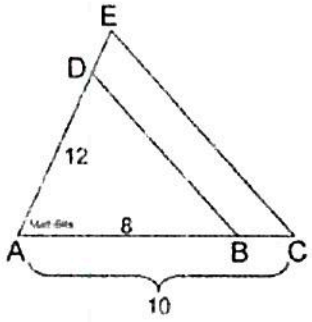
Name:_____ Date:_____
Period:_____ Ms. Simon

Mock Regents

Answer all 16 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet.

1. In $\Delta AEC, \overline{DB} \parallel \overline{EC}, AC = 10$, $AB = 8$, and $AD = 12$. Find DE.



○ [1] 1.75 ○ [2] 2 ○ [3] 3 ○ [4] 4

2. What is the equation of the line parallel to the line whose equation is $5y + 8 = -2x$?

○ [1] $y = -2x + 3$ ○ [2] $y = 2x + 1$ ○ [3] $y = -2/5\,x + 4$ ○ [4] $y = 5/2\,x - 1$

3. Which three dimensional figure will be created if a rectangle is rotated about one of its lines of symmetry?

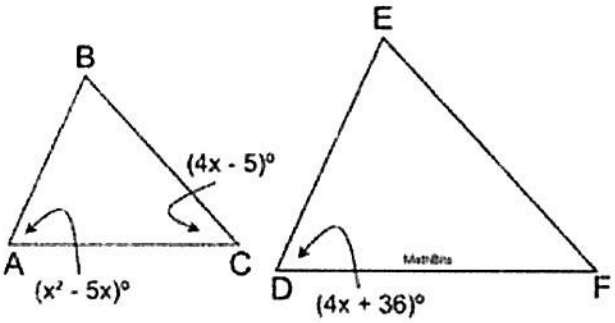
○ [1] cone ○ [2] cube ○ [3] sphere ○ [4] cylinder

7. The altitude of an equilateral triangle is 9 inches. Find the perimeter of the triangle in inches.

○ [1] $6\sqrt{3}$ ○ [2] $18\sqrt{3}$ ○ [3] $27\sqrt{3}$ ○ [4] $54\sqrt{3}$

8. ΔABC is similar to ΔDEF. $m\angle BAC = (x^2 - 5x)°$. $m\angle BCA = (4x - 5)°$ and $m\angle EDF = (4x + 36)°$. Find $m\angle F$.

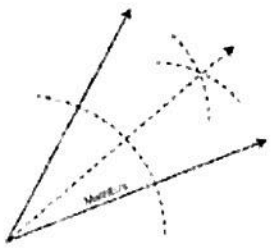
○ [1] 43°
○ [2] 36°
○ [3] 30°
○ [4] 12°



9. Which equation represesnts the perpendicular bisector of $\overline{AB}$ whose endpoints are A (4,1) and B (0,3)?

○ [1] $y = -\frac{1}{2}x + 3$ ○ [2] $y = 2x - 2$ ○ [3] $y = \frac{1}{2}x + 1$ ○ [4] $y = -2x + 6$

10. The proof of the construction shown at the right utilizes



○ [1] congruent triangles and the Side-Angle-Side postulate.
○ [2] congruent triangles and the Side-Side-Side postulate.
○ [3] similar triangles and the Angle-Angle postulate for similarity.
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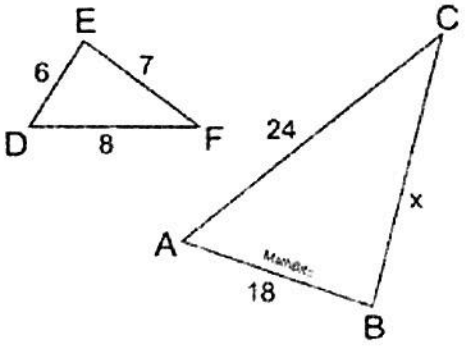
14. ΔABC is similar to ΔDEF, as shown at the right. Find BC.



○ [1] 6
○ [2] 7
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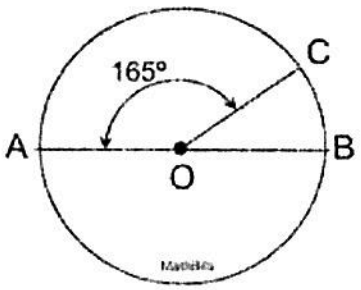
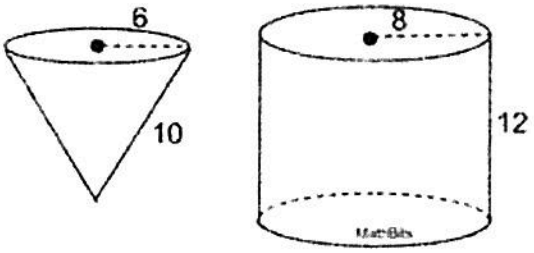
○ [4] 21

15. Circle O has diameter $\overline{AB}$, $OA = 3$ units and $m\angle AOC = 165°$. Which of the choices expresses the arc length of minor arc $\overset{\frown}{AC}$?



○ [1] $\frac{3\pi}{4}$ ○ [2] $\frac{9\pi}{4}$
○ [3] $\frac{11\pi}{4}$ ○ [4] $\frac{15\pi}{4}$

16. A right circular cone has a radius of 6 inches and a slant side length of 10 inches. A right cylinder has a radius of 8 inches and a height of 12 inches. How many cones full of water are needed to fill the cylinder?



○ [1] 4 ○ [2] 8
○ [3] 10 ○ [4] 12

17. The line $y = 3x + 2$ is dilated by a scale factor of 2 centered at the origin. Which equation represents the image of the line after the dilation?

[1] $y = 3x + 4$ [2] $y = 3x + 9$ [3] $y = 2x + 2$ [4] $y = 6x + 4$

18. In right ΔABC, the right angle is located at vertex C. If $\sin(A) = 3x - 0.5$ and $\cos(B) = 2x - 0.1$, find x.

[1] 0.5 [2] 0.4 [3] 9.06 [4] 18.12

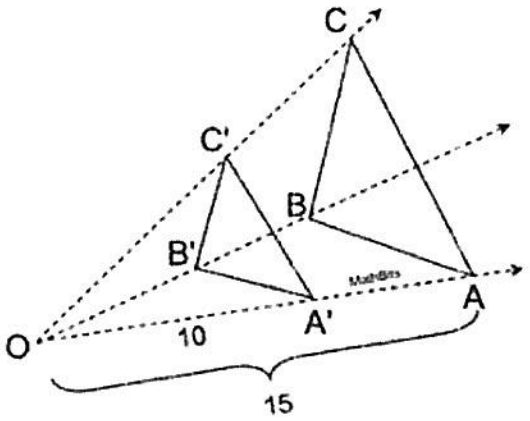
19. From a point on the ground 62 feet from the foot of statue, the angle of elevation of the top of the statue is 37°. Find the height of the statue to the *nearest foot*.

[1] 37 feet [2] 47 feet [3] 50 feet [4] 82 feet

20. A dilation centered at O is shown at the right. The image of ΔABC is $\Delta A'B'C'$, $OA' = 10$ and $OA = 15$. What is the scale factor of the dilation?

[1] $\frac{2}{3}$ [2] $\frac{3}{2}$

[3] $\frac{1}{2}$ [4] 2



21. If $\Delta ABC \cong \Delta DEF$, which choice is not necessarily true?

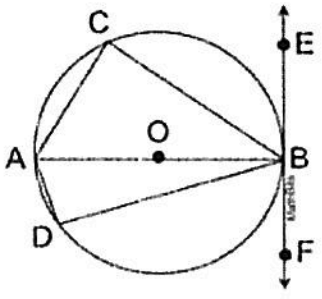
[1] $\overline{CB} \cong \overline{FE}$ [2] $\overline{DF} \cong \overline{AC}$

[3] $\angle ACB \cong \angle DEF$ [4] $\angle CAB \cong \angle FDE$

22. Circle O has diameter $\overline{AB}$ and tangent $\overline{EF}$ at point B. Which of the following angles is not a right angle?

[1] $\angle ACB$ [2] $\angle ADB$

[3] $\angle EBA$ [4] $\angle FBD$

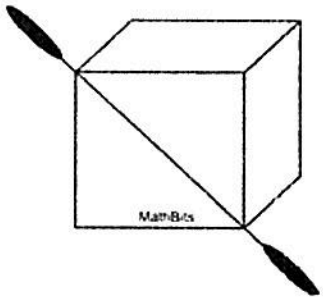


Part II

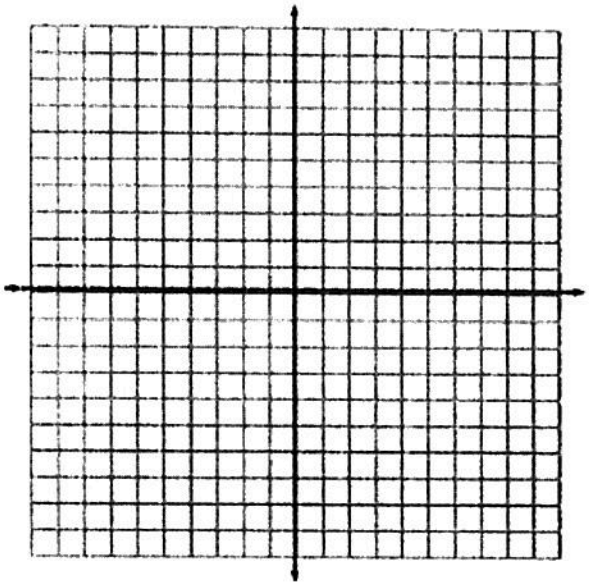
Answer all 5 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.

26. ΔABC is a dilation of ΔDEF by a scale factor of 3. If $m\angle E = 90°$. $DE = 5$ and $DF = \sqrt{89}$, express the $\sin(\angle A)$ as a fraction.

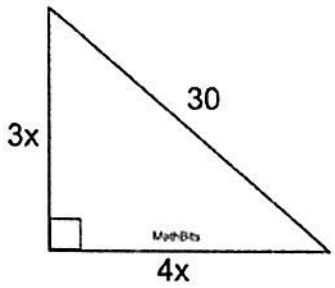
27. A cube of cheese has side lengths of 8 inches. Using a cheese cutter, the cube is sliced into two sections with a cut along the diagonal from one side, as shown. Find the area of the cross section formed by the slice.



28. You are given three clues to find a specific point on a coordinate axis.
Start at the point (4,3).
Clue 1: move to the image after the translation $(x,y) \rightarrow (x - 8, y + 4)$
Clue 2: now, reflect your position over the x-axis.
Clue 3: now, rotate your position 90° counterclockwise.
What are the coordinates of your final positon?



29. Given the diagram shown at the right, find the value of $3x$.

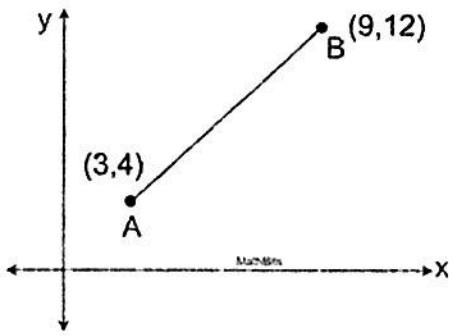


30. Does the circle with a center at (2,3) and passing through the point (8,9), also pass through the point (-4,-1)? Explain your answer.

Part III

Answer all 2 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.

32. In the diagram at the right, C lies on $\overline{AB}$. If the ratio of AC to CB is 3 : 2, what is the y-coordinate of C?



34. Given parallelogram $ABCD$, $m\angle BAD = 56°$, $m\angle ABC = (8a - b)°$ and $m\angle BCD = (2a + 6b)°$. Find the values of a and b.

Part IV

Answer the 1 question in this part. Each correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.

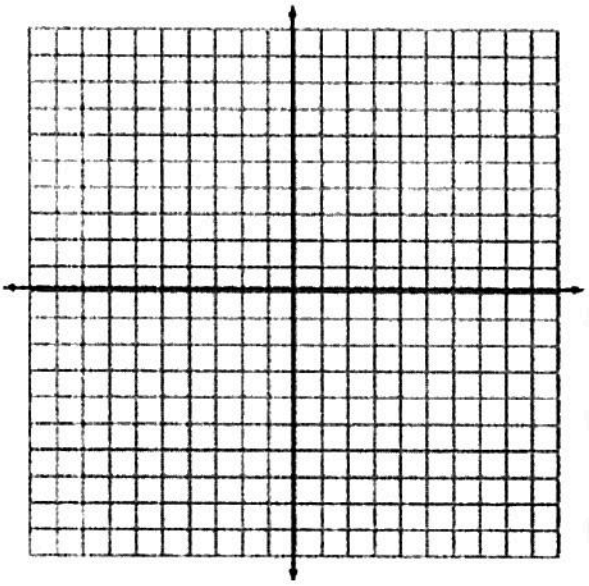
35. The coordinates of quadrilateral $ABCD$ are located at $A(-2,3)$, $B(4,5)$, $C(6,-1)$ and $D(0,-3)$.

a) Using coordinate geometry methods, show that the diagonals bisect each other.

b) Using coordinate geometry methods, show that the diagonals are perpendicualr.

c) Using coordiante geometry methods, show that all four sides are congruent.

d) Based only upon the information shown in parts *a, b* and *c*, what name can be given to this quadrilateral?



Common Core High School Math Reference Sheet
(Algebra I, Geometry, Algebra II)

CONVERSIONS

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5280 feet
1 mile = 1760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilograms
1 kilogram = 2.2 pounds
1 ton = 2000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1000 cubic centimeters

FORMULAS

Triangle	$A = \frac{1}{2}bh$	Pythagorean Theorem	$a^2 + b^2 = c^2$
Parallelogram	$A = bh$	Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Circle	$A = \pi r^2$	Arithmetic Sequence	$a_n = a_1 + (n-1)d$
Circle	$C = \pi d$ or $C = 2\pi r$	Geometric Sequence	$a_n = a_1 r^{n-1}$
General Prisms	$V = Bh$	Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Cylinder	$V = \pi r^2 h$	Radians	$1 \text{ radian} = \frac{180}{\pi} \text{ degrees}$
Sphere	$V = \frac{4}{3}\pi r^3$	Degrees	$1 \text{ degree} = \frac{\pi}{180} \text{ radians}$
Cone	$V = \frac{1}{3}\pi r^2 h$	Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$
Pyramid	$V = \frac{1}{3}Bh$		

Name:_____
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Mock Regents

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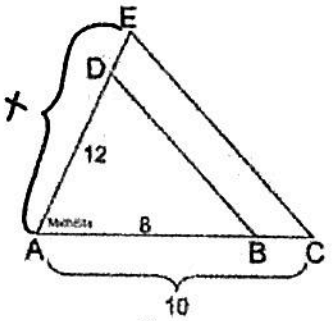


$\frac{12}{x} = \frac{8}{10}$

$8x = 120$

$x = 15$

$15 - 12 = 3$

[1] 1.75 [2] 2 [3] 3 [4] 4

2. What is the equation of the line parallel to the line whose equation is $5y + 8 = -2x$?

[1] $y = -2x + 3$ [2] $y = 2x + 1$ [3] $y = -2/5\,x + 4$ [4] $y = 5/2\,x - 1$

$5y + 8 = -2x$

$-8 \quad -8$

$5y = -2x - 8$

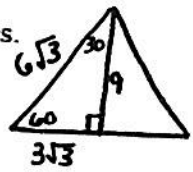
$y = -\frac{2}{5}x - \frac{8}{5}$

3. Which three dimensional figure will be created if a rectangle is rotated about one of its lines of symmetry?

[1] cone [2] cube [3] sphere [4] cylinder

7. The altitude of an equilateral triangle is 9 inches. Find the perimeter of the triangle in inches.

[1] $6\sqrt{3}$ [2] $18\sqrt{3}$ [3] $27\sqrt{3}$ [4] $54\sqrt{3}$



$6\sqrt{3} \times 3 = 18\sqrt{3}$

8. ΔABC is similar to ΔDEF. $m\angle BAC = (x^2 - 5x)°$, $m\angle BCA = (4x - 5)°$ and $m\angle EDF = (4x + 36)°$. Find $m\angle F$.

[1] 43°
[2] 36°
[3] 30°
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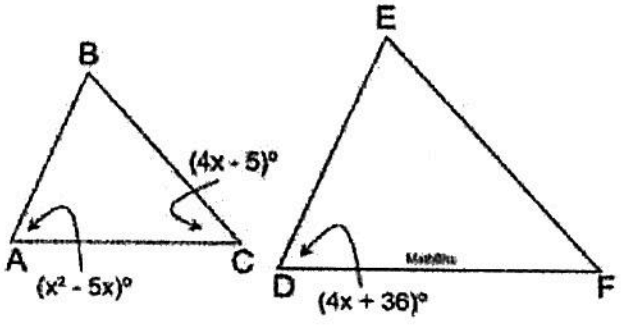

$x^2 - 5x = 4x + 36$

$x^2 - 9x - 36 = 0$

$(x - 12)(x + 3) = 0$

$x = 12 \quad x = -3$

$4(12) - 5 =$

$M = \left(\frac{4+0}{2}, \frac{1+3}{2}\right) = (2,2)$ $m = \frac{3-1}{0-4} = -\frac{1}{2}$

$\hookrightarrow m_{\perp} = 2$

9. Which equation represesnts the perpendicular bisector of $\overline{AB}$ whose endpoints are A (4.1) and B (0,3)?

[1] $y = -\frac{1}{2}x + 3$ (2) [2] $y = 2x - 2$ [3] $y = \frac{1}{2}x + 1$ [4] $y = -2x + 6$

10. The proof of the construction shown at the right utilizes

[1] congruent triangles and the Side-Angle-Side postulate.
(2) [2] congruent triangles and the Side-Side-Side postulate.
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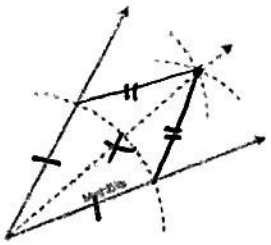


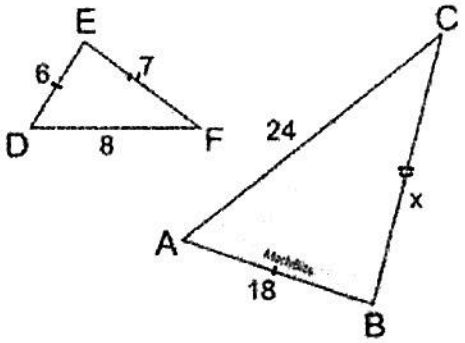
14. ΔABC is similar to ΔDEF, as shown at the right. Find BC.

[1] 6
[2] 7
[3] 18
(4) [4] 21

$\frac{18}{6} = \frac{x}{7}$

$6x = 126$

$x = 21$



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[1] $\frac{3\pi}{4}$ [2] $\frac{9\pi}{4}$
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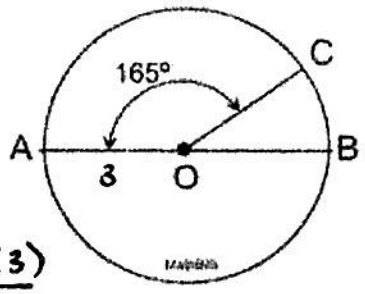
$\frac{165 \cdot 2\pi(3)}{360}$



16. A right circular cone has a radius of 6 inches and a slant side length of 10 inches. A right cylinder has a radius of 8 inches and a height of 12 inches. How many cones full of water are needed to fill the cylinder?

[1] 4 (2) [2] 8
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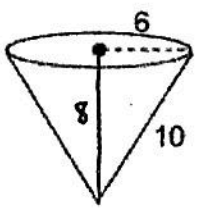

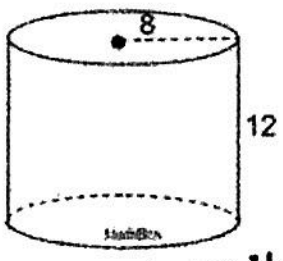

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi(6)^2(8)$

$V = 96\pi$

$V = \pi r^2 h$

$V = \pi(8)^2(12)$

$V = 768\pi$

$\frac{768\pi}{96\pi} = 8$

17. The line $y = 3x + 2$ is dilated by a scale factor of 2 centered at the origin. Which equation represents the image of the line after the dilation?

[1] $y = 3x + 4$ [2] $y = 3x + 9$ [3] $y = 2x + 2$ [4] $y = 6x + 4$

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[1] 0.5 [2] 0.4 [3] 9.06 [4] 18.12

$3x - 0.5 = 2x - 0.1$

$x = 0.4$

19. From a point on the ground 62 feet from the foot of statue, the angle of elevation of the top of the statue is 37°. Find the height of the statue to the *nearest foot.*

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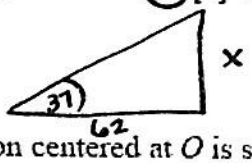

$\tan(37) = \frac{x}{62}$

$x = 62\tan(37)$

$x = 47$

20. A dilation centered at O is shown at the right. The image of ΔABC is $\Delta A'B'C'$, $OA' = 10$ and $OA = 15$. What is the scale factor of the dilation?

[1] $\frac{2}{3}$ [2] $\frac{3}{2}$

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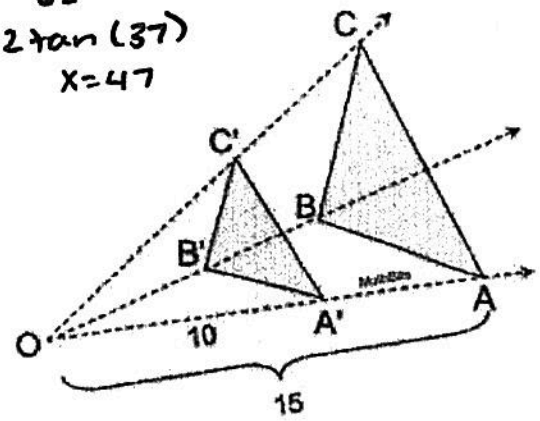

$\frac{\text{image}}{\text{preimage}} = \frac{10}{15} = \frac{2}{3}$

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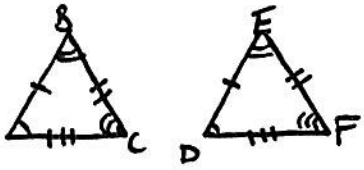
[1] $\overline{CB} \cong \overline{FE}$ ✓ [2] $\overline{DF} \cong \overline{AC}$ ✓

[3] $\angle ACB \cong \angle DEF$ [4] $\angle CAB \cong \angle FDE$ ✓



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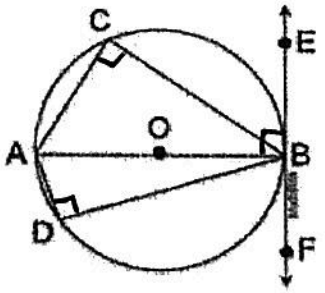

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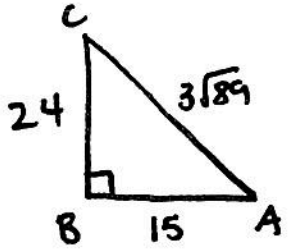
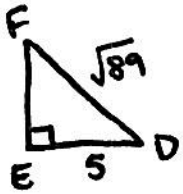
26. ΔABC is a dilation of ΔDEF by a scale factor of 3. If $m\angle E = 90°$, $DE = 5$ and $DF = \sqrt{89}$, express the $\sin(\angle A)$ as a fraction.





$\sin(A) = \frac{24}{3\sqrt{89}}$ or $\frac{8}{\sqrt{89}}$

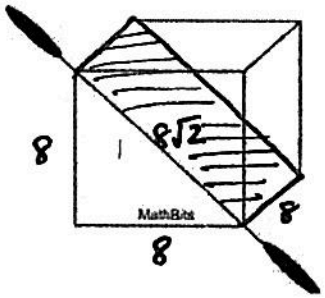
$15^2 + x^2 = (3\sqrt{89})^2$

$225 + x^2 = 801$

$x^2 = 576$

$x = 24$

27. A cube of cheese has side lengths of 8 inches. Using a cheese cutter, the cube is sliced into two sections with a cut along the diagonal from one side, as shown. Find the area of the cross section formed by the slice.



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

$64 + 64 = x^2$

$\sqrt{128} = \sqrt{x^2}$

$8\sqrt{2} = x$

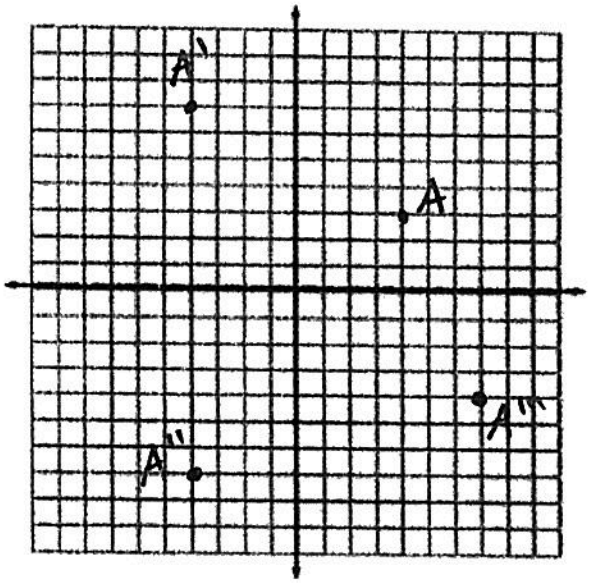
$A = bh$

$A = (8\sqrt{2})(8)$

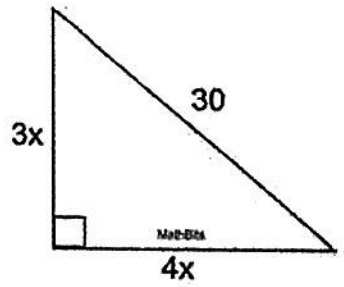
$A = 64\sqrt{2}\ in^2$

28. You are given three clues to find a specific point on a coordinate axis.
Start at the point (4,3).
Clue 1: move to the image after the translation $(x,y) \rightarrow (x - 8, y + 4)$
Clue 2: now, reflect your position over the x-axis.
Clue 3: now, rotate your position 90° counterclockwise.
What are the coordinates of your final positon?

$(4, 3)$
$(-4, 7)$
$(-4, -7)$
$\boxed{(7, -4)}$



29. Given the diagram shown at the right, find the value of $3x$.



$(3x)^2 + (4x)^2 = 30^2$
$9x^2 + 16x^2 = 900$
$\frac{25x^2}{25} = \frac{900}{25}$
$x^2 = 36$
$x = 6$
$\boxed{3x = 18}$

30. Does the circle with a center at (2,3) and passing through the point (8,9), also pass through the point (-4,-1)? Explain your answer.

$r = \sqrt{(8-2)^2 + (9-3)^2}$
$r = \sqrt{72}$

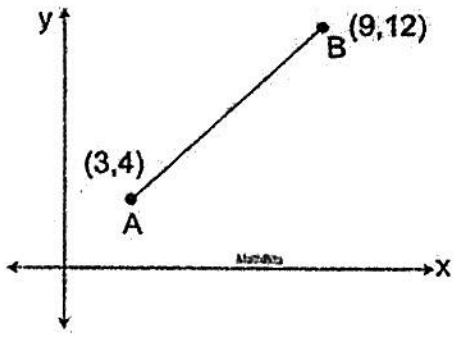
$(x-2)^2 + (y-3)^2 = 72$
$(-4-2)^2 + (-1-3)^2 = 72$
$52 \neq 72$

The circle does not pass through the point (-4,-1)

Part III

Answer all 2 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.

32. In the diagram at the right, C lies on $\overline{AB}$. If the ratio of AC to CB is 3 : 2, what is the y-coordinate of C?



$K = \frac{3}{5}$

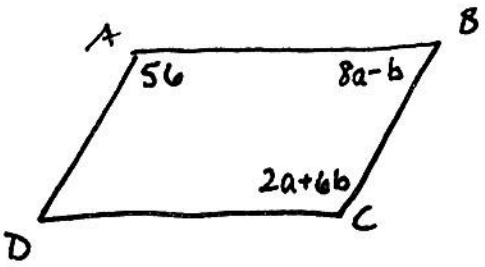
$x_1 + K(x_2 - x_1)\ ,\ y_1 + K(y_2 - y_1)$

$3 + \frac{3}{5}(9-3)\ ,\ 4 + \frac{3}{5}(12-4)$

$(6.6\ ,\ 8.8)$

y coordinate is 8.8

34. Given parallelogram $ABCD$, $m\angle BAD = 56°$, $m\angle ABC = (8a - b)°$ and $m\angle BCD = (2a + 6b)°$. Find the values of a and b.



$2a + 6b = 56$

$2a = 56 - 6b$

$a = 28 - 3b$

$8a - b + 2a + 6b = 180$

$8(28-3b) - b + 2(28-3b) + 6b = 180$

$224 - 24b - b + 56 - 6b + 6b = 180$

$-25b + 280 = 180$

$-25b = -100$

$\boxed{b = 4}$

$a = 28 - 3(4)$

$\boxed{a = 16}$

Part IV

Answer the 1 question in this part. Each correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.

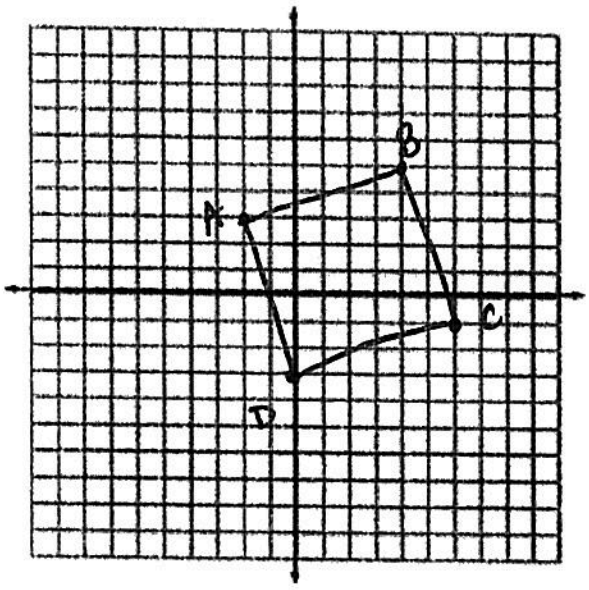
35. The coordinates of quadrilateral *ABCD* are located at *A*(-2,3), *B*(4,5), *C*(6,-1) and *D*(0,-3).

a) Using coordinate geometry methods, show that the diagonals bisect each other.

b) Using coordinate geometry methods, show that the diagonals are perpendicualr.

c) Using coordiante geometry methods, show that all four sides are congruent.

d) Based only upon the information shown in parts *a*, *b* and *c*, what name can be given to this quadrilateral?



midpoint

a) $AC = \left(\frac{-2+6}{2}, \frac{3+-1}{2}\right) = (2, 1)$

$BD = \left(\frac{4+0}{2}, \frac{5+-3}{2}\right) = (2, 1)$

since their midpoints are the same the diagonals bisect each other

slope

b) $AC = \frac{3--1}{-2-6} = \frac{4}{-8} = -\frac{1}{2}$

$BD = \frac{5--3}{4-0} = \frac{8}{4} = 2$

since their slopes are negative reciprocals they are $\perp$

c) $AD = \sqrt{(-2-0)^2+(3--3)^2}$

$AD = \sqrt{40}$

$AB = \sqrt{(-2-4)^2+(3-5)^2}$

$AB = \sqrt{40}$

$BC = \sqrt{(4-6)^2+(5--1)^2}$

$BC = \sqrt{40}$

$CD = \sqrt{(6-0)^2+(-1--3)^2}$

$CD = \sqrt{40}$

ABCD is a rhombus b/c all 4 sides are equal and diagonals are $\perp$ bisectors of each other.

Common Core High School Math Reference Sheet
(Algebra I, Geometry, Algebra II)

CONVERSIONS

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5280 feet
1 mile = 1760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilograms
1 kilogram = 2.2 pounds
1 ton = 2000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1000 cubic centimeters

FORMULAS

Triangle	$A=\frac{1}{2}bh$	Pythagorean Theorem	$a^2+b^2=c^2$
Parallelogram	$A=bh$	Quadratic Formula	$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$
Circle	$A=\pi r^2$	Arithmetic Sequence	$a_n=a_1+(n-1)d$
Circle	$C=\pi d$ or $C=2\pi r$	Geometric Sequence	$a_n=a_1r^{n-1}$
General Prisms	$V=Bh$	Geometric Series	$S_n=\frac{a_1-a_1r^n}{1-r}$ where $r\neq 1$
Cylinder	$V=\pi r^2h$	Radians	1 radian $=\frac{180}{\pi}$ degrees
Sphere	$V=\frac{4}{3}\pi r^3$	Degrees	1 degree $=\frac{\pi}{180}$ radians
Cone	$V=\frac{1}{3}\pi r^2h$	Exponential Growth/Decay	$A=A_0e^{k(t-t_0)}+B_0$
Pyramid	$V=\frac{1}{3}Bh$		