$ C. $9x - 36$ D. $x + 6$
3. Which function is equivalent to $a^2 - 25$? A. $(a - 25)(a + 25)$ B. $(a - 5)(a - 5)$ C. $(a + 5)(a - 5)$ D. $(a + 5)(a + 5)$	4. Which expression is a factor of to $9x^2 - 1$? A. $(3x + 1)$ B. $(1 - 3x)$ C. $(x - 3)$ D. $(x + 3)$
5. Which function is equivalent to $2k^2 - 18$? A. $2(k - 3)(k - 3)$ B. $2(k + 3)(k + 3)$ C. $2(k + 3)(k - 3)$ D. $(2k + 3)(k - 3)$	6. Which function is equivalent to $a^2 - b^2$? A. $(a - b)(a + b)$ B. $(a - b)(a - b)$ C. $(a + b)(b - a)$ D. $(a + b)(a + b)$

7. Which expression is a factor of $36x^2 - 1$? A. $18x - 7$ B. $6x - 1$ C. $1 - 6x$ D. $6x - 7$	8. Which function is equivalent to $a^2 - 25b^2$? A. $(a - 25b)(a + 25b)$ B. $(a - 5b)(a - 5b)$ C. $(a + 5b)(a - 5b)$ D. $(a + 5b)(a + 5b)$
9. Which expression is a factor of $81x^4 - 4t^2$? A. $4x - 7$ B. $9x^2 - 2t$ C. $2x + 7$ D. $7-2x$	10. Which is equivalent to (13 + 2) (13 – 2)? a. $15^2 + 11^2$ b. $15^2 - 11^2$ c. $13^2 + 2^2$ d. $13^2 - 2^2$
11. Factor $x^2 - 4$	12. Factor $144 - 5x^2$
13. Factor $196c^2 - 144$	14. Factor $180k^2 - 5$

15. Factor $81x^4 - 4t^2$?	16. Factor $a^2 - 25b^2$

b. Solving Equations

1. If $x + 3(2x - 5) = 6$ what is the value of x? a. – 2 b. $1\frac{4}{7}$ c. 0 d. 3	2. If $3(4x + 2) = 7$ what is the value of x? a. – 1 b. $\frac{1}{12}$ c. 10 d. -5
3. If $4p + 1 = 10$ what is the value of p? a. – 2 b. $\frac{9}{4}$ c. -1 d. $\frac{11}{4}$	4. If x = 3 in the equation below, what is the value of a? $ax - 10 = x + 2$ a. 5 b. 10 c. 15 d. 20

5. If $x - 10 = 5x - 10$ what is the value of x?
a. – 5
b. $-3\frac{2}{3}$
c. 0
d. 5

6. If 6(t – 2) – 4 = 2t, then t =?
a. -2
b. 0
c. 2
d. 4

7. $If 4 = \frac{7+y}{2}, then\ y = ?$
a. -1
b. $\frac{7}{9}$
c. 1
d. 7

8. $If\ \frac{x}{2} = \frac{x+1}{3}, then\ x = ?$
a. 1
b. 2
c. 3
d. 4

9. $If\ 4b - 3 = 2b\ ,\ \ then\ 12b = ?$
a. 6
b. 8
c. 18
d. 24

10. $If\ 4b - 1 = b\ ,\ \ then\ 24b = ?$
a. $\frac{1}{3}$
b. 1
c. $\frac{25}{5}$
d. 8

11. $If\ \frac{x}{4} = \frac{x+1}{5}, then\ x = ?$

a. 1
b. 2
c. 3
d. 4

12. $If\ 3 = \frac{8-r}{2}, then\ r = ?$

a. -1
b. -2
c. 2
d. 4

13. $If\ 3 = \frac{8-r}{r}, then\ r = ?$

a. -1
b. -2
c. 2
d. 4

14. If $3(4x + 2) = 7$, then $x = ?$

a. 12
b. $\frac{1}{2}$
c. $\frac{5}{12}$
d. $\frac{1}{12}$

15. $If\ \frac{2}{5x} + \frac{1}{x} = 35, then\ x = ?$

a. $\frac{1}{25}$
b. $\frac{1}{5}$
c. 5
d. 7

16. If $x + y = 12$ and $x = 2y$, then x?

a. 2
b. 6
c. 8
d. 10

17. If n + (3n) =12, what is n? a. 2 b. 3 c. 4 d. 5	18. If x = 5 and y = 3, then $3x + 5y =$? a. 25 b. 30 c. 35 d. 40

c. Solving Quadratic and Square Root Equations

1. Which of the following is a solution to $x^2 - 5x - 24 = 0$? a. 8 b. 3 c. 1 d. 0	2. Which of the following is a solution to $x^2 + 8x + 7 = 0$? a. 7 b. -1 c. 1 d. 0
3. Which of the following is a solution to $x^2 - 12x + 11 = 0$? a. -8 b. -11 c. 1 d. 0	4. Which of the following is a solution to $x^2 - 3x - 10 = 0$? a. -8 b. -6 c. -5 d. -2

5. If $\sqrt{x} + 3 = 11$ what is the value of x?

a. 19
b. 8
c. 64
d. 14

6. If $\sqrt{x - 3} = 5$, what is the value of x?

a. 8
b. 25
c. 28
d. 64

7. If $7w(w - 2) = 0$, what could be the value of w?

a. 5
b. -10
c. -3
d. 2

8. Which of the following equations has solution of $x = 5$?

a. $x^2 = 10$
b. $\sqrt{3x + 1} = 4$
c. $3x^2 = 225$
d. $\sqrt{4x} = 10$

9. If x = -3, which of the following is positive

a. x^3
b. x^2
c. $2x$
d. $\frac{1}{x}$

10. If the function of $g(x) = \frac{x}{x+1}$, then?

a. $g(10) < g(20)$
b. $g(20) < g(10)$
c. $g(0) = 1$
d. $g(1) = 0$

11. What is a solution to $x^2 + 2x - 15 = 0$?	12. What is a solution to $x^2 - 5x + 6 = 0$?
13. What is a solution to $-2x^2 + 7x - 3 = 0$?	14. If $a + \sqrt{x} = b, then\ x =?$
15. What is a solution to $6x^2 - 11x - 10 = 0$?	16. If $\sqrt{x-3} = 15$, what is the value of x?

d. Rational and Exponents

1. $\left(\frac{7}{x}\right)^2$ =?
   a. $\frac{14}{x^2}$
   b. $\frac{49}{x^2}$
   c. $\frac{7^2}{x}$
   d. $\frac{x^2}{49}$

2. $\left(\frac{5a}{b}\right)^2$ =?
   a. $\frac{5a^2}{b^2}$
   b. $\frac{25a}{b^2}$
   c. $\frac{25a^2}{b^2}$
   d. $\frac{10a^2}{b}$

3. $\left(\frac{2r}{3s}\right)^2$ =?
   a. $\frac{2r^2}{3s^2}$
   b. $\frac{2r}{3s^2}$
   c. $\frac{4r^2}{9s^2}$
   d. $\frac{9s^2}{4r^2}$

4. $\left(\frac{12}{b}\right)^2$ = ?
   a. $\frac{24}{b^2}$
   b. $\frac{12}{b}$
   c. $\frac{144}{b}$
   d. $\frac{144}{b^2}$

5. $\frac{m^{10}}{m^2}$ =?
   a. m^5
   b. m^8
   c. $\frac{1}{m^5}$
   d. $\frac{1}{m^8}$

6. If $h(x) = 10^x$, then for what value of x does $h(x) = 1{,}000{,}000$?
   a. 2
   b. 4
   c. 6
   d. 8

7. For what value of x is the function $g(x) = \frac{x}{1-x}$ not defined? a. 0 b. 1 c. 2 d. 3	8. For what value of a would make the expression $\frac{ax-b}{a}$ not defined? a. 0 b. 1 c. 2 d. 3
9. $If\ \ a \neq 0\ ,\ a \neq 1$ $\frac{ax-b}{a-1} = b\ \ ,what\ is\ the\ value\ of\ x?$ a. b b. 1 c. a d. $\frac{b}{a}$	10. $If\ \ a \neq 0\ ,\ a \neq 3$ $\frac{ax-3b}{a-3} = b\ \ ,what\ is\ the\ value\ of\ x?$ a. b b. 1 c. a d. 3

e. Geometry Concepts:

1. If a rectangle has a perimeter of 24, what could be its length and width? a. $L = 2, W = 12$ b. $L = 4, W = 20$ c. $L = 5, W = 7$ d. $L = 8, W = 3$	2. $P = 2(L + W)$ Formulate for perimeter of a rectangle with length, L, and width, W, is given above. If the perimeter of a rectangle has P = 28. What could length, L, and width, W, be? a. $28 = 2(2 + 14)$ b. $28 = 2(7 + 21)$ c. $28 = 2(5 + 9)$ d. $28 = 2(4 + 7)$

3. If the length of a rectangle is 4 more than its width and the perimeter of the rectangle is 52, find the width.
   a. w = 11
   b. w = 12
   c. w = 15
   d. w = 24

4. If the rectangle has length x and width x – 2, what is the perimeter of the rectangle?
   a. $2x - 2$
   b. $2x - 4$
   c. $4x - 2$
   d. $4x - 4$

5. A company plans to pave a rectangular parking lot behind an office building. If the length or the planned parking lot is 140 feet and the width is 84 feet, what is the area to the paved from this parking lot? $(Area = length \times width)$
   a. 11,760 ft.
   b. 10,760 ft.
   c. 9,760 ft.
   d. 8,760 ft.

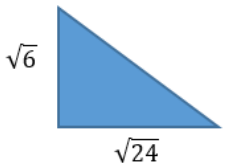
6. The expressions $x - 2$ and $x + 3$ represent the length and width of a rectangle, respectively. If the area of rectangle is 24, what is the perimeter of the rectangle?
   a. 20
   b. 22
   c. 24
   d. 28

7. Rectangular frame 5 inches width and 7 inches, what is the outside perimeter of the frame?
   a. 20 inches
   b. 22 inches
   c. 24 inches
   d. 26 inches

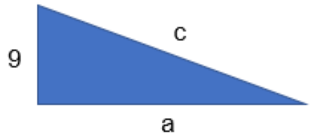
8. If the length of 2 sides of a triangle are 2x - 5 and x +3 perimeter triangle is 4x – 1 length of 3rd side?
   a. $x + 3$
   b. $2x - 1$
   c. $x + 1$
   d. $x - 1$

9. If a triangle has side lengths $x, x+2$, and $x-4$, what is perimeter of the triangle?
   a. $3x+3$
   b. $2x-1$
   c. $2x+1$
   d. $3x-2$

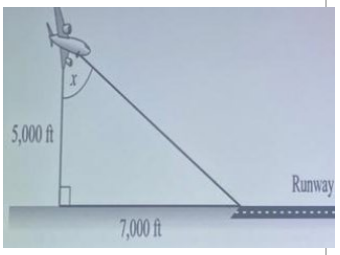
10. What is the area of the triangle?
   a. 6
   b. 24
   c. 36
   d. 73



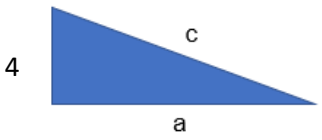
11. In the triangle, if $c = 12$, what is the value of a?
   a. 3
   b. 9
   c. $3\sqrt{7}$
   d. $9\sqrt{7}$



12. An airplane is 5,000ft above ground and has to land on a runway that is 7,000 ft. away as shown above. Let x be the angle the pilot takes to land the airplane at the beginning of the runway. Which equation is a correct way to calculate x?
   A. $Sin(x) = \frac{5{,}000}{7{,}000}$
   B. $Sin(x) = \frac{7{,}000}{5{,}000}$
   C. $Tan(x) = \frac{5{,}000}{7{,}000}$
   D. $Tan(x) = \frac{7{,}000}{5{,}000}$

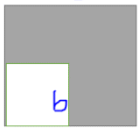


13. In the triangle, if $c = 7$, what is the value of a?
   a. $\sqrt{33}$
   b. 3
   c. $3\sqrt{7}$
   d. 9



14. What is the area of a square that has a perimeter of 24 feet?
a. 10
b. 16
c. 26
d. 36

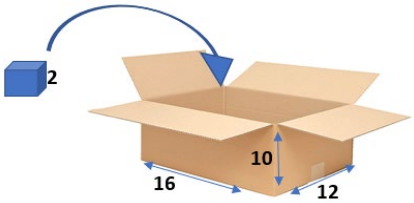
15. In the figure above, the lager square has sides of length a and the smaller square has sides of length b. What is the area of the shaded region in terms of a and b?
a. $a^2 - b^2$
b. $(a + b)^2$
c. $(a - b)^2$
d. ab



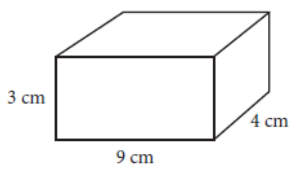
16. The area of the square below is 36. What is the value of x?
a. 2
b. 4
c. 9
d. 12

17. The area of a rectangle is 1,176 square inches and the width of the rectangle is 28 inches. What is the length of the rectangle? (Area = length x width)
a. 21 inches
b. 42 inches
c. 560 inches
d. 1,148 inches

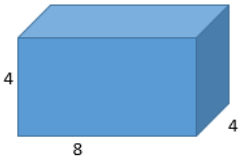
18. A small cube has a side length of 2. How many small cubes are needed to fill a box with the following dimensions: length = 16, width = 12, height = 10?
a. 240
b. 120
c. 160
d. 25



19. The surface area of a right rectangular prism can be found by finding the sum of the area of each of the faces of the prism. What is the surface area of a right rectangular prism with length 4 centimeters (cm), width 9 cm, and height 3 cm? (Area of a rectangle is equal to length times width.)
A. 75 cm^2
B. 108 cm^2
C. 120 cm^2
D. 150 cm^2



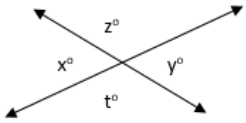
20. Which is the volume of the rectangular solid shown above ($V = L \times W \times H$)



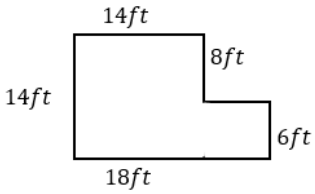
a. $160\ in^3$
b. $128\ in^3$
c. $64\ in^3$
d. $32\ in^3$

21. In the figure, what is the average (arithmetic mean) of x, y, w and z

A. 90
B. 100
C. 120
D it can't be determined



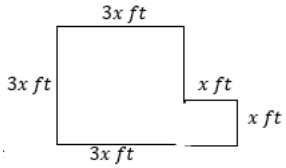
22. The dimensions of a room are shown, what is the area?



a. $112\ ft^2$
b. $196 ft^2$
c. $220\ ft^2$
d. $252\ ft^2$

23. The dimensions of a room are shown, what is the area?

a. $14x + 2$
b. $12x + 2$
c. $10x^2$
d. $10x^2 + 2x$

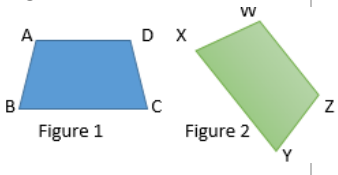


24. In an isosceles triangle, the base angles measure 65°. Which of the following expression is a way to calculate the measure the third angle?

a. $180^o + 65^o$
b. $180^o - 65^o$
c. $180^o + 2(65^o)$
d. $180^o - 2(65^o)$

25. Figure 2 is 90° clockwise rotation of figure 2, which of the following angles in figure 2 coresponds to $\angle A$ in figure 1?

a. $\angle W$
b. $\angle X$
c. $\angle Y$
d. $\angle Z$



26. The small base of an isosceles trapezoid is x cm long. The large base is 3 cm shorter than twice the small base. Each remaining side is 2 cm longer than the small base. If the perimeter is 26 cm, which of the following is true?

a. 4x – 3 = 26
b. 4x -1 = 26
c. 5x – 1 = 26
d. 5x + 1 = 26

27. If the length of a rectangle, L, is 3 less than twice the width, W, which of the following gives the length of the rectangle in terms or width.
    a. L = 3 – 2W
    b. L = 2W - 3
    c. L = 3W – 2
    d. L = 2 – 3W

f. Algebraic expression

1. A rental car company charges $45 per day for a car rental, plus an additional $0.25 per mile driven. Which of the following represents the cost in dollars of renting a car per d days and driving m miles?
    a. $45 + 0.25 + d + m$
    b. $45 \cdot 0.25 + dm$
    c. $45d + 0.25m$
    d. $\frac{45}{d} + \frac{25}{m}$

2. A rectangular swimming pool is x meters wide. The length of the swimming pool is twice as long as the width. If the perimeter of the pool is 64 meters, which of the following equations represents the given information?

a. $x + x + 2x + 2x = 64$
b. $x + 2x = 64$
c. $x + 2 + x + 2 = 64$
d. $2x + 2x + 2x + 2x = 64$

3. The width of a rectangle is 10 meters. The length of the rectangle is three times as long as it's width. Which is equal to the perimeter of the rectangle?

a. $(10 + 10 + 30 + 30)$
b. $(10 + 30)$
c. (10×30)
d. $2(10 \times 30)$

4. Which of the following sentences can be used to represent the equation below?

$$\frac{n}{3} + 6 = 5$$

a. Six more than a number n equals 5
b. Six more than one third of a number n equals 5
c. Three more than a number n divide by 6 equals 5
d. A number n put one third of 6 equals 5

5. Which of the following number that added to 5, gives a result less than 13?

a. 7 b. 8 c. 9 d. 10

6. Twice a number is 4 less than 26. What is the number?

a. 9 b. 11 c. 15 d. 18

7. Which of the following expressions is 5 times as much as the sum of *r* and *s*?

A. 5 × *r* + *s*
B. 5 + *r* + *s*
C. *r* + *s* × 5
D. (*r* + *s*) × 5

8. Alice earns x dollars per hour for the first 40 hours she works and 1.5 times as much for each hour over 40. If Alice works for 48 hours, how much money will she earn?

a. $52x$
b. $48x$
c. $40 + 12x$
d. $40x + 12$

9. Maria has three more dollars than Zulma. According to the statement above, which of the following inequalities is true?

a. $Maria > Zulma$
b. $Maria < Zulma$
c. $Maria + 3 < Zulma$
d. $Maria < Zulma - 3$

10. At a restaurant the cost for a breakfast taco and a small glass of milk is $2.10. The cost for 2 tacos and 3 small glasses of milk is $5.15. What pair of equations can be used to determine t, the cost of a taco, and m, the cost of a small glass of milk?

a. $t + m = 5.15$
$2t + 3m = 2.10$
b. $t - m = 5.15$
$2t - 3m = 2.10$
c. $t + m = 2.10$
$2t + 3m = 5.15$
d. $t - m = 2.10$
$2t - 3m = 5.15$

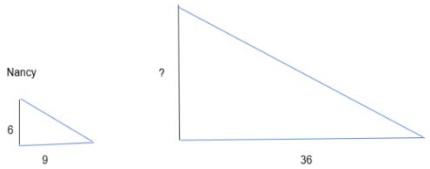
11. Jill read a book at an average of p pages per minute for m minutes, the book has 160 pages, which of the following represents this context? a. $\frac{p}{m} = 160$ b. $p + m = 160$ c. $p \cdot m = 160$ d. $160 + m = p$	12. A store charges 25 cents for each ruler and 5 cents each pencil. Sarah bought r and p from store, which of the following represents the amount in cents the store charged her? a. 25r + p b. 5(5r + p) c. 30(r + p) d. 5r + 25p

g. Ratio and Proportional Relationships

1. It took Khalid 90 minutes to complete 40 tasks. Which of the following is an equivalent rate? A. 10 tasks in 0.9 minutes B. 10 tasks in 2.25 minutes C. 10 tasks in 9 minutes D. 10 tasks in 22.5 minutes	2. Jacoby followed a recipe that requires 2 cups of water for every 3 cups of flour. If he used 8 cups of flour, how many cups of water did he use? a. $2\frac{2}{3}$ b. 4 c. $5\frac{1}{3}$ d. 12
3. The elevation at the summit of Mount Whitney is 4,418 meters above sea level. Climbers begin at a trailhead that has an elevation of 2,550 meters above sea level. What is the change in elevation, to the nearest foot, between the trailhead and the summit? (1 foot = 0.3048 meters) a. 569 feet b. 5,604 feet c.6,129 feet d. 14,495 feet	4. Jen is sewing a ribbon around baby quilt. She needs 19.5 feet of ribbon. If the ribbon is sold by full yard. How many yards of ribbon does she need? (Hint: 1 yard = 3 feet) a. 6 yards b. b. 6.5 yards c. c. 7 yards d. d7.5 yards

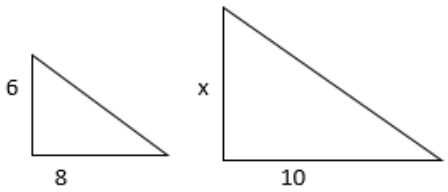
5. Nancy is 6 feet tall and cast a 9-foot shadow. If a flagpole next to him, casts a shadow that is 36 feet long. How tall is the flagpole?

a. 12 feet
b. 24 feet
c. 33 feet
d. 54 feet



6. What is value of x?

a. 7
b. 7.5
c. 8
d. 8.5



7. 1 centimeter on the map represents 5 kilometers. If two towns are 30 centimeters a part on the map, what is the actual distance between the two towns?

a. 6 km
b. 35 km
c. 36 km
d. 150 km

8. A certain map has a scale in which $\frac{1}{2}$ inch on the map represents an actual distance of 10 miles. A distance of x miles is represented by how many inches on this map?

a. $\frac{x}{20}$
b. $\frac{x}{10}$
c. $5x$
d. $20x$

9. Terry weights 60.8 kg. What is his weight in grams? $(1kg = 1{,}000g)$

a.0.608 g
b. 6.08 g
c. 6,080 g
d. 60,800 g

10. The price of cherries at two markets is shown in the table above. What is the price per pound for cherries at Big-Value Market?

a. 2.42
b. 2.41
c. 1.79
d. 1.78

Price of cherries

	Weight in Pounds	Total Cost
Product Market	2	3.58
	5	8.95
Big Value market	2	4.84
	5	12.10

11. If the cost of tiling a floor is $1.25 per square foot, how much will it cost to tile a rectangular floor that is 8ft by 12ft? (Hint: A = L x W)
a. $120.00
b. $97.25
c. $96.00
d. $25.00

12. If the cost of tiling a floor is $1.75 per square foot, how much will it cost to tile a rectangular floor that is 9ft by 12ft? (Hint: A = L x W)
a. $189.00
b. $109.75
c. $108.00
d. $36.75

13. John is 6 feet 4 inches tall, and Beth is 5 feet 5 inches tall. How much taller is John than Beth? (1 foot = 12 inches)
a. 9 inches
b. 11 inches
c. 13 inches
d. 15 inches

14. If an angle of 360º measures 6400 miles, how many degrees in 1600 miles?
a. 30º
b. 60º
c. 90º
d. 120º

15. Rory has 5 one-liter containers of apple juice for a party. How many full 8 ounce cups of apple juice can she pour from these 5 containers? (1 liter = 33.8 ounces)
a. 20 b. 21 c. 22 d. 23

16. Gimli has 5 bushels of oats. She wants to pour all of the oats into boxes that hold 1 peck. How many boxes will she need? (4 pecks = 1 bushel)
a. 20 b. 16 c. 8 d. 4

17. It takes Bert 30 minutes longer to mow a rectangular lawn that measures 30 feet by 25 feet than it takes him to mow a rectangular lawn that measures 20 feet by 15 feet. If he mows the two lawns at the same rate per square foot, how long does it take him to mow both lawns?
a. 50 minutes
b. 60 minutes
c. 70 minutes
d. 80 minutes

18. Ramona made a meatloaf for dinner. The recipe says bake the meatloaf in the oven for 1 hour and 45 minutes at 350 degrees, remove from oven, and cool for 10 minutes. If she put the meatloaf in the oven at 4:20 pm, at what time will the meatloaf be ready to eat?
a. 5:50 pm
b. 5:55 pm
c. 6:05 pm
d. 6:15 pm

19. If the price of 3 apples is $1.95, what is the price of 14 apples?
a. $6.50
b. $7.80
c. $9.10
d. $9.75

20. Ron traveled 6.8 miles of his delivery route in 1.2 hours. At this same rate, which of the following is closet to the time for Ron to travel 20 miles?
a. 3 hours
b. 6 hours
c. 3.5 hours
d. 6.5 hours

21. Maria walks x yards in 15 minutes. If she continues to walk at the same rate, how many more yards will she walk in the next 7 minutes?
a. 74
b. 70
c. 66
d. 62

22. Pumps 1.5 gallons per/minute. How long would it take to fill a tub with a capacity of 150 gallons?
a. 30 minutes
b. 350 minutes
c. 65 minutes
d. 100 minutes

23. A rectangular photograph that is 5 inches wide 7 inches long is enlarged to produce a photograph that is 12 inches wide. If the enlarged photograph is in proportion to the original, what is the length, in inches of the enlarged photograph?
a. $\frac{35}{12}$
b. 8
$c. \frac{84}{5}$
d. 12

24. Ashley and her friend Robin are running around an oval track. Ashley can complete one lap around the track in 2 minutes, while Robin completes one lap is 3 minutes. If they start running the same direction from the same point on the track, after how many minutes will they meet again?
a. 2
b. 3
c. 6
d. 12

25. If $xy = k$, where *k* is a constant, and $y = 4\ when\ x = 6, what\ is\ y\ when\ x = 8$?
a. 2
b. 4
c. 3
d. 18

26. $If\ xy = k, where\ k\ is\ a\ constant, and\ y = 5\ when\ x = 8, what\ is\ y\ when\ x = 4?$
a. 4
b. 10
c. 20
d. 5

27. $If\ xy = k, where\ k\ is\ a\ constant, and\ y = 3\ when\ x = 4, what\ is\ y\ when\ x = 24?$
a. 2 $b.\frac{1}{2}$ $c.\frac{3}{2}$ $d.$ 16

28. $If\ y\ varies\ directly\ as\ x, and\ y = 8\ when\ x = 2, what\ is\ x\ when\ y = 2?$
a. $\frac{1}{2}$ $b.4$ $c.\frac{1}{4}$ $d.$ 16

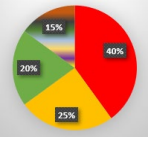
29. $If\ y\ varies\ directly\ as\ x, and\ y = 24\ when\ x = 6, what\ is\ y\ when\ x = 4?$
a. 16
b. 8
c. 12
d. 32

30. $If\ y\ varies\ directly\ as\ x, and\ y = 24\ when\ x = 6, what\ is\ y\ when\ x = 10?$
a. 16
b. 23
c. 12
d. 40

h. Percentage

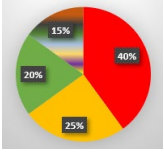
1. There are 2000 jelly beans in a jar. 20% are green, 25% are yellow, 40% are red, and the remaining are classified as ‘other’. Which is the correct amount for how many more are yellow than green?

a. 100
b. 50
c. 5
d. 10



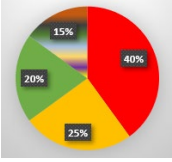
2. There are 2000 jelly beans in a jar. 20% are green, 25% are yellow, 40% are red, and the remaining are classified as ‘other’. Which is the correct amount for how many more are Red than yellow?

a. 300
b. 150
c. 15
d. 25



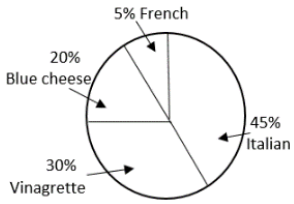
3. There are 2000 jelly beans in a jar. 20% are green, 25% are yellow, 40% are red, and the remaining are classified as ‘other’. Which is the correct amount for how many more are Red then green?

a. 400
b. 300
c. 20
d. 30

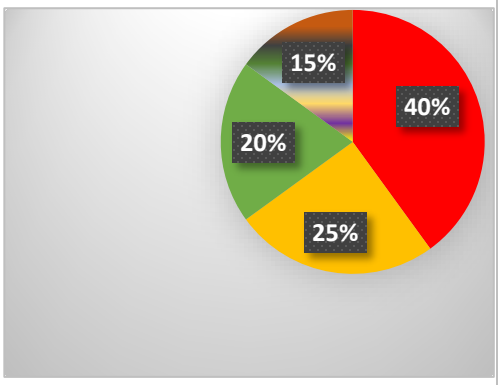


4. The circle graph above gives the distribution of salad dressing chosen by customers at a restaurant. If approximately 200 customers order each day at the restaurant. Which of the following is closest to the difference per day between the number who choose Italian dressing and the number who choose vinaigrette dressing?

a. 20
b. 30
c. 40
d. 50



5. There are 2000 jelly beans in a jar. 20% are green, 25% are yellow, 40% are red, and the remaining are classified as 'other'. Which is the correct amount for each of the following: A) How many more are yellow than green? B) Red than yellow? C) Red then green?



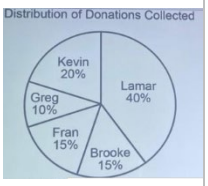
a- A) 100, B)300, C) 400

b- A) 50, B) 150, C) 300

c- A) 5, B)15, C) 20

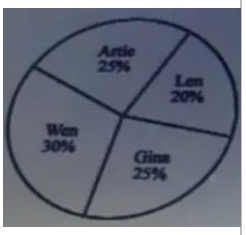
d- A)10, B) 15, C) 30

6. A garden club collected donations for a new city part. The circle graph above shows the distribution of donations collected from 5 members of the club. If the combined amount of donations collected by Kevin, Fran, and Brooke, exceeded the amount Lamar collected by $250, what was the total amount of donations collected by all five club members?



a. $500
b. $1,200
c. $2,500
d. $3,200

7. Artie (25%), Len (20%), Gina (25%), and Wen(30%) divided a carton of baseball cards as shown in the circle graph above. If Wen's share was 60 cards, what was Gina's share of the cards?



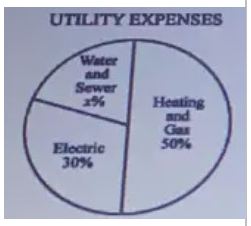
a. 25
b. 50
c. 100
d. 200

8. Mr. Alsup asked the students in his third and sixth period English classes whether they had chosen a topic for their writing assignment. He recorded the data in a two way table, as shown below. If Jannette is in Mr. Alsup's sixth period English class, what is the probability that she has not chosen a topic for her writing assignment?

English class	Yes	No	Total
Third Period	24	6	30
Sixth Period	22	3	25
Total	46	9	55

a. 3%
b. 5%
c. 12%
d. 14%

9. The circle graph below shows the distribution of ultility expenses for the Hierra family last year. If the Hierra family's total utility expenses last year were $3,600, what were their expenses for Water and Sewer?



a. 720
b. 750
c. 900
d. 1,080

10. A suit is on sale for 15 percent off the original price of x dollars. If a customer has a coupon for 5 dollars off the sales price, which of the following represents the price, in dollars, the customer will pay, before tax, for the shirt?

A. 0.15x-5 B. 0.85x-5

C. 0.85(x-5) D. 5-0.85x

11. Last week Maria bought k pounds of cherries at $2.75 per pound. This week cherries are on sale for 20% off, and Maria bought twice as many pounds as she did last week. What is the total, in dollars, she paid for last and this week's cherries?

a. 3k c. 4.95k
b. 7.15k d. 8.25k

12. At a computer store, tablet was on sale for 10% off, P is the original price, what is the sale price.

a. P – 10
b. P – 10P
c. 0.9P
d. 0.1P-1P

13. If Manuel deposits 25% of $130 into a savings account, what is the amount of his deposit?

a. $5.20 b. $25.00
c. $32.50 d. $97.50

i. Linear applications

1.It costs Jenny $31.95d + 0.10m$ dollars to rent a car for *d* days and drive it *m* miles. How much does it cost Jenny to rent a car for 5 days if the car is driven a total of 600 miles?

a. $159.75
b. $165.75
c. $219.75
d. $759.75

2. The formula for converting temperature from Fahrenheit(F) to Celsius(C) is $C = \frac{5}{9}(F - 32)$. If the temperature is 212 degrees Fahrenheit (F), what is it in Celsius (C)?

1. 125 degrees Celsius
2. 98.6 degrees Celsius
3. 100 degrees Celsius
4. 82.49 degrees Celsius

3. The relationship between a temperature in degrees Celsius (C°) and in Kelvins (K) is given by $K = C + 273$. What is the Celsius (C°) temperature for a temperature of 10 Kelvins (K)?

1. 263 degrees Celsius
2. 283 degrees Celsius
3. -263 degrees Celsius
4. -283 degrees Celsius

4. The formula for converting temperature from Fahrenheit(F) to Celsius(C) is $C = \frac{5}{9}(F - 32)$. If the temperature is 77 degrees Fahrenheit (F), what is it in Celsius (C)?

1. 25 degrees Celsius
2. 45 degrees Celsius
3. $41\frac{2}{3}$ degrees Celsius
4. $60\frac{5}{9}$ degrees Celsius

5. In the equation below, T represents the boiling point of water in degrees Fahrenheit, and h represents the height above sea level in feet. If $T = 209^o\ F$, what is the value of h?

$$T = 212 - \frac{h}{550}$$

a. $1{,}750ft$
b. $1{,}650\ ft$
c. $1{,}550ft$
d. $1{,}450ft$

6. The formula below represents how long a ball dropped from *s* feet takes to hit the ground in *t* seconds. How much longer would it take the ball to hit the ground from 32 feet than from 8 feet?

$$t = \frac{\sqrt{s}}{4}$$

1. $\sqrt{2}\ sec$
2. $\sqrt{0.5}$ sec
3. $0.707\ sec$
4. 1.414 sec

7. If a circle has a radius, r, and area, A, find A.

1. $A = \ \mathrm{r} \cdot \pi^2$
2. $A = \pi \cdot r^2$
3. $A = \sqrt{\frac{r}{\pi}}$
4. $A = \frac{\sqrt{r}}{\pi}$

8. If a circle has a radius, r, and area, A, find r in terms of A.

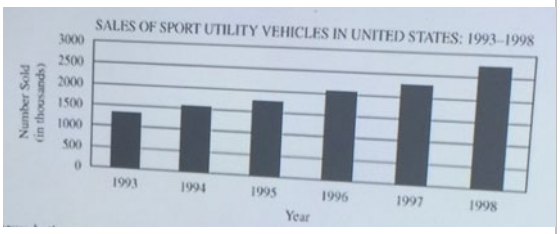
1. $\mathrm{r} = \mathrm{A}\pi^2$
2. $\mathrm{r} = \mathrm{A}/\pi$
3. $\mathrm{r} = \sqrt{\frac{A}{\pi}}$
4. $\mathrm{r} = \frac{\sqrt{A}}{\pi}$

9. 10, 15, ____, 25, 30 What number should fill in the blank? a. 16 b. 18 c. 20 d. 23	10. 10.30, 7.85, ____, 2.95, 0.50 which of the following should be placed in the blank above to complete the pattern? a. 6.30 b. 5.40 c. 4.85 d. 3.45

j. Probability

1. A box contains 3 chocolate chip, 5 oat meal raising, and 4 peanut butter cookies. What is the probability that a peanut butter cookie will be selected? a. $\frac{1}{4}$ b. $\frac{1}{3}$ c. $\frac{1}{2}$ d. $\frac{3}{4}$	**2.** A bowl contains 6 green grapes, 10 red grapes, and 8 black grapes. Which of the following is the correct calculation for probability of choosing a red grape and then without putting the red grape back into the bowl, choosing a green grape? a. $\frac{10}{24}+\frac{6}{24}$ b. $\frac{10}{24}+\frac{6}{23}$ c. $\frac{10}{24}\times\frac{6}{24}$ d. $\frac{10}{24}\times\frac{6}{23}$
3. A bag contains 7 red cubes, 3 yellow cubes, 2 green cubes, and 4 blue cubes. One cube is selected at random from the bag, what is the probability the cube will not be blue? a. $\frac{1}{4}$ c. $\frac{3}{4}$ b. $\frac{5}{8}$ d. $\frac{7}{8}$	4. On average, there are 18 children per classroom in the 6 classrooms at West Elementary school. What is the total number of children in these 6 classroom? 1. 108 2. 200 3. 208 4. 300

5. If the trend shown in the graph above continued into the next year, approximately how many sport utility vehicles were sold in 1999?
   a. 3 million
   b. 2.5 million
   c. 2 million
   d. 3 thousand



6. Dan choose a card at random from a deck of 52 cards, in which there are 13 diamonds cards, 13 spades cards, 13 hearts cards, and 13 clubs cards. What is the probability that the chosen card is a red card?
   a. $\frac{1}{13}$
   b. $\frac{1}{4}$
   c. $\frac{1}{2}$
   d. 1

7. David choose a card at random from a deck of 52 cards, in which there are 13 diamonds cards, 13 spades cards, 13 hearts cards, and 13 clubs cards. What is the probability that the chosen card is a diamonds card?
   a. $\frac{1}{13}$
   b. $\frac{1}{4}$
   c. $\frac{1}{2}$
   d. 1

8. From the integers from 1 to 50, inclusive, one integer will be selected at random. Which of the following is most likely?
   a. The integer selected will be even.
   b. The integer selected will be a multiple of 5.
   c. The integer selected will be a multiple of 10.
   d. The integer selected will be a multiple of 20.

9. A 12-sided die is rolled. The set of equally likely outcomes is {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12}. What is the probability or rolling a number less than 8?
   a. $\frac{1}{4}$
   b. $\frac{9}{8}$
   c. $\frac{3}{4}$
   d. $\frac{7}{12}$

k. Descriptive Statistics

1. The average of three numbers is 70. Two of the numbers are 105 and 40. What is the third number? **a.** 55 **b.** 65 **c.** 70 d. 75	**2.** The mean of three numbers is 14. Two of the numbers are 10 and 6. What is the third number? **a.** 16 **b.** 18 **c.** 24 **d.** 26
3. The average of 8, 14, and x is 10. What is the value of x? a. 8 b. 10 c. 11 d. 12	**4.** The average of three numbers is 15. Two of the numbers are 10 and 7. What is the third number? **a.** 17 **b.** 28 **c.** 32 **d.** 45
5. The average of three number is 16. If one of the numbers is 18, what is the sum of the other two numbers? a. 12 b. 14 c. 20 d. 30	6. On 5 days, Lisa swam 650 meters, 675 meters, 725 meters, 800 meters, and 900 meters. What was her average distance per day? a. 700 meters b. 750 meters c. 3,650 meters d. 3,750 meters

7.

Days of Week	Number of hours of sleep per night
Sunday	8
Monday	$6\frac{1}{2}$
Tuesday	$6\frac{1}{2}$
Wednesday	7
Thursday	6
Friday	7
Saturday	8

The number of hours of sleep a person gets per night for one week is shown in the table above. What is the average number of hours of sleep per night for this week?

a. 6
b. $6\frac{1}{2}$
c. 7
d. $7\frac{1}{2}$

8.

Days of Week	Distance
Monday	4 miles
Tuesday	5 miles
Wednesday	3 miles
Thursday	6 miles
Friday	6 miles

The distance that Karen ran for each of 5 days is shown in the table above. What was the average distance that Karen ran per days?

a. 2.5 b. 2 c. 4 d. 4.8

9. The table below shows a bakery's cost per cookie for each of the five types of cookies the bakery sells. If the mean cost per cookies is $0.73, what is the cost per cookie, in dollars, for a sugar cookie?

a. 0.54
b. 0.67
c. 0.79
d. 0.89

Chocolate chip	0.73
Double chocolate	0.82
Oatmeal raisin	0.70
Sugar	X
Butter pecan	0.86

10. What is the mean (average) stopping distance for the 10 cars?

a. 25
b. 49.8
c. 50
d. 50.2

Stopping Distance	**Frequency**
48	1
49	2
50	3
51	2
52	2

11. If the mean of the numbers 10, and x is 14, what is the value of x?

a. 16
b. 17
c. 18
d. 19

12. What is the average of 8, 6.5, 6.5, 7, 6, 7, 8?

a. 7
b. 8
c. 9
d. 10

13. The following are scores for 6 students in Ms. Kennedy's Math class 451, 500, 600, 422, 603, 514

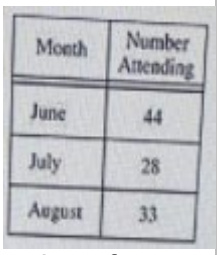
What is the range of scores?

a. 109
b. 149
c. 178
d. 181

14. On 5 trips to the grocery store, James spent $42, $51, $33, $28, and $31, what was the average amount James spent per trip?

a. 37
b. 38
c. 39
d. 40

15. The table above shows the number of members of a local gardening club who attended each of the three monthly meetings of the club last summer. If no members left or joined the club during the summer, what is the least number of members that the club could have had during the summer?



Month	Number Attending
June	44
July	28
August	33

a. 28
b. 35
c. 44
d. 105

16. From below the list of used truck prices, what is the median price of the truck?

2004 Chevrolet truck $12,500
2005 Toyota truck $14,000
2004 Ford truck $13,500
2006 Dodge truck $13,000
2002 Mazda truck $8,700

a. $12,000 B. $12,340 C. $13,000 D. $13,500

17. In a game B scores 6 points on his first move, and 9 points on his second moves. How many points must be score on his third move, so that the average number of points for the 3 moves will be 12?

a. 21 b. 22 c. 25 d.28

18. The following are Nancy's scores on 5 math practices, 390, 420, 510, 440, 490

What is the range of her scores?

A. 100
B. 120
C. 440
D. 2250

19. Find the range for the group of data items.
3, 16, 3, 16, 3, 16, 3, 16

a. 19 b. 9.5 c. 13 d. 16

20. The ages of five friends are 20, 31, 28, 31, and 25. What is the range of their ages?

a. 6 b. 11 c. 13 d. 7

21. Average of 3 number is 15. 7 and 10 are 2 numbers. What is the 3rd number?

a. 11
b. 28
c. 32
d. 45

22. The average of 3 numbers is 15, the average of 6 other numbers is 12, what is the average of all 9 numbers?

A. 11 B. 12 C. 13 D. 15

23. The ages of five friends are 20, 31, 28, 31, and 25. How many are older than the average (arithmetic mean) age?

A. 2 b. 3 c. 4 d. 5

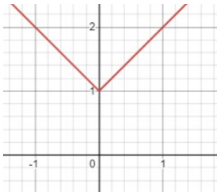
24. If 2 is taken out of the series of numbers below, which measure will remain the same?
2 3 4 6 6 7

a. Mean
b. Median
c. Mode
d. Range

I. Functions and systems of equations

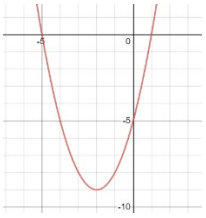
1. Which of the following could be the function gather below?

a. $f(x) = |x + 1|$
b. $f(x) = |x - 1|$
c. $f(x) = |x| + 1$
d. $f(x) = |x| - 1$



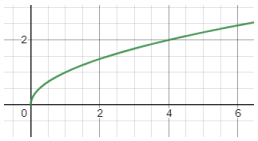
2. What is the equation of the graph at the right?

e. $y = (x - 2)^2 - 9$
f. $(x + 5)(x - 1) = 0$
g. $y = (x + 2)^2 - 9$
h. $(x - 5)(x + 1) = 0$
i. $y = x^2 + 4x + 5$

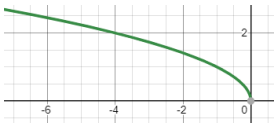


3. Which of the following could be the graph of $y = -\sqrt{x}$?

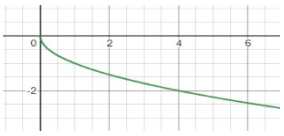
a.



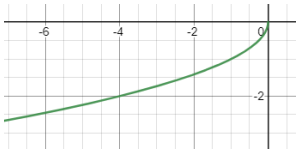
b.



c.



d

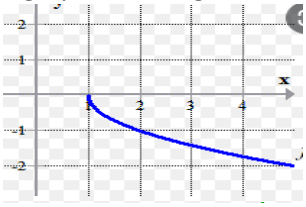


4. In xy plane, the equation $y = x^2 + 2$ intersect x-axis at how ow many point?

j. None
k. One
l. Two
m. Three

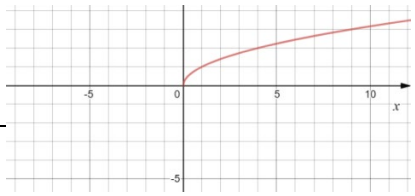
5. What is the equation of the graph at the right?

a. $f(x) = -\sqrt{x - 1}$
b. $f(x) = -\sqrt{x + 1}$
c. $f(x) = (x + 1)^2$
d. $f(x) = -(x - 1)^2$



6. What is the equation of the graph at the right?

n. $f(x) = \sqrt{x}$
o. $f(x) = -\sqrt{x}$
p. $f(x) = x^2$
q. $f(x) = -x^2$



7. What are the coordinates of the point of intersection of $y = x + 3$ and $y = 3x - 3$?

a. $(2, 5)$
b. $(3, 6)$
c. $(4, 9)$
d. $(5, 12)$

8.How many solutions can the systems of linear equations below have?

$$x + 4y = 3$$
$$2x + 8y = 4$$

a. None
b. One
c. Two
d. Infinite (∞)

9. Jan bought 5 notebooks, Kim bought 4 notebooks and $18.00 schoolbag. Together, Jan and Kim spent $45.00. In each notebook costs the same, how much did each notebook cost?

r. 3.00
s. 3.50
t. 4.50
u. 5.00

10. Margo bought 7 pens from a bookstore. Some of the pens cost $3 each, and the rest cost $4 each. If she paid a total of $23 for the pens, how many of the $3 pens did she buy?

v. Two b. Three c. Four d. Five

11.A group consisting of 10 children and adults went to a movie theater. Children's tickets cost $5 each and adult's ticket cost $8 each and the total cost for the 10 people was $62. How many children were in the group?

a. 4
b. 5
c. 6
d.7

m. Key Concepts: average, range, mean, median and mode

1. Five friends ages are 20, 31, 28, 31, and 25. How many are older than the average age? a. 2 b. 3 c. 4 d. 1	2. Five friends ages are 20, 31, 28, 31, and 25. What is range of their ages? a. 6 b. 11 c. 13 d. 7
3. If 2 is taken out of the series of numbers below, which measure will remain the same? 2 3 4 6 6 7 a. Mean b. Median c. Mode d. Range	

n. Simplify Expressions

1. $If\ 4b-1=b\ ,\quad then\ 24b=?$ a. $\frac{1}{3}$ b. 8 c. 4 d. -3	2. $\left(\frac{5a}{b}\right)^2=?$ a. $\frac{5a^2}{b^2}$ b. $\frac{25a}{b^2}$ c. $\frac{25a^2}{b^2}$ d. $\frac{10a^2}{b}$

3. $\left(\frac{7}{x}\right)^2 = ?$ a. $\frac{14}{x^2}$ b. $\frac{49}{x^2}$ c. $\frac{7^2}{x}$ d. $\frac{x^2}{49}$	4. $\left(\frac{12}{b}\right)^2 = ?$ a. $\frac{24}{b^2}$ b. $\frac{12}{b}$ c. $\frac{144}{b}$ d. $\frac{144a^2}{b^2}$
5. $If\ a \neq 0\ ,\ a \neq 1\ ,\ and\ \frac{ax-b}{a-1} = b\ ,what\ is\ the\ value\ of\ x?$ a. b b. 1 c. a d. $\frac{b}{a}$	7. If $a + \sqrt{x} = b, then\ x = ?$

O. Self check practice

1. You receiced 10% off the original price (P) of air jordans. Write an expression for the sale price of the jordans.
   a. $P - 10$
   b. $P - 10P$
   c. $0.9P$
   d. $0.1P - 1P$

2. The formula below represents how long a ball dropped from *s* feet takes to hit the ground in *t* seconds. How much longer would it take the ball to hit the ground from 32 feet than from 8 feet?

$$t = \frac{\sqrt{s}}{4}$$

   a. $\sqrt{2}\ sec$
   b. $\sqrt{0.5}$sec
   c. $0.707\ sec$
   d. $1.414\ sec$

3. Alice earns x dollars per hour for the first 40 hours she works and 1.5 times as much for each hour over 40. If Alice works for 48 hours, how much money will she earn?

   a. $52x$
   b. $48x$
   c. $40 + 12x$
   d. 40x+12

4. Last week Maria bought k pounds of cherries at $2.75 per pound. This week cherries are on sale for 20% off, and Maria bought twice as many pounds as she did last week. What is the total, in dollars, she paid for last and this week's cherries?

   a. 3k
   b. 4.95k
   c. 7.15k
   d. 8.25k

5. If $xy = k$, where *k* is a constant, and $y = 4\ when\ x = 6, what\ is\ y\ when\ x = 8$?
    a. 2
    b. 4
    c. 3
    d. 18

6. $If\ xy = k, where\ k\ is\ a\ constant, and\ y = 5\ when\ x = 8, what\ is\ y\ when\ x = 4?$
    a. 4
    b. 10
    c. 20
    d. 5

7. $If\ xy = k, where\ k\ is\ a\ constant, and\ y = 3\ when\ x = 4, what\ is\ y\ when\ x = 24?$
    a. 2
    b. $\frac{1}{2}$
    c. 3/2
    d. 6

8. $If\ y\ varies\ directly\ as\ x, and\ y = 8\ when\ x = 2, what\ is\ x\ when\ y = 2?$
    a. $\frac{1}{2}$
    b. 4
    c. $\frac{1}{4}$
    d. 16

9. $If\ y\ varies\ directly\ as\ x, and\ y = 24\ when\ x = 6, what\ is\ y\ when\ x = 4?$
   a. 16
   b. 8
   c. 12
   d. 32

10. Which is equivalent to $7x^2 + 21$?
   a. $3(7x^2 – 7)$
   b. $7(x^2 - 3)$
   c. $7(x^2 + 3)$
   d. $3(x^2 + 7)$

11. If the length of a rectangle is 4 more than its width and the perimeter of the rectangle is 52, find the width.
   a. w = 11
   b. w = 8
   c. w = 52
   d. w = 12

12. If a circle has a radius, r, and area, A, find r in terms of A.
   a. $r = A\pi^2$
   b. $r = A/\pi$
   c. $r = \sqrt{\frac{A}{\pi}}$
   d. $r = \frac{\sqrt{A}}{\pi}$

13. Which two are NOT a factor of $2x^2 - x - 6$
    a. (2x-3)
    b. (2x+3)
    c. (x+2)
    d. (x-2)

14. Sarah bought 7 pens from a bookstore. Some of the pens cost $3 each, and the rest cost $4 each. If she paid a total of $23 for the pens, how many of the $3 pens did she buy?
    a. 2
    b. 3
    c. 4
    d. 5

15. It costs Jenny 31.95d+0.10m dollars to rent a car for *d* days and drive it *m* miles. How much does it cost Jenny to rent a car for 5 days if the car is driven a total of 600 miles?
    a. $159.75
    b. $165.75
    c. $219.75
    d. $759.75

16. If $\frac{5}{2}x + 4 = 8$, then x =
    a. $\frac{8}{5}$
    b. 4
    c. $\frac{24}{5}$
    d. 10

17. If $x - 10 = 5x - 10$ what is the value of x?
    a. – 5
    b. $-3\frac{2}{3}$
    c. 0
    d. 5

18. If 6(t – 2) – 4 = 2t, then t =
    a. -2
    b. 0
    c. 2
    d. 4

19. The formula for converting temperature from Fahrenheit(F) to Celsius(C) is $C = \frac{5}{9}(F - 32)$. If the temperature is 77 Fahrenheit degrees, what is it in Celsius?
    a. 25 degrees Celsius
    b. $41\frac{2}{3}$ degrees Celsius
    c. 45 degrees Celsius
    d. $60\frac{5}{9}$ degrees Celsius

20.
At a restaurant the cost for a breakfast taco and a small glass of milk is $2.10. The cost for 2 tacos and 3 small glasses of milk is $5.15. Which pair of equations can be used to determine *t*, the cost of a taco, and *m*, the cost of a small glass of milk?

21.

The Frosty Ice-Cream Shop sells sundaes for $2 and banana splits for $3. On a hot summer day, the shop sold 8 more sundaes than banana splits and made $156.

22.

Chase and Sara went to the candy store. Chase bought 5 pieces of fudge and 3 pieces of bubble gum for a total of $5.70. Sara bought 2 pieces of fudge and 10 pieces of bubble gum for a total of $3.60. Which system of equations could be used to determine the cost of 1 piece of fudge, f, and 1 piece of bubble gum, g?

23.

At a college bookstore, Carla purchased a math textbook and a novel that cost a total of $54, not including tax. If the price of the math textbook, m, is $8 more than 3 times the price of the novel, n, which system of linear equations could be used to determine the price of each book?

24.

Marcos had 15 coins in nickels and quarters. He had 3 more quarters than nickels. He wrote a system of equations to represent this situation, letting x represent the number of nickels and y represent the number of quarters. Then he solved the system by graphing. What is the solution?