

WSMC First Round Knowdown 2005

"I will read the question twice then you will have 10 seconds to answer and your last answer given in the ten seconds will be the accepted one. If the answer is incorrect you will be retired from the competition. Are there any questions? Let's begin."

1.	Find x if 50% of x is 120.	240
2.	Simplify the square root of x^6 ?	x^3
3.	Evaluate and simplify $9/6$ divided by 2.	$3/4$
4.	The square root of 30 is between which two consecutive integers.	5 and 6
5.	Evaluate $-3x^3y$ when $x = 1$ and $y = 7$.	-21
6.	What is the median of 10, 10, 10, 12, 12, and 14?	11
7.	If a circle has a circumference of 16π , what is its diameter?	16
8.	If the volume of a cube is 8, what is the surface area?	24
9.	Evaluate 7^2 divided by 14^2 .	$1/4$
10.	If $F(x) = 2x - 9x^2$, find $F(3)$	-75
11.	Find the slope of the line through (6,3) and (4,5)	-1
12.	Evaluate $(1/2)$ plus $(2/3)$	$7/6$ or $1 \frac{1}{6}$
13.	Solve for x in $5x - 30 = 40$	14
14.	Find the slope of the line with the equation $6y + 3 = 12$.	0
15.	Find 250 increased by 150%	625
16.	If $F(x) = 1 - x $ find $F(-6)$	7

17.	Give the fractional answer to $1/3 - 0.6$ repeating	$-1/3$
18.	Solve for x in $-2x > 22$	$x < 11$
19.	Evaluate the square root of 36 divided by 6^2 .	$1/6$
20.	If $F(x) = 8x - x^2$, find $F(3)$	15
21.	Find the slope of the line through (0,5) and (4,0)	$-5/4$
22.	Evaluate $(1/2) + (1/3) + (1/6)$	1
23.	Solve for x in $(x-3)/2 = 8$	19
24.	Find the slope of the line with the equation $7y = 5 - 2x$.	$-2/7$
25.	Find the ratio of x and 200% of x.	$1/2$
26.	If $F(x) = -2 - x^2 $ find $F(2)$	6
27.	Evaluate 98 times 7	686
28.	Solve for x in $2x - 5 \neq 7$	$x \neq 6$
29.	Find the surface of a 1 by 1 by 2 rectangular solid.	10
30.	If the ratio of the area of two similar objects is 4:9, what is the ratio of the heights?	2:3

WSMC Regional Second Round Knowdown 2005

"The second round will consist of five questions. In this round I will read the question and all of you will write your final answer on the paper in front of you. You will have 15 seconds to answer and I will count down the final three seconds; 3, 2, 1, 0. When I say zero your pencil must be on the desk in front of you or you will be disqualified. Your answers will be checked after each question. Each correct answer will earn a point. At the end of round two, participants are ranked. If there is clearly a first, second and third, Knowdown is over. If there are ties, they will be broken by sudden death Third Round Play. Are there any questions? Let's begin."

1	How many different arrangements of the letters in the word 'happy' are there?	60
2	Find the value of x that minimizes y in $3x^2-3x+7=y$.	$1/2$
3	A runner races at 7 m/s. What is the runner's speed in km/hr?	25.2
4	After finding the smallest number that has three factors besides 1 and itself, multiply these three factors.	64
5	A trapezoid has parallel bases of 7 and 10. One leg is perpendicular to a base and is 4. What is the length of the other leg?	5

WSMC Regional : Third Round Knowdown 2005

"I will project the question and you will have 20 seconds to write and circle your answer on your paper. I (we) will count down the last three seconds as in round two and then collect or score your papers. If your pencil is not down by the count of zero, your answer will not be accepted. You will be able to use an SAT approved calculator on this section. Are there any questions? Let's begin."

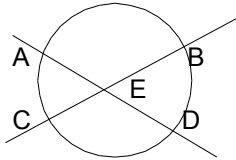
Slide 10

Simplify and give answer with positive exponents only:

$$\frac{-18x^{-3}y^3z^0}{2x^3(-3y)^2z}$$

Slide 11

If $AE=9$, $BE=12$, and $DE=10$, find EC .



Slide 12

Multiply these matrices:

$$\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix} \cdot \begin{bmatrix} 5 & 4 \\ 4 & -1 \\ 2 & -2 \end{bmatrix}$$

Slide 13

If $x < 0$, solve for x in:
 $2(x^{1/3}-5)^2-128=0$.

Slide 14

A sphere with a radius of 13 cm.
is intersected by a plane 5 cm.
from the center of the sphere.
What is the area to two decimal
places of the circle formed?

Slide 15

Find the equation of the line
through (7, 2)
parallel to
 $3x+2y=12$.

Slide 16

The ratio of the angles of a triangle is 1:1:3. What is the measure in degrees of the smallest exterior angle?

Slide 17

Two concentric spheres differ in volume by 26 cubic meters. The ratio of their radii is 1:3. What is the volume in cubic meters of the smaller sphere?

Slide 18

Find the midpoint of $(-9, 4, 7)$ and $(-6, 5, -4)$.

Slide 19

Find the solution to this system of equations:

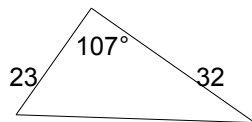
$$\begin{aligned}x - 2y &= 7 \\ 2x + 3y &= 49\end{aligned}$$

Slide 20

Find the maximum value of $f(x)$ if:
 $f(x) = -5x^2 + 8x + 12$

Slide 21

Find the unknown side of the triangle to two decimal places:



Slide 22

Find all values of x such that $\sin(2x)=1/2$ and $0<x<360$.

Slide 23

Find the length to two decimal places of a diagonal in a rectangular solid with dimensions of 7.2, 3.6 and 4.2.

Slide 24

Describe the transformation where (x, y) is mapped to $(2x, 2y)$

Slide 25

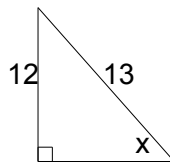
Given these probabilities:
 $P(A \text{ and } B) = 1/2$,
 $P(B) = 2/3$, and
 $P(A \text{ or } B) = 1/3$.
What is $P(A)$?

Slide 26

If $f(x) = x/(x-3)$, find the
inverse of $f(x)$.

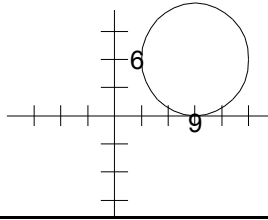
Slide 27

Find the measure in degrees of
angle x to two decimal places:



Slide 28

Write the equation of this circle:



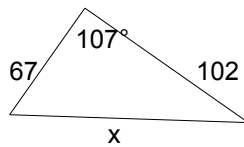
Slide 29

If $f(x)$ is a function over the real numbers, what is the domain of

$$f(x) = \frac{f(x) \text{ if } x^2 - 6x + 9}{x^2 - 6x + 9}$$

Slide 30

Find the length of x to two decimal places:



Solve for all possible values of θ
where $0^\circ \leq \theta \leq 360^\circ$:

$$2 \tan^2(\theta) - 1 = 0.$$

Third Round Answers

1. $-y/(x^6z)$
2. $90/12 = 7.5$
3.

10	8
8	-2
4	-2
4. 2197 or -27
5. 452.39
6. $3x+2y=21$
7. 72
8. 1
9. (-7.5, 4.5, 1.5)
10. (17, 5)
11. 15.2
12. 44.54
13. 15, 75, 195, 255
14. 9.08
15. dilation (scale factor 2 centered at origin)

16. $1/6$
17. $(3x)/(x-1) = y$
18. 67.38
19. $(x-9)^2 + (y-6)^2 = 36$
20. all reals except 3
21. 137.44
22. 35.26, 215.26, 144.74, 324.74