1

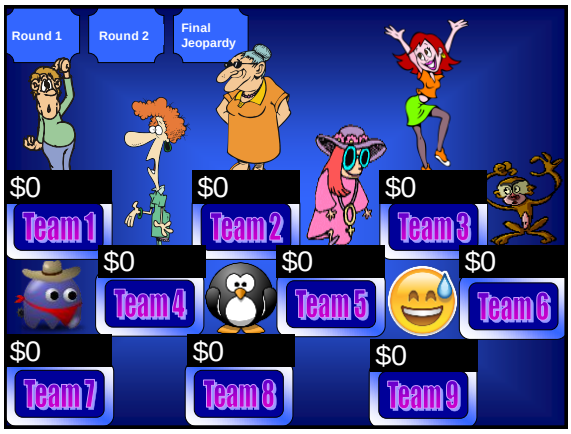
RULES:

Every team does every problem.

Answers MUST go on your own paper. The group answer goes on the whiteboard.

I will give a 20 second timer. Your group's answer MUST go up when the timer goes off!

2



3

4

$100 Feel the Power

How many mistakes are there? Describe it/them.

Ling is finding the volume of a cube with an edge length of $5ab^3$. Her work is shown. 8.EE.1

Part A:

Step 1 $V = (5ab^3)^3$

Step 2 $V = 5^3(a)^3(b^3)^3$

Step 3 $V = 15a^3b^6$

5

$100

Part A:

Step 1 $V = (5ab^3)^3$

Step 2 $V = 5^3(a)^3(b^3)^3$

Step 3 $V = 15a^3b^6$

2 mistakes:

5^3 is 125, not 15

$(b^3)^3$ is b^9, not b^6

Scores

6

$200 Feel the Power **NO CALC**

In the final game of a baseball tournament, about 5 x 10^4 fans attended the game and about 1 x 10^7 fans watched the game on television.

A. How many times more fans watched on TV than in person?

B. How many more fans watched on TV than in person?

7

$200

A: $\frac{1\times10^7}{5\times10^4} = 0.2 \times 10^3 = 200$

B: 10,000,000
– 50,000
9,950,000

A. 200 times more fans

B. 9,950,000 more fans

Scores

8

$300 Feel the Power **NO CALC**

Match each expression on the left with an expression on the right. The expressions on the right can be used more than once.

1) $\frac{3^{-7}}{3^{-9}}$
2) $\frac{9}{9^0}$
3) $(9^3)(9^{-4})$
4) $\frac{3^3}{3^4}$

A $\frac{1}{9}$
B $\frac{1}{3}$
C 3
D 9

9

$300

$\frac{3^{-7}}{3^{-9}} = 3^{-7-(-9)} = 3^2 = 9$

$\frac{9}{9^0} = \frac{9}{1} = 9$

$(9^3)(9^{-4}) = 9^{-1} = \frac{1}{9^1}$

$\frac{3^3}{3^4} = 3^{-1} = \frac{1}{3^1}$

1) D
2) D
3) A
4) B

Scores

10

$400 Feel the Power **NO CALC**

Which expressions are equivalent to $\frac{3^2}{3^{-5}}$?

A. $\frac{3\cdot3}{3\cdot3\cdot3\cdot3\cdot3}$

B. 3^{2-5}

C. 3^{2+5}

D. $\frac{3^4}{3^{-3}}$

E. 3^7

F. $\frac{1}{3^3}$

G. $3^2 \cdot 3^5$

11

$400

$\frac{3^2}{3^{-5}} = 3^{2-(-5)} = 3^7$

A is 3^{-3}
B is 3^{-3}
C is 3^7
D is 3^7

E is 3^7
F is 3^{-3}
G is 3^7

C, D, E, G

Scores

12

$500 Feel the Power

Choose all of the expressions that are equivalent to $16x^8$.

A. $2x^5 \cdot 8x^3$ B. $\frac{20x^{10}}{4x^2}$ C. $\frac{32x^9}{2x}$

D. $(4x^4)^2$ E. $(8x^4)^2$ F. $4x^4 \cdot 4x^2$

G. $\frac{16x^3}{x^{11}}$ H. $(16x^8)^1$ I. $(16x^8)^0$

13

$500

A, C, D, H

A is $16x^8$ F is $16x^6$

B is $5x^8$ G is $16x^{-8}$

C is $16x^8$ H is $16x^8$

D is $16x^8$ I is 1

E is $64x^8$

Scores

14

$100 Don't be Irrational **NO CALC**

Select **all** equations that are correct.

A $\sqrt[3]{8} = 2$

B $\sqrt{125} = 5$

C $\sqrt[3]{99} = 33$

D $\sqrt{169} = 13$

E $\sqrt[3]{27} = 3$

15

$100

A, D, E

Select **all** equations that are correct.

A $\sqrt[3]{8} = 2$

B $\sqrt{125} = 5$

C $\sqrt[3]{99} = 33$

D $\sqrt{169} = 13$

E $\sqrt[3]{27} = 3$

$2 \cdot 2 \cdot 2 = 8$

$5 \cdot 5 \neq 125$

$33 \cdot 33 \cdot 33 \neq 99$

$13 \cdot 13 = 169$

$3 \cdot 3 \cdot 3 = 27$

Scores

16

$200 Don't be Irrational

Choose ALL equations/tables that are linear.

A. $y = \frac{1}{2}x^2 + 8$

B. $y = 4(2 + x) + 2x$

C. $y = x(2x + 1)$

D.

x	y
0	3
2	6
4	12
6	24
8	48

E.

x	y
1	7
2	10
3	13
4	16
6	22

17

$200

A: Exponent → Nonlinear

B: Simplifies to 8 + 6x → Linear

C: Simplifies to $2x^2 + x$ → Nonlinear

D: Not a constant R.O.C. → Nonlinear

E: R.O.C. is a constant 3/1 → Linear

B and E

Scores

18

$300 Don't be Irrational

How many solutions do each of these equations have?

A. $x^2 = 100$

B. $x^3 = 27$

C. $x^3 = -27$

D. $x^2 = 26$

E. $x^2 = -16$

F. $x^3 = -\frac{8}{27}$

19

$300

A. Two (10 and -10)

B. One (Just 3)

C. One (Just -3)

D. Two (About 5.1 and -5.1)

E. Zero

F. One (-2/3)

Scores

20

$400 Don't be Irrational

Which of these are irrational? Select ALL that apply.

A. 4.2587

B. $\sqrt{81}$

C. $\frac{18}{79}$

D. $\sqrt[3]{12}$

E. 1.232323…

F. $\sqrt{50}$

G. $\sqrt[3]{8}$

H. $\frac{\pi}{\pi}$

21

$400

D and F

Terminating = Rational

A. 4.2587

B. $\sqrt{81}$ = 9; Rational

C. $\frac{18}{79}$ Fraction; Rational

D. $\sqrt[3]{12}$

Non-exact root = Irrational

Repeating decimal; rational ($1\frac{23}{99}$)

E. 1.232323…

Non-exact root = Irrational

F. $\sqrt{50}$

G. $\sqrt[3]{8}$ = 2; Rational

H. $\frac{\pi}{\pi}$ = 1; Rational

Scores

22

$500 Don't be Irrational

Classify each as:

A. Defined and Rational

B. Defined and Irrational

C. Undefined

1) $\sqrt{-49}$

2) $\sqrt{7}$

3) $\sqrt[4]{-16}$

4) $\sqrt[3]{18}$

5) $\sqrt[3]{-8}$

23

$500

1) $\sqrt{-49}$ Not possible! Undefined

2) $\sqrt{7}$ There is an answer, but it's a decimal

3) $\sqrt[4]{-16}$ Not possible! Undefined

4) $\sqrt[3]{18}$ There is an answer, but it's a decimal

5) $\sqrt[3]{-8}$ -2 x -2 x -2 = -8; Rational

1) C

2) B

3) C

4) B

5) A

Scores

24

$100 LINE It Up

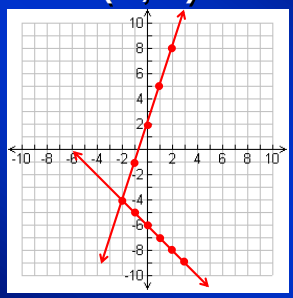
Solve the system of equations by graphing:

$$\begin{cases} y = -x - 6 \\ y = 3x + 2 \end{cases}$$

25

$100

(-2, -4)



Scores

26

$200 LINE It Up

John and Paul each had a big math assignment to do. The number of problems John had left is represented by the equation y = -4x + 50, where x represents the number of minutes he has been working. The number of problems Paul has left is given in the table. Who was working faster?

# of minutes	0	2	5	7	11
# problems left	60	54	45	39	27

27

$200

John (he was doing 4 problems per minute; Paul was only doing 3 problems per minute)

Scores

28

$300 LINE It Up

For $1200, a business can post an advertisement for 30 days. For $1500, the advertisement will be posted for 60 days. The relationship comparing cost to days is linear. Which function can be used to model the relationship between cost, *y*, and the number of days, *x*, that an advertisement will be posted?

A. $y = 300x + 1200$

B. $y = 1200x + 300$

C. $y = 10x + 900$

D. $y = 900x + 10$

29

$300

$$\frac{1500 - 1200}{60 - 30} = \frac{\$300}{30\ days}$$

This would be $10 per day.

C: y = 10x + 900

Scores

30

$400 LINE It Up

The points (3, 10), (5, 14), and (8, 20) satisfy a linear function. Which point satisfies the SAME linear function?

A. (1, 2)

B. (10, 22)

C. (12, 28)

D. (16, 40)

31

$400

Make a table; the rate of change should be 2/1.

Extend the pattern, and you will get C.

OR find the equation, which is $y = 2x + 4$.

C (12, 28)

Scores

32

$500 LINE It Up

To ship packages, Company A and Company B both charge a certain price per ounce, plus a "flat fee". At Company A, a 5-oz package costs $3.25 and a 6-oz package costs $3.40. At Company B, a 3-oz package costs $3.90 and a 5-oz package costs $4.10. Which company has a <u>higher flat fee</u>, and by how much?

33

$500

Company B's flat fee is higher by $1.10

(Company A: $2.50 flat fee, $.15 per ounce;

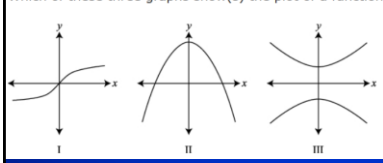
Company B: $3.60 flat fee, $.10 per ounce)

Scores

34

$100 FUNctions

Which of these three graphs show(s) the plot of a function with input *x* and output *y*?



A. I only

B. II only

C. I and II only

D. I, II, and III

35

$100

C: I and II only

(on graph III, each x-value has multiple y-values)

Scores

36

$200 FUNctions

Air temperature affects the speed of sound. The relationship between the temperature of air, T (in degrees celsius) and the speed of sound, S, is given by the function **S = 331.5 + 0.61T**. At what air temperature is the speed of sound 343.7 meters per second?

37

$200

343.7 = 331.5 + 0.61T

12.2 = 0.61T

20º C

Scores

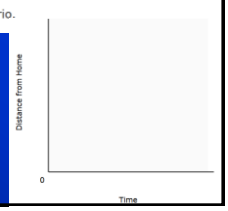
38

$300 FUNctions

David is getting ready to go to school.

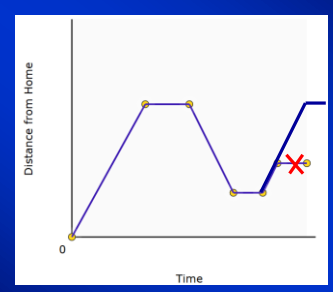
- He rides his bike from his house to the school at a constant rate.
- When he gets to school, he chains his bike to a bike rack and goes to class.
- After class, David realizes he forgot his lunch at home and rides his bike back towards his house at a constant rate.
- Before arriving home, he decides to use the $5 he has to buy lunch at school. He stops, turns around immediately and rides his bike back to school at a constant rate.
- When he gets to the school, he chains his bike to the bike rack.

Graph the motion of David's bike over time in this scenario.



39

$300



Scores

40

$400 FUNctions

Mike and Tim each opened bank accounts on the same day.

- Mike opened a bank account with $80.
- Mike deposits $20 each week.
- Tim opened a bank account with $500.
- Tim withdraws $50 each week.

After how many weeks will Mike and Tim have the same amount of money in their accounts? How much money will they each have?

41

$400

80 + 20x = 500 – 50x

x = 6

6 weeks, $200

Scores

42

$500 FUNctions

Which story matches the graph?

A. Tom took his dog for a walk to the park. He set off slowly and then increased his pace. At the park Tom turned around and walked slowly back home.

B. Tom rode his bike east from his home up a steep hill. After a while the slope eased off. At the top he raced down the other side.

C. Tom went for a jog. At the end of his road he bumped into a friend and his pace slowed. When Tom left his friend he walked quickly back home.

43

$500

C

Scores

44

$100 Solve It!

Mr. Zane wrote two equations on the board:

$K\ 3(x - 12) - 3x = 12$
$L\ 3(x - 4) + 24 - 3x = 12$

Which statement is true about the two equations?

A. Equation K has one solution and equation L has no solution.
B. Equation L has one solution and equation K has no solution.
C. Equation K has no solution and equation L has infinite solutions.
D. Equation L has no solution and equation K has infinite solutions.

45

$100

Equation K:

$3(x - 12) - 3x = 12$
$3x - 36 - 3x = 12$
$-36 = 12$

Equation L:

$12 = 12$

C

Scores

46

$200 Solve It!

Put a number in each blank so that the equation would have no solution.

-2(-3x + 4) – 4x = ___x – ___

47

$200

-2(-3x + 4) – 4x = ___x – ___

2x – 8 = ___x – ___

1st blank: 2

2nd blank: anything besides 8

Scores

48

$300 Solve It!

Solve the equation:

4x – 9 – 7x – 18 = -3(-x + 1)

49

$300

4x – 9 – 7x – 18 = -3(-x + 1)

-3x – 27 = 3x – 3

– 27 = 6x – 3

– 24 = 6x

-4 = x

Scores

50

$400 Solve It!

Solve the system:

$$\begin{cases} y = 5x - 9 \\ 4x - 2y = 0 \end{cases}$$

51

$400

$$\begin{cases} y = 5x - 9 \\ 4x - 2y = 0 \end{cases}$$

$$4x - 2(5x - 9) = 0$$
$$4x - 10x + 18 = 0$$
$$-6x + 18 = 0$$
$$-6x = -18$$

x = 3

y = 6

Scores

52

$500 Solve It!

Solve the system:

$$\begin{cases} x - 3y = 25 \\ 3x + 2y = 20 \end{cases}$$

53

$500

$$-3(x - 3y = 25)$$
$$3x + 2y = 20$$

$$-3x + 9y = -75$$
$$3x + 2y = 20$$

$$11y = -55$$
$$y = -5$$

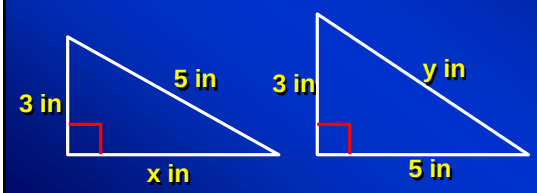
(10, -5)

Scores

54

$100 Angles and Tri-angles

How much longer is y than x? Round to the nearest hundredth of an inch.



55

$100

$x^2 + 3^2 = 5^2$ $\quad$ $3^2 + 5^2 = x^2$

$x = 4$ $\quad$ $x \approx 5.83$

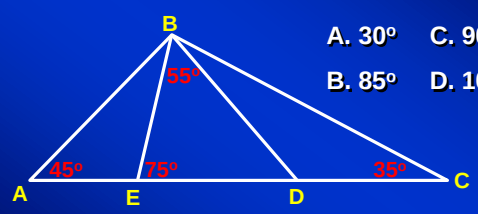
1.83 in

Scores

56

$200 Angles and Tri-angles

Find the measure of $\angle ABD$.

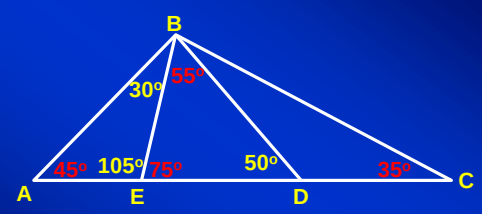


A. 30° C. 90°

B. 85° D. 100°

57

$200



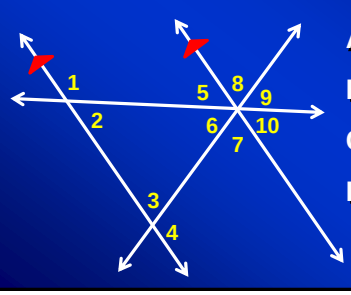
B. 85°

Scores

58

$300 Angles and Tri-angles

Which of these pairs of angles MUST be congruent?



A. 2 and 3

B. 3 and 5

C. 1 and 4

D. 3 and 8

59

$300

D. 3 and 8

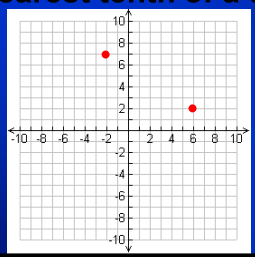
(corresponding angles, attached to the same transversal)

Scores

60

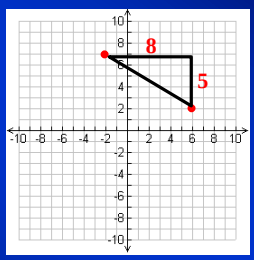
$400 Angles and Tri-angles

Find the distance between the points (-2, 7) and (6, 2). Round to the nearest tenth of a unit.



61

$400



$$8^2 + 5^2 = d^2$$

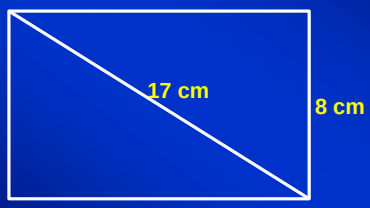
9.4 units

Scores

62

$500 Angles and Tri-angles

Find the area and perimeter of the rectangle. Round answers to the nearest tenth.



63

$500

$$8^2 + x^2 = 17^2$$

Area = 120 cm²

Perimeter = 46 cm

Scores

64

$100 I Can Transform Ya

Line segment AB, whose original length is 10 units, is translated up four units, rotated 90º clockwise, and then dilated by a scale factor of two. Which of the following is true?

A. The length of the image is 5 units

B. The length of the image is 10 units

C. The length of the image is 20 units

D. The length of the image is 28 units

65

$100

Translation: length stays the same

Rotation: length stats the same

Dilation: length doubles

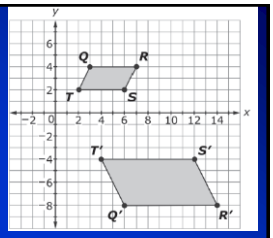
C

Scores

66

$200 I Can Transform Ya

What sequence of transformations maps QRST onto Q'R'S'T'?



A. Reflection over x-axis, then dilation by a scale factor of 2

B. 90º clockwise rotation, then dilation by a scale factor of 2

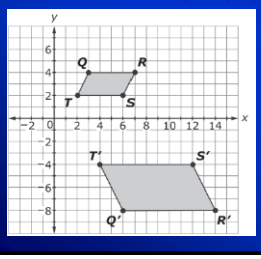
C. Dilation by a scale factor of 2, then translation 2 units right and 2 units down

D. 270º counterclockwise rotation, then a dilation by a scale factor of 2

67

$200

The shape is reflected and then dilated. Multiplying the coordinates during the dilation causes it to move farther away from the origin.



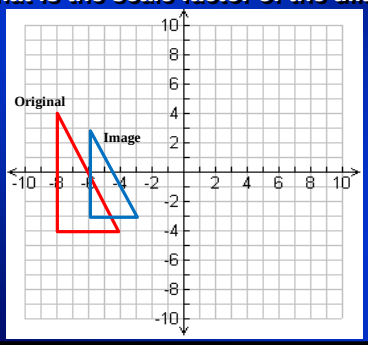
A

Scores

68

$300 I Can Transform Ya

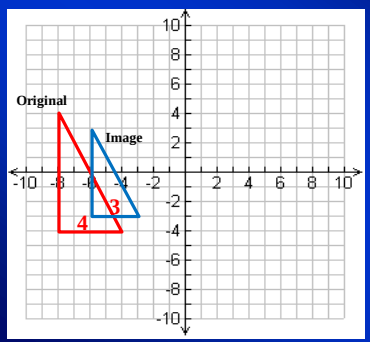
What is the scale factor of the dilation?



69

$300

4 x ? = 3 3 ÷ 4



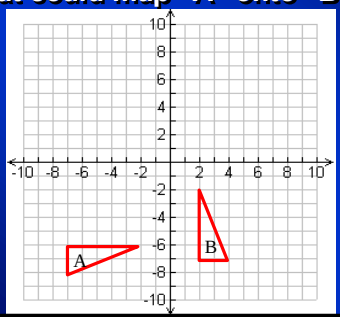
¾ or 0.75

Scores

70

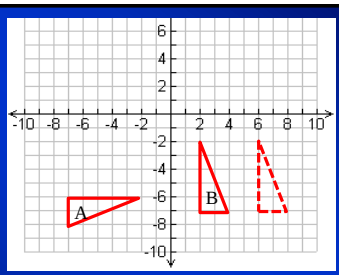
$400 I Can Transform Ya

Name a sequence of transformations that could map "A" onto "B".



71

$400



90º counterclockwise rotation (or 270º clockwise), then translation 4 units left

OR

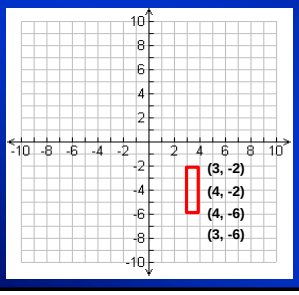
4 up, then 90º CCW rotation

Scores

72

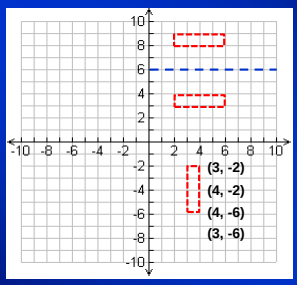
$500 I Can Transform Ya

Rotate 90º counterclockwise, then reflect across the line y = 6.



73

$500

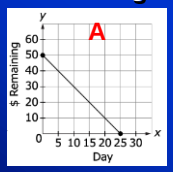


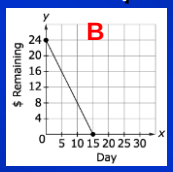
Scores

74

FINAL JEOPARDY

Rank from lowest rate of spending to highest rate of spending.





$y = -3x + 30$

C

x is # of days,
y is $ remaining

D

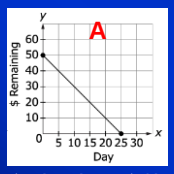
Day	0	5	10	15	20
$ Remaining	48	36	24	12	0

E

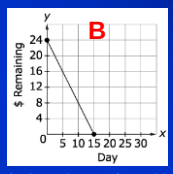
Day	0	2	4	6	8
$ Remaining	100	90	80	70	60

75

FINAL JEOPARDY



$10 in 5 days = $2/day



$8 in 5 days = $1.60/day

$y = -3x + 30$

C

x is # of days,
y is $ remaining

Slope is -3: $3/day

D

Day	0	5	10	15	20
$ Remaining	48	36	24	12	0

$12 in 5 days: $2.40/day

E

Day	0	2	4	6	8
$ Remaining	100	90	80	70	60

$10 in 2 days: $5/day

B, A, D, C, E

Scores

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