7th/8th grade Math Meet '12

Name:_____ School Team:_____

Event 1: Problem Solving (no calculators)

Part 1: Computation (2 pts. each)

1) 1/2 + 1/x + 3/10 = 1

Common denominator of 10
5/10 + ?/10 + 3/10 X = 5
? = 2, so fraction is reduced to 1/5
X = 5

2) 20% of 15 = x % of 12
.20(15) = 3
.25(12) = 3 X = 25
So x =25

3) 100 - x = (2)(3)(4) + 36

(2)(3)(4) + 36 = 60 X = 40
So 100 – x = 60
X = 40

4) 0.36 ÷ x = 4.0

36/9 = 4 X = 0.09
So, .36/.09 = 4

5) 18/42 = x/35

Reduce the fraction 18/42 = 3/7 X = 15
So when multiplying the numerator and denominator by 5, we get 15/35, so x = 15

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Name:_____ School Team:_____

Event 1: Problem Solving (no calculators)

Part 2: Problems Involving Order of Operations (2 pts. each)

Use the order of operations to evaluate each problem.

1) $3-2+3\bullet 3-\sqrt{9}$ 7

3 – 2 + 9 - 3 = 1 + 9 – 3 = 10 – 3 = 7

2) $3+8\div 4-0/5+\sqrt{16}$ 9

3 + 2 – 0 + 4 = 5 + 4 = 9

3) $\dfrac{9+7-2(3)}{3+2}$ 2

16 – 6 = 10 and 3 + 2 = 5, so 10/5 = 2

4) $36-6^2\div 9-2$ 30

36 – 36/9 – 2 = 36 – 4 – 2 = 32 – 2 = 30

5) $3(2^2+1)-30\div 3$ 5

3(4 + 1) – 10 = 3(5) – 10 = 15 – 10 = 5

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Name:_____ School Team:_____

Event 2: Conversions. (with calculators)
(5 points each)

12 inches = 1 foot
3 feet = 1 yard
1 mile = 5280 feet
3 teaspoons (t) = 1 Tablespoon (T)
8 ounces (oz) = 1 cup (c)
2 cups (c) = 1 pint (pt)
2 pints (pt) = 1 quart (qt)
2 tablespoons (T) = 1 ounce (oz)
4 quarts (qt) = 1 gallon (gal)

Perform the following conversions, using the unit ratios. When necessary, round answers to the nearest hundredth.

1) How many inches are in $2\frac{1}{3}$ yards?

   2 yards = 6 feet = 72 inches and 1/3 yards = 1 foot = 12 inches
   72 + 12 = 84

   84 inches

2) How many cups are in 4 quarts?

   2 cups in 1 pint, 4 cups in 1 quart, so
   16 cups in 4 quarts

   16 cups

3) How many ounces are in 6 pints?

   8 oz = 1 cup, 2 cups = 1 pint, so 12 cups,
   So 8(12) = 96 ounces

   96 ounces

4) How many yards are in 3 miles?

   5280 feet = 1 mile, 5280 x 3 = 15,840 feet
   3 feet = 1 yard,
   So 15840/3 = 5280 yards

   5280 yards

5) How many teaspoons are in 1 ½ cups?

   3 teaspoons = 1 tablespoon, 2 tablespoons = 1 ounce,
   So 6 teaspoons = 1 ounce
   8 ounces = 1 cup, so (8)(6) = 48 teaspoons = 1 cup
   1 cup = 48 teaspoons
   ½ cup = 24 teaspoons, 48 + 24 = 72 teaspoons

   72 teaspoons

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Name:_____School Team:_____

Event 3: Problem Solving (with calculators)

Part 1: Adding and Subtracting Mixed Numbers. (3 points each)

Add or Subtract.
Write answers as mixed numbers in reduced form. No decimal answers!

1) $1\frac{5}{8} + 2\frac{1}{2}$

13/8 + 5/2 = 13/8 + 20/8 = 33/8 = 4 1/8

$= 4\frac{1}{8}$

_____

2) $\frac{1}{6} + \frac{1}{2} + \frac{2}{3}$

1/8 + 3/6 + 4/6 = 8/6 = 1 2/6 = 1 1/3

$= 1\frac{1}{3}$

_____

3) $\frac{9}{16} - \frac{3}{8}$

9/16 - 6/16 = 3/16

$= \frac{3}{16}$

_____

4) $9\frac{1}{4} - 4\frac{5}{16}$

37/4 – 69/16 = 148/16 – 69/16 = 79/16 = 4 15/16

$= 4\frac{15}{16}$

_____

5) $9\frac{1}{32} - 3\frac{3}{8}$

289/32 – 27/8 = 289/32 – 108/32 = 181/32 = 5 21/32

$= 5\frac{21}{32}$

_____

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Name:_____School Team:_____

Event 3: Problem Solving (with calculators)
Part 2: Multiplying and Dividing Mixed Numbers (4 points each)
Multiply or Divide.
Write answers as mixed numbers in reduced form. No decimal answers!

1) $\left(\frac{1}{2}\right)\left(7\frac{1}{3}\right)$

(1/2)(22/3) = 22/6 = 3 4/6 = 3 2/3

$= 3\frac{2}{3}$

_____

2) $\left(9\frac{1}{2}\right)\left(3\frac{4}{5}\right)$

(19/2)(19/5) = 361/10 = 36 1/10

$= 36\frac{1}{10}$

_____

3) $\left(3\frac{3}{4}\right) \div \left(1\frac{1}{2}\right)$

(15/4) ÷ (3/2) = (15/4)(2/3) = 30/12 = 5/2 = 2 1/2

$= 2\frac{1}{2}$

_____

4) $\left(5\frac{5}{6}\right) \div \left(1\frac{1}{14}\right)$

(35/6) ÷ (15/14) = (35/6)(14/15) = 490/90 = 49/9 = 5 4/9

$= 5\frac{4}{9}$

_____

5) $\left(3\frac{1}{4}\right)^2$

(13/4)(13/4) = 169/16 = 10 9/16

$= 10\frac{9}{16}$

_____

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Name:_____School Team:_____

Event 4: Mental Math (no calculators)

Each answer is worth 2 pt each.

1) _____50_____

(22) + (28) = 50

2) _____58_____

26+14+35-5-9-3
40 + 30 – 9 – 3
70 – 9 – 3
61 – 3 = 58

3) _____24_____

6(2) + 5(2) + 2(1)
12 + 10 + 2 = 24

4) _____9/20_____

1/5 + 1/4
4/20 + 5/20
9/20

5) _____4_____

38 + 2 + -16 + -8 =
40 + -24 = 16
16/4 = 4

6) _____5_____

6/15 + X/15 + 5/15 = 14/15
X = 3, SO 3/15 = 1/5,
? = 5

7) _____1_____

(-3) + 2(X + 3) = 5
2(X + 3) = 8
X = 1

8) _____36_____

6 + 24 + 6
30 + 6 = 36

9) _____2_____

4 + 116 + 9 + 11
120 + 20 = 140/70 = 2

10) _____10_____

8 + 3 + 8 + 9 + 2 =
(8 + 2) + (3 + 9) + 8
10 + 12 + 8 = 30/3 = 10

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Event 5: Team Problems (with calculators)

Area, Perimeter, Circumference, Surface Area and Volume Formulas

b = base of the polygon
h = height of the polygon
b_1 = the first base
b_2 = the second base
r = radius

Area (A)		**Perimeter (P) and Circumference (C)**
Square	A = (b)(h)	P = the sum of the sides of the polygon
Rectangle	A = (b)(h)	
Parallelogram	A = (b)(h)	
Trapezoid	A = ½ h (b_1 + b_2)	
Circle	A = πr^2	C = $2r\pi$

Surface Area (SA)		**Volume (V)**
Prism	SA = ph + 2B	V = Bh
Cylinder	SA = Ch + 2B	V = Bh
Pyramid	SA = πrs + B	V = $\frac{1}{3}$ Bh
Cone	SA = πrs + B	V = $\frac{1}{3}$ Bh
Sphere	SA = $4\pi r^2$	V = $\frac{4}{3}\pi r^3$

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Name:_____School Team:_____

Event 5: Team Problems (with calculators)

Problem 1: Area & Perimeter Problems involving Polygons
(5 points each) LABEL YOUR ANSWERS! You must use $\pi = 3.14$

1) An illuminated sign in the main entrance of a hospital is a parallelogram with a base of 56 in. and an adjacent side of 42 in. How many inches of aluminum molding are needed to frame the sign?
   Perimeter is the sum of the sides: 56 + 56 + 42 + 42 = 196

   196 inches

2) The square parking lot of a doctor's office is to have curbs built on all four sides. If the lot is 160 ft on each side, how many feet of curb are needed? Allow 12 ft for a driveway into the parking lot.
   Perimeter of the lot is the sum of the sides or 160(4) = 640 total
   640 – 12 (no curb for driveway) = 628

   628 feet

3) The six glass panes in a kitchen light fixture each measure 4 ½ in. along the top and 10 in. along the bottom. The top and bottom are parallel. The height of each pane is 8 in. What is the combined area of the six trapezoidal panes?
   Trapezoid area formula: 1/2(8)(4.5 + 10) = 58 total area (6 panes) = 348

   348 square inches

4) Tiles that are 6 in. x 6 in. cover the floor of a shower. How many whole tiles are needed for the floor if the shower measures 4.5 ft by 6 ft?
   Each tile is 36 square inches, area of the shower in inches:
   4.5(12) X 6(12) = 3888 square inches total. 3888/36 = 108 tiles

   108 tiles

5) Madison Duke is wallpapering the walls of a laundry room 8 ft by 8 ft by 8 ft high. How many square feet of paper will she need if there are 63 square feet of openings in the room?
   Area of a wall is 8(8) = 64 (4 walls) = 256 square feet of paper – 63 in opening = 193
   193 square feet

7th/8th grade Math Meet '12

Name:_____School Team:_____

Event 5: Team Problems (with calculators)

Problem 2: Area & Circumference Problems involving Circles.
(5 points each) LABEL YOUR ANSWERS! You must use $\pi = 3.14$

1) Find to the nearest inch the circumference of a circle with a radius of 1 ft 9 in.
   C = 2rπ so 2(21)π
   132 inches

2) Find the area to the nearest square inch of the top of a circular tank with a diameter of 12 ft 8 in.
   D = 152, r = 76 A = (3.14)r² = (76)(76)(3.14) = 18,137

   18,137 square inches

3) A 15-in. diameter wheel has a 3-in. hole in the center. Find the area of a side of the wheel to the nearest tenth.
   r = 7.5 the inner r = 1.5 A = (7.5)(7.5)(3.14) – (1.5)(1.5)(3.14)

   169.6 square inches

4) Sam has a circular pool with a diameter of 30 feet. There is a 3 foot wide walkway that goes around the pool. How much fencing is needed to go around the walkway? Round answer to the nearest tenth.
   r = 15 radius including walkway = 18 C = 2r(3.14) = 2(18)(3.14)

   113.0 feet

5) A swimming pool is circular with a diameter of 30 feet. There is a 5 foot wide walkway surrounding the pool. What is the area of the walkway? Round to the nearest tenth.
   r = 15, radius with the walkway = 20.
   Area: (20)(20)(3.14) – (15)(15)(3.14)

   549.5 square feet

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Name:_____School Team:_____

Event 5: Team Problems (with calculators)

Problem 3: Surface Area Application Problems.
(5 points each) LABEL YOUR ANSWERS! You must use $\pi = 3.14$

1) How many square inches are in the total surface area of an aluminum box with a 2 ½ in. length, 4 ¾ in. height, and 3 in. width? Round to the nearest hundredth.
   Surface Area: Base perimeter = 2.5 + 2.5 + 3 + 3 = 11,
   ph = 11(4.75) = 52.25
   Area of 2 bases = (2.5)(3) = 7.5, 52.25 + 7.5 + 7.5 = 67.25

   67.25 square inches

2) How many square centimeters of sheet metal are needed to form a conical rain cap 25 cm in diameter if the slant height is 15 cm? Round to the nearest hundredth.
   Πrs + B = (12.5)(15)(3.14) + (12.5)(12.5)(3.14) = 1079.38

   1079.38 square centimeters

3) What is the total surface area of a cylindrical oil storage tank that has a 40-ft diameter and 15-ft height?
   Radius = 20, 2(20)(15)(3.14) + 2(3.14)(20)(20) = 4396

   4396 square feet

4) How many square feet of steel are needed to manufacture a spherical water tank with a diameter of 45 ft? Round to the nearest tenth.
   Radius = 22.5, 4(3.14)(22.5)(22.5) = 6358

   6358.5 square feet

5) Find the total surface area of a conical tank that has a radius of 15 ft and a slant height of 20 ft. Round to the nearest tenth.
   (3.14)(15)(20) + (3.14)(15)(15) = 1648.5

   1648.5 square feet

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Name:_____School Team:_____

Event 5: Team Problems (with calculators)

Problem 4: Application Problems involving Volume.
(5 pts. each) LABEL YOUR ANSWERS! You must use $\pi = 3.14$

1) What is the volume of a cylindrical oil storage tank that has a 40-ft diameter and 15-ft height? Round to the nearest whole number.
r = 20, (20)(20)(15)(3.14) = 18,840

18,840 cubic feet

2) How many cubic feet are in a conical pile of sand that is 30 ft in diameter and is 20 ft high?
r = 15, 1/3(3.14)(15)(15)(20) = 4710

4710 cubic feet

3) A cone-shaped storage container holds a photographic chemical. If the container is 80 cm wide and 30 cm high, how many liters of the chemical does it hold if 1 L = 1,000 cm^3 ? Round to nearest whole liter.
r = 40, 1/3(3/14)(40)(40)(30) ÷ 1000 = 50

50 liters

4) Find the volume of a pyramid that has a square base of 48 m on a side and a height of 100 m.
Area of the base = (48)(48) = 2304, Volume = 1/3(2034)(100) = 76,800

76,800 cubic meters

5) If 1 ft^3 = 7.48 gal, how many gallons can a spherical water tank hold if its diameter is 45 ft? Round to nearest whole gallon.
radius = 22.5 Volume = 4/3(22.5)(22.5)(22.5)(3.14) ÷ 7.48 = 6,376

6,376 gallons