CCGPS Geometry PACKET 2 Unit 5 – Solving Quadratics Review: 4

Name: ______________________ Date: KEY

Use the following to review for your test. Work the Practice Problems on a separate sheet of paper.

Unit 5

You need to know & be able to do	Things to remember	Example Problems	
Solve a Quadratic by Factoring	$5x$ 4 / x: $5x^2$ $4x$ / 1: $5x$ 4 Get in standard form. Factor. Set each factor equal to zero and solve. $2x$ 5 / $2x$: $4x^2$ $10x$ / 3: $6x$ 15	1. $4x^2-9=0$ $(2x+3)(2x-3)$ $2x=-3$ $2x=3$ $x=-3/2$ $x=3/2$	2. $2x^2+x=6$ $2x^2+x-6=0$ $(2x-3)(x+2)$ $x=3/2, -2$
		3. $-4x^2=-4x-15$ $-(4x^2-4x-15)=0$ $(2x-5)(2x+3)=0$ $x=5/2, -3/2$	4. $5x^2+x=4$ $5x^2+x-4=0$ $(5x-4)(x+1)$ $x=4/5, -1$
Solve a Quadratic by Taking Square Roots	Isolate the square. Take the square root of both sides. Don't forget the $\pm$. Get the variable by itself.	5. $x^2+13=0$ $x^2=-13$ $x=\sqrt{-13}$ $=\pm\sqrt{13}\,i$	6. $-3(x^2-1)=27$ $\div -3$ $\div -3$ $x^2-1=-9+1$ $+1$ $x^2=-8$ $x=\pm\sqrt{8}\,i$
		7. $2(x-1)^2+4=16$ $2(x-1)^2=12$ $(x-1)^2=6$ $(x-1)=\sqrt{6}$ $1\pm\sqrt{6}$ $-1.45, 3.45$	8. $(x+4)^2=121$ $(x+4)=\pm 11$ -4 ± 11 $-15, 7$
Solve a Quadratic by Completing the Square	Put terms with an x on the left. Find the number that completes the square. Add it to both sides. Factor the left. Simplify the right. Take the square root of each side. Solve for x.	9. $x^2+2x-4=0$ $x^2+2x=4$ $x^2+2x+1=5$ $(x+1)^2=5$ $x+1=\sqrt{5}$ $-1\pm\sqrt{5}$	10. $x^2+8x+4=0$ $x^2+8x=-4$ $x^2+8x+16=-4+16$ $(x+4)^2=12$ $-4\pm\sqrt{12}$ $-.536, -7.46$
		11. $x^2-8x+36=0$ $x^2-8x=-36$ $x^2-8x+16=-36+16$ $(x-4)^2=-20$ No Real Solution	12. $3x^2+12x-6=0$ $3x^2+12x=6$ $3(x^2+4x)=6$ $x^2+4x=2$ $x^2+4x+4=2+4$ $(x+2)^2=6$

$x+2=\sqrt{6}$
$-2\pm\sqrt{6}$ $-4.45, .45$

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Solve a Quadratic by Quadratic Formula	Put it in standard form. Identify a, b, and c. Use the formula. $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$	13. $x^2+4x-2=0$ $x=\frac{-4\pm\sqrt{4^2-4(1)(-2)}}{2(1)}$ $=\frac{-4\pm\sqrt{24}}{2}$ $\frac{-4\pm4.9}{2}$ $-4.45, .45$	14. $x^2+4x-1=0$ $x=\frac{-4\pm\sqrt{4^2-4(1)(-1)}}{2(1)}$ $=\frac{-4\pm\sqrt{20}}{2}$ $\frac{-4\pm4.47}{2}$ $-4.235, .235$
		15. $6x^2-3x=-2$ $6x^2-3x+2=0$ $\frac{-(-3)\pm\sqrt{(-3)^2-4(6)(2)}}{2(6)}$ $\frac{-3\pm\sqrt{9-48}}{2}$ No Real Solution	16. $2x^2+2x=4x-1$ $2x^2-2x+1=0$ $\frac{-(-2)\pm\sqrt{(-2)^2-4(2)(1)}}{2(2)}$ $\frac{2\pm\sqrt{4-8}}{4}$ No Real Solution
Find the Discriminant and Determine the Type of Roots	Put in standard form. Identify a, b, and c. Use b^2-4ac. • Positive answer, 2 real roots. • Zero, one real root. • Negative answer, 2 imaginary roots.	17. $x^2+8x+16=0$ $8^2-4(1)(16)$ $64-64=0$ 1 Real Root	18. $2x^2+5x-3=0$ $5^2-4(2)(-3)$ $25+24=49$ 2 Real Roots
		19. $x^2+5x+9=0$ $5^2-4(1)(9)$ $25-36=-11$ No Real Solution	20. $2x^2+5x+7=0$ $5^2-4(2)(7)$ $25-56=-31$ No Real Solution
Solve Quadratic Inequalities Algebraically	Get in standard form. Change the sign to =. Factor. Solve. Test points. Answer.	21. $3x^2+10x\ge 8$ $3x^2+10x-8=0$ $\begin{array}{c\|c\|c} & 3x & 2 \\ \hline x & 3x^2 & 2x \\ \hline 4 & 12x & 8 \end{array}$ $(x+4)(3x-2)$ $x=-4$ $x=\frac{2}{3}$ T T	22. $4x^2-15x+9<0$ $\begin{array}{c\|c\|c} & 4x & 3 \\ \hline x & 4x^2 & 3x \\ \hline 3 & 12x & 9 \end{array}$ $(x-3)(4x-3)$ $x=3$ $x=\frac{3}{4}$ F F

EOC REVIEW   Name________________   ID: 1

ANALYTICAL GEOMETRY   Date________   Period____

FOIL when A = 1
when A ≠ 1, find factors that + to AC.

FIRST x FIRST
Last x Last
Inner Product
Outer Product
Combine Inner + Outer Product

Factor each completely.

1) $x^2 - 8x + 7$ $(x-7)(x-1)$

2) $n^2 - 6n - 16$ $(n+2)(n-8)$

3) $a^2 + 6a - 40$ $(a+10)(a-4)$

4) $n^2 - 12n + 27$ $(n-3)(n-9)$

5) $5x^2 + 21x - 20$ $(5x-4)(x+5)$

	x	5
5x	$5x^2$	25x
4	4x	20

6) $3a^2 + 7a - 6$ $(3a-2)(a+3)$

	a	3
3a	$3a^2$	9a
2	2a	6

Solve each equation by factoring.

7) $v^2 + 6v + 5 = 0$ $(x+5)(v+1)$

8) $n^2 + n - 12 = 0$ $(n-3)(n+4)$

9) $x^2 + 9x + 14 = 0$ $(x+2)(x+7)$

10) $a^2 + 3a - 18 = 0$ $(a+6)(a-3)$

Solve each equation by completing the square.

Add $\left(\frac{B}{2}\right)^2$ to both sides

11) $a^2 + 20a + 96 = 0$
$a^2+20a=-96$
$a^2+20a+100=-96+100$
$(a+10)^2=4$
-10 ± 2
$-8, -12$

12) $m^2 + 8m + 15 = 0$ $(m+5)(m+3)$

13) $n^2 - 8n - 90 = 0$
$n^2-8n=90$
$n^2-8n+16=90+16$
$(n-4)^2=106$
$4 \pm \sqrt{106}$

14) $a^2 + 12a - 84 = 0$
$a^2+12a=84$
$a^2+12+36=84+36$
$(a+6)^2=120$
$-6 \pm \sqrt{120}$

Solve each equation by taking square roots.

15) $64n^2 + 2 = 66$
$64n^2=64$
$n^2=1$
$n=\pm 1$

16) $64n^2 - 9 = 91$
$64n^2=100$
$n^2=\frac{100}{64}$
$n=\pm\frac{5}{4}$

17) $25v^2 + 10 = 74$
$25v^2=64$
$v^2=\frac{64}{25}$
$v=\pm \frac{8}{5}$

18) $6m^2 + 2 = -39$
$6m^2=-41$
$m^2=-\frac{41}{6}$
No Real Solutions

Find the discriminant of each quadratic equation then state the number and type of solutions.

19) $-10x^2 - 9x - 2 = 0$
$(-9)^2-4(-10)(-2)$
$81-80=1$
2 Real Solutions

20) $-k^2 + 6k - 9 = 0$
$-(k^2-6k+9)=0$
$(-6)^2-4(1)(9)$
$36-36=0$
1 Real

21) $10x^2 + 10x + 4 = 0$
$10^2-4(10)(4)$
$100-160=-60$
No Real Solutions

22) $2k^2 + 7k - 9 = 0$
$7^2-4(2)(-9)$
$49+72=121$
2 Real

23) $-2p^2 + 8p - 8 = 0$
$-2(p^2-4p+4)=0$
$(-4)^2-4(1)(4)$
$16-16=0$
1 real Solution

24) $8x^2 + 7x + 6 = 0$
$7^2-4(8)(6)$
$49-192=-143$
No Real Solutions

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Name:______________________________

Period:________ Date:____________________

Vertex = (h, k)

$h = \frac{-b}{2a}$ $k = y$ substitute h for x in equation. Solve for y

Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of each function.

1. $y = x^2 - 10x + 2$

$h = \frac{-(-10)}{2} = 5$

$y = 5^2 - 10(5) + 2$

$25 - 50 + 2 = -23$

Axis of symmetry: $x = 5$

Vertex: $(5, -23)$

2. $y = x^2 + 12x - 9$

$h = \frac{-12}{2} = -6$

$y = (-6)^2 + 12(-6) - 9$

$36 - 72 - 9 = -55$

Axis of symmetry: $x = -6$

Vertex: $(-6, -55)$

3. $y = -x^2 + 2x + 1$

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

$y = -(1)^2 + 2(1) + 1$

$-1 + 2 + 1 = 2$

Axis of symmetry: $x = 1$

Vertex: $(1, 2)$

4. $y = 3x^2 + 18x + 9$

$h = \frac{-18}{6} = -3$

$y = 3(-3)^2 + 18(-3) + 9$

$27 - 54 + 9 = -18$

Axis of symmetry: $x = -3$

Vertex: $(-3, -18)$

5. $y = 3x^2 + 3$

$h = \frac{0}{6} = 0$

$y = 0 + 3 = 3$

Axis of symmetry: $x = 0$

Vertex: $(0, 3)$

6. $y = 16x - 4x^2$

$-4x^2 + 16x$

$h = \frac{-16}{-8} = 2$

$y = -4(2)^2 + 16(2) = 16$

Axis of symmetry: $x = 2$

Vertex: $(2, 16)$

Graph each quadratic equation. Make sure you find the vertex and axis of symmetry first.

7. $y = x^2 - 6x + 4$

$h = \frac{-(-6)}{2} = 3$

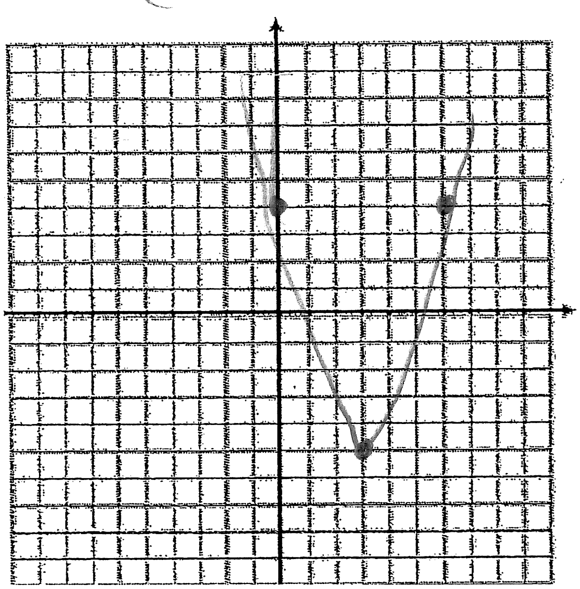
$y = 3^2 - 6(3) + 4$

$9 - 18 + 4 = -5$

y-int = 4

Axis of symmetry: $x = 3$

Vertex: $(3, -5)$



8. $y = x^2 + 4x - 1$

$h = \frac{-4}{2} = -2$

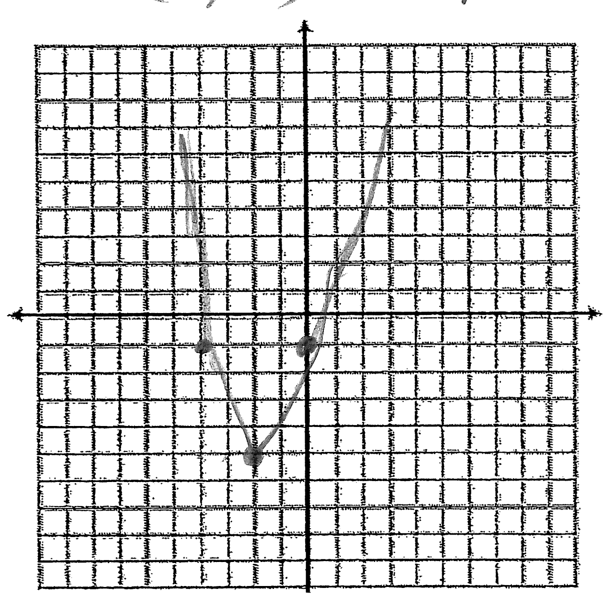
$y = (-2)^2 + 4(-2) - 1$

$4 - 8 - 1 = -5$

y-int = -1

Axis of symmetry: $x = -2$

Vertex: $(-2, -5)$



Name: $h = \frac{-b}{2a}$ Period: Date:

Algebra II/ Unit 4A Test Review

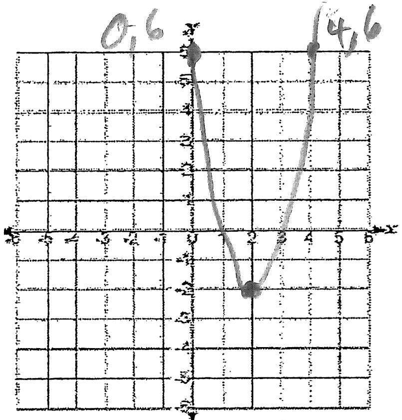
How do you graph a quadratic

Std Form

1. $y = 2x^2 - 8x + 6$

$h = \frac{-(-8)}{4} = 2$

$y = 2(2)^2 - 8(2) + 6 = 8 - 16 + 6 = -2$



a) Axis of symmetry: $x = 2$

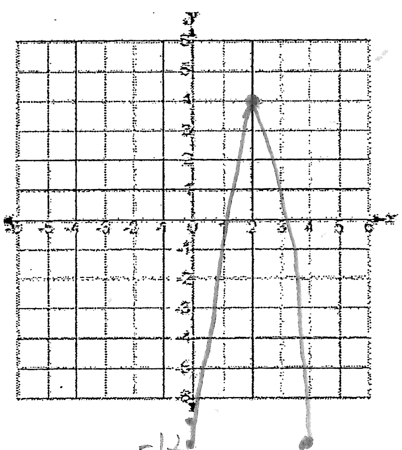
b) Vertex: $(2, -2)$

c) y-intercept: 6, Plot Point Symmetric to 0,6 @ Axis $x = 2$ (4,6)

d) Sketch the graph.

Vertex form $h =$ $y = a(x-h)^2 + k$ (h,k) is the vertex

2. $y = -4(x-2)^2 + 4$



a) Axis of symmetry: $h = 2$ $x = 2$

b) Vertex: 2, 4

c) y-intercept: $-4(0-2)^2 + 4 = -4(4) + 4 = -12$

d) Sketch the graph. Use y-int and symmetric point

e) Standard form: $y = -4(x-2)^2 + 4$

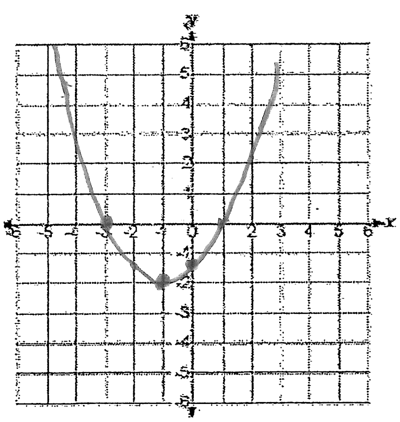
$= -4(x^2 - 4x + 4) + 4$

$= -4x^2 + 16x - 16 + 4$

$y = -4x^2 + 16x - 12$

Intercept Form

3. $y = \frac{1}{2}(x+3)(x-1)$



a) x-intercepts: products are the intercepts (p,q)

$-3, 1$

b) Axis of symmetry:

$\frac{p+q}{2} = \text{axis}$ $\frac{-3+1}{2} = \frac{-2}{2} = -1$ $x = -1$

b) Vertex:

substitute $x = -1$ $y = \frac{1}{2}(-1+3)(-1-1) = -2$ $(-1, -2)$

c) y-intercept:

$x = 0$ $y = \frac{1}{2}(0+3)(0-1) = -\frac{3}{2}$

d) Sketch the graph.

e) Standard form: $y = \frac{1}{2}(x+3)(x-1)$

$\frac{1}{2}(x^2 + 2x - 3)$

$y = \frac{1}{2}x^2 + x - \frac{3}{2}$

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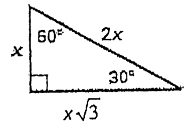
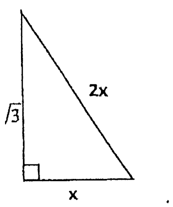
)° - 60° - 90° Triangle Theorem



X 1: Fill in the table with the missing side lengths of the 30-60-90 triangle. Leave all answers in simplified radical form.

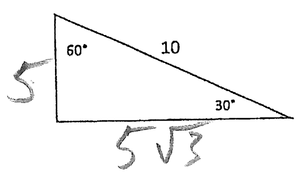


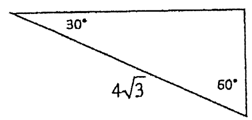
Short Leg (x)	Long Leg ($x\sqrt{3}$)	Hypotenuse (2x)
6	$6\sqrt{3}$	12
10	$10\sqrt{3}$	20
4	$4\sqrt{3}$	8
$2\sqrt{3}$	6	$4\sqrt{3}$
$\frac{8\sqrt{3}}{3}$	8	$\frac{16\sqrt{3}}{3}$
$9\sqrt{3}$	27	$18\sqrt{3}$
$4\sqrt{6}$	$4\sqrt{6}\sqrt{3} = 4\sqrt{18}$ $4\sqrt{9}\sqrt{2} = 12\sqrt{2}$	$8\sqrt{6}$
18	$18\sqrt{3}$	36

$\frac{8}{\sqrt{3}}$ $\frac{27\sqrt{3}}{3}$

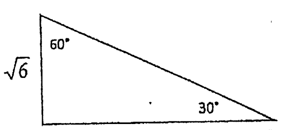
EX 2: Find all the missing side lengths.

b.



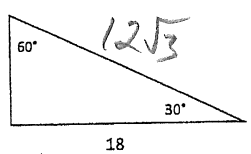


c.



$\sqrt{6}\sqrt{3} = \sqrt{18} = 3\sqrt{2}$

d.



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

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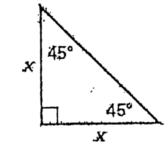
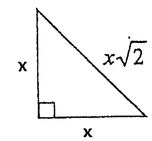
SPECIAL RIGHT TRIANGLES

NOTES 7.4

45° - 45° - 90° Triangle Theorem



EX 1: Fill in the table with the missing side lengths of the 45-45-90 triangle. Leave all answers in simplified radical form.



Leg (x)	Leg (x)	Hypotenuse ($x\sqrt{2}$)
5	5	$5\sqrt{2}$
3	3	$3\sqrt{2}$
6	6	$6\sqrt{2}$
$5\sqrt{2}$	$5\sqrt{2}$	10
$2\sqrt{6}$	$2\sqrt{6}$	$2\sqrt{6}\sqrt{2} = 2\sqrt{12} = 2\sqrt{4}\sqrt{3} = 4\sqrt{3}$
$\frac{15\sqrt{2}}{2}$	$\frac{15\sqrt{2}}{2}$	15
$\sqrt{14}$	$\sqrt{14}$	$\sqrt{14}\sqrt{2} = \sqrt{28} = \sqrt{4}\sqrt{7} = 2\sqrt{7}$
$8\sqrt{3}$	$8\sqrt{3}$	$8\sqrt{6}$

45-45-90 Rules:

When you are given the length of a LEG multiply by $\sqrt{2}$ to get the length of the HYPOTENUSE.

When you are given the length of the HYPOTENUSE divide by $\sqrt{2}$ to get the length of the LEG.

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Skills Practice

Equations of Circles

$(x-h)^2+(y-k)^2=r^2$

Write the equation of each circle.

1. center at origin, radius 6

$x^2+y^2=36$

2. center at (0, 0), radius 2

$x^2+y^2=4$

3. center at (4, 3), radius 9

$(x-4)^2+(y-3)^2=81$

4. center at (7, 1), diameter 24

$(x-7)^2+(y-1)^2=144$

Use distance formula $d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

5. center at (−4, −1), passes through (−2, 3)

$d=\sqrt{(-4-{-2})^2+(-1-3)^2}$

$\sqrt{4+16}$

$\sqrt{20}=2\sqrt{5}$

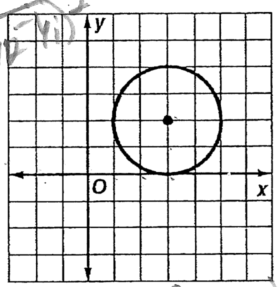
$(x+4)^2+(y+1)^2=20$

6. center at (5, −2), passes through (4, 0)

$d=\sqrt{(5-4)^2+(-2+0)^2}=\sqrt{5}$

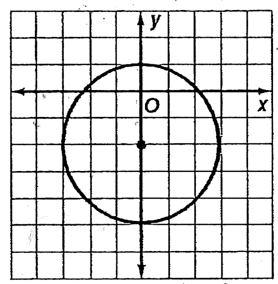
$(x-5)^2+(y+2)^2=5$

7.



$(x-3)^2+(y-2)^2=4$

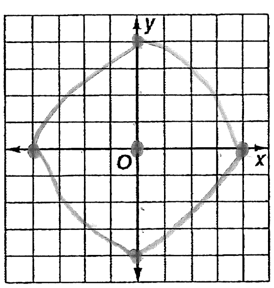
8.



$x^2+(y+2)^2=9$

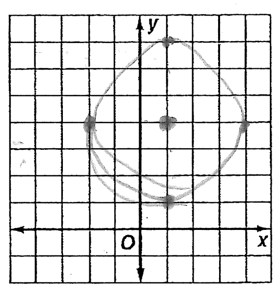
For each circle with the given equation, state the coordinates of the center and the measure of the radius. Then graph the equation.

9. $x^2+y^2=16$ (0,0) r=4



$r =$

10. $(x-1)^2+(y-4)^2=9$ (1,4) r=3

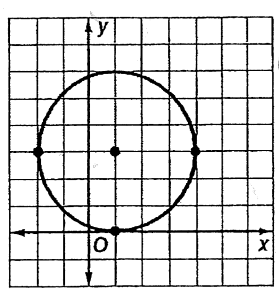


$r =$

Write an equation of a circle that contains each set of points. Then graph the circle.

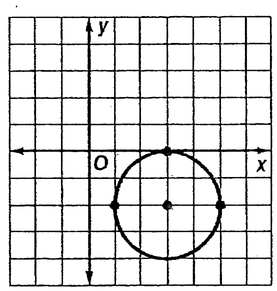
11. $A(-2, 3)$, $B(1, 0)$, $C(4, 3)$

$(x-1)^2+y^2=9$



12. $F(3, 0)$, $G(5, -2)$, $H(1, -2)$

$(x-3)^2+(y+2)^2=4$



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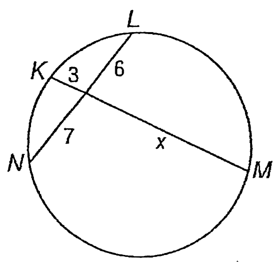
NAME ______________________ DATE ____________ PERIOD ____________

Skills Practice

Special Segments in a Circle

Find x to the nearest tenth if necessary. Assume that segments that appear to be tangent are tangent.

1.

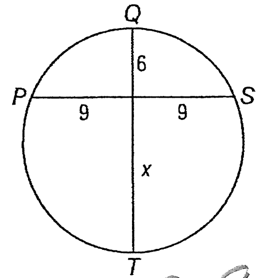


$3x = 7 \cdot 6$

$3x = 42$

$x = 14$

2.

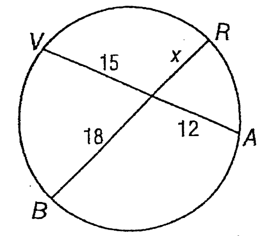


$6x = 9 \cdot 9$

$6x = 81$

$x = 13.5$

3.

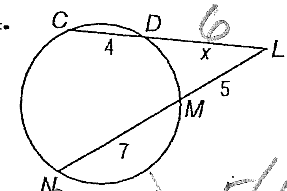


$18x = 12 \cdot 15$

$18x = 180$

$x = 10$

4.



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$x(4+x) = 5(5+7)$

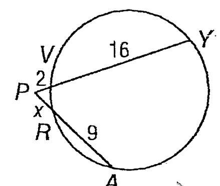
$4x + x^2 = 60$

$x^2 + 4x - 60 = 0$

$(x+10)(x-6)$ $x = 6$

$\cancel{x = -10}$

5.



$2(2+16) = x(x+9)$

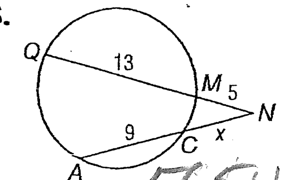
$36 = x^2 + 9x$

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

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

$\cancel{x = -12}$ $x = 3$

6.



$5(5+13) = x(x+9)$

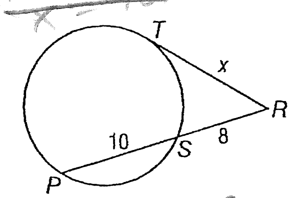
$90 = x^2 + 9x$

$x^2 + 9x - 90 = 0$

$(x+15)(x-6)$ $x = 6$

$\cancel{x = -15}$

7.

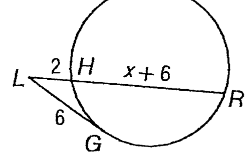


$x^2 = 8(10+8)$

$x^2 = 144$

$x = 12$

8.



$6^2 = 2(2+x+6)$

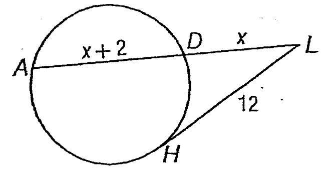
$36 = 2(x+8)$

$36 = 2x + 16$

$20 = 2x$

$x = 10$

9.



$12^2 = x(x+x+2)$

$12^2 = 2x^2 + 2x$

$2x^2 + 2x - 144 = 0$

$2(x^2 + x - 72) = 0$

$2(x+9)(x-8) = 0$

$2(x+9)$ $x = 8$

$\cancel{x = -9}$

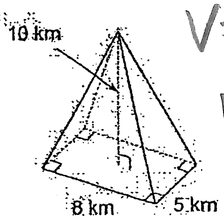
Review: 7

Analytic Geometry — Name________________

Mixed Volume — Date____________ Period____

Find the volume of each figure. Round your answers to the nearest tenth, if necessary.

1)



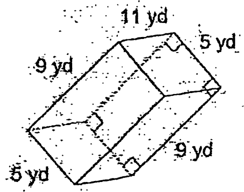
$V = \frac{1}{3} B h$

$V = \frac{1}{3}(lw)h$

$V = \frac{1}{3}(8\cdot5)(10)$

$V = 133.33 \text{ km}^3$

2)

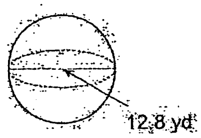


$V = Lwh$

$V = 11\cdot9\cdot5$

$= 495 \text{ yd}^3$

3)



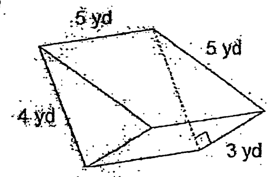
$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi(12.8)^3$

$V = 2796.2\pi \text{ yd}^3$

$= 8784.53 \text{ yd}^3$

4)



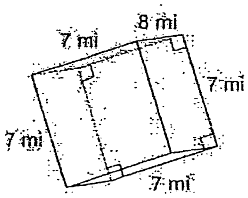
$V = Bh$

$V = \frac{1}{2} b h_1 h_2$

$V = \frac{1}{2}\cdot3\cdot4\cdot5$

$V = 30 \text{ yd}^3$

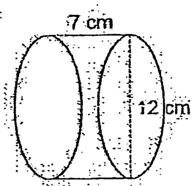
5)



$V = Lwh$

$V = 7\cdot7\cdot8$

6)



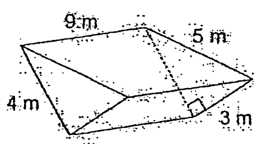
$V = \pi r^2 h$

$V = \pi 6^2\cdot7$

$= 294\pi \text{ cm}^3$

923.6 cm^3

7)



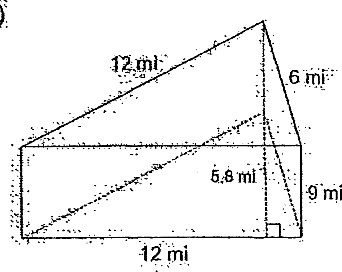
$V = Bh$

$V = \frac{1}{2} b h_1 h_2$

$V = \frac{1}{2} 3\cdot4\cdot9$

$V = 54 \text{ m}^3$

8)



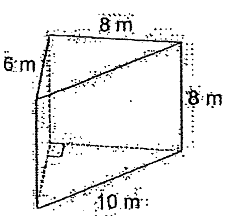
$V = Bh$

$V = \frac{1}{2} b h_1 h_2$

$= \frac{1}{2} 12\cdot5.8\cdot9$

$= 626.4 \text{ mi}^3$

9)



$V = Bh$

$V = \frac{1}{2} b h_1 h_2$

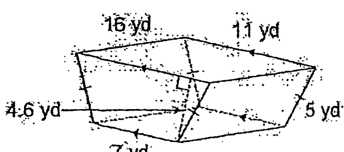
$V = \frac{1}{2} 8\cdot6\cdot8$

$= 192 \text{ m}^3$

Trap Area

$B = \left(\frac{b_1+b_2}{2}\right)h$

10)



$V = Bh$

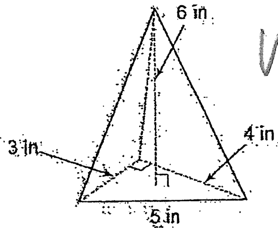
$V = \left(\frac{b_1+b_2}{2}\right) h_1 h_2$

$V = \left(\frac{7+11}{2}\right) 4.6\cdot16$

$V = 662.4 \text{ yd}^3$

24

11)



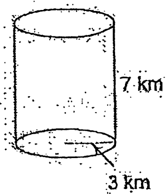
$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(\frac{1}{2}bh_1)\ h_2$

$V = \frac{1}{3}(\frac{1}{2}\cdot 3\cdot 4)\ 6$

$V = 12\ in^3$

12)



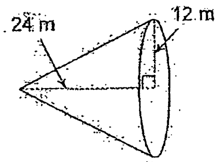
$V = \pi r^2 h$

$V = \pi\ 3^2 \cdot 7$

$= 63\pi\ Km^3$

$197.9\ Km^3$

13)



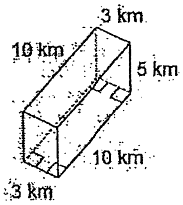
$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi\ 12^2 \cdot 24$

$= 1152\pi\ m^3$

$= 3619.1\ m^3$

14)

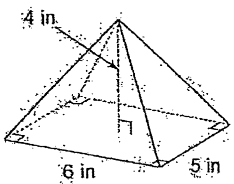


$V = Lwh$

$3 \cdot 10 \cdot 5$

$= 150\ Km^3$

15)



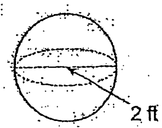
$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(lw)h$

$V = \frac{1}{3}(5\cdot 6)4$

$= 40\ in^3$

16)



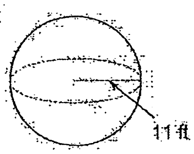
$V = \frac{4}{3}\pi r^3$

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

$= \frac{4}{3}\pi\ ft^3$

$4.2\ ft^3$

17)



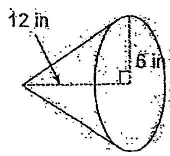
$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi\ 11^2$

$= 161.\overline{3}\ \pi\ ft^3$

$506.8\ ft^3$

18)



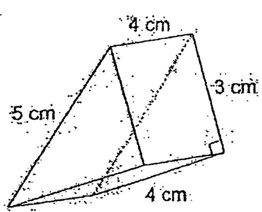
$V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi\ 6^2\ 12$

$144\pi\ in^3$

$452.4\ in^3$

19)



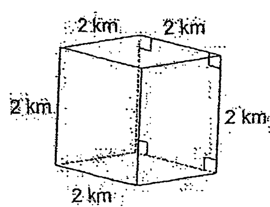
$V = Bh$

$V = \frac{1}{2}bh_1\ h_2$

$V = \frac{1}{2}\ 3\cdot 4\cdot 4$

$= 24\ cm^3$

20)

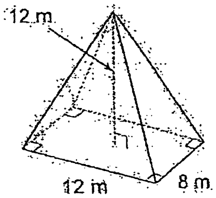


$V = Lwh$

$= 2\cdot 2\cdot 2$

$= 8\ Km^3$

21)



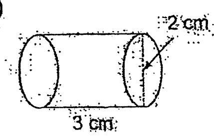
$V = \frac{1}{3}Bh$

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

$= \frac{1}{3}\ 12\cdot 8\cdot 12$

$= 384\ m^3$

22)



$V = \pi r^2 h$

$= \pi\ 1^2 \cdot 3$

$= 3\pi\ cm^2$

$9.4\ cm^2$

25

Based on properties of parallelograms

VI.

44) ABCD is a square

a) m∠3 = 90°

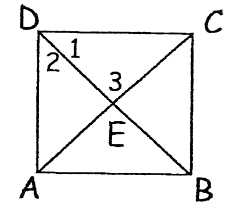
b) m∠1 = 45°

c) if AB = 6, AD = 6

d) if AC = 10, DE = 5

e) m∠ABC = 90°

f) if AC = 8, BD = 8



45) ABCD is a parallelogram

a) if m∠1 = 60°, m∠4 = 60°

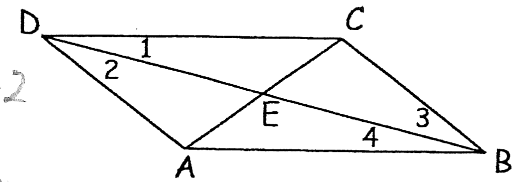
b) if m∠DAB = 120°, m∠ABC = 60°

c) if AC = 20, EC = 10

d) if AD = 4x – 5 and BC = 3x + 2, then x = 7

4x−5=3x+2

e) if m∠1 = 40° and m∠2 = 35°, then m∠DAB = 105°



46) ABCD is a rectangle

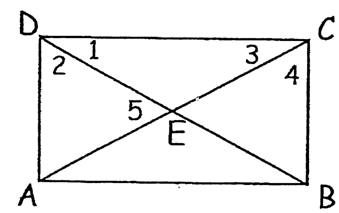
a) m∠ABC = 90°

b) if m∠1 = 40°, m∠3 = 40°

c) if m∠1 = 35°, m∠2 = 55°

d) if AC = 12, DE = 6

e) if m∠1 = 36°, m∠5 = 72°



47) ABCD is a rhombus

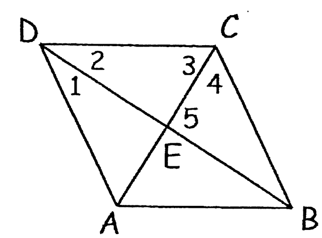
a) m∠5 = 90°

b) if m∠1 = 43°, m∠2 = 43°

c) if m∠1 = 40°, m∠3 = 50°

d) if AC = 20, AE = 10

e) if BE = 4, ED = 4



48) ABCD is an isosceles trapezoid

a) if m∠1 = 60°, m∠A = 60°

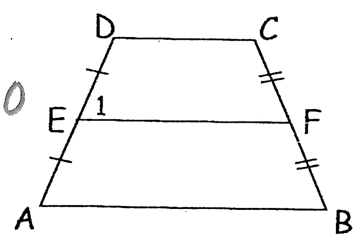
b) if AD = 4x – 6 and CB = 2x + 8, then x = x=7

4x−6=2x+8

c) if AD = 3x + 4 and BC = 4x – 6, then x = 3x+4=4x−6 =10

d) if CD = 10 and AB = 16, then EF = $\frac{10+16}{2}$ = 13

e) if EF = 15 and DC = 8, then AB = 15 = $\frac{8+x}{2}$ x=11

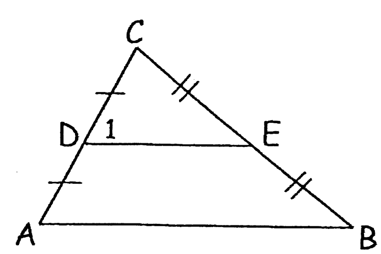


49) Given △ABC with midpoints D and E

a) if AB = 20, DE = 10

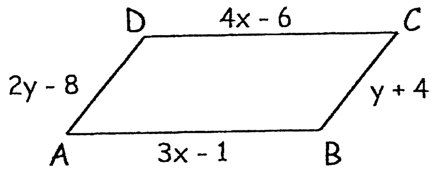
b) if DE = 18, AB = 36

c) if m∠1 = 81°, m∠A = 81°



VII. Find the missing values.

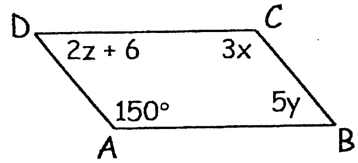
50) parallelogram



$2y - 8 = y + 4$
$y = 12$
$4x - 6 = 3x - 1$
$x = 5$

x = 5 y = 12
AB = 14 AD = 16

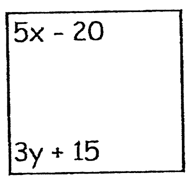
51) parallelogram



$3x = 150$
$x = 50$
$5y = 30$
$y = 6$
$2z + 6 = 30$
$z = 12$

x = 50 y = 6 z = 12

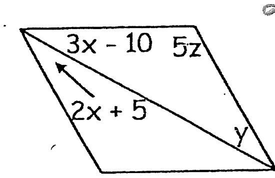
52) square



$5x - 20 = 90$
$5x = 110$
$x = 22$
$3y + 15 = 90$
$3y = 75$
$y = 25$

x = 22 y = 25

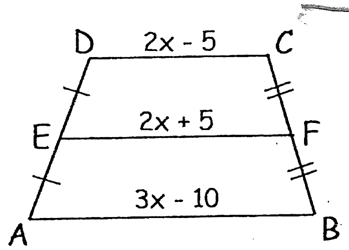
53) rhombus



$2x + 5 = 3x - 10$
$15 = x$
$2x + 5 = 35$
$3x - 10 = 35$
70
$5z = 110$
$z = 22$

x = 15 y = 35 z = 22

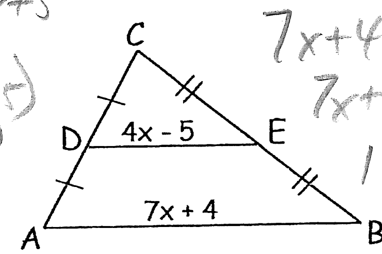
54)



$\frac{2x - 5 + 3x - 10}{2} = 2x + 5$
$5x - 15 = 2(2x + 5)$
$5x - 15 = 4x + 10$
$x = 25$

x = 25 CD = 45
AB = 65 EF = 55

55)



$7x + 4 = 2(4x - 5)$
$7x + 4 = 8x - 10$
$14 = x$

x = 14 DE = 51
AB = 102

Review

5

Geometric Construction Notes

A geometric construction is a drawing of geometric shapes using a compass and a straightedge.

When performing a geometric construction, only a compass (with a pencil) and a straightedge are allowed to be used.

We will be performing "process demonstrations" of each construction in class and you will be asked to perform additional process demonstrations as part of your homework. A process demonstration is showing a construction step by step including al the previous steps.

There are seven basic geometric constructions.

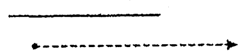
1. congruent segment
2. segment bisector
3. congruent angle
4. angle bisector
5. a line perpendicular to a given line through a point not on the line.
6. a line perpendicular to a given line through a point on the line.
7. a line parallel to a given line through a point not on the line.

Other geometric shapes or figures, such as right triangles or equilateral triangles, can be constructed using these seven basic constructions.

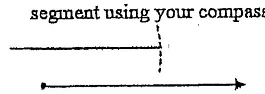
Congruent Segment – construct a segment congruent to a given segment.

Process demonstration

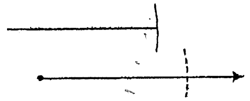
Step 1 draw a ray



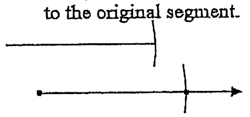
Step 2 – Measure the length of the original segment using your compass.



Step 3 – Mark the length on your ray.



Step 4 – Mark the intersection of the arc and ray to make a segment congruent to the original segment.

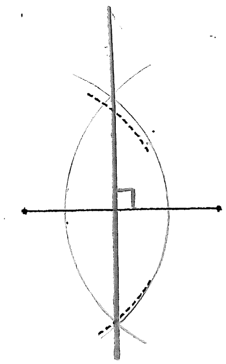


Segment Bisector or **Perpendicular Bisector**

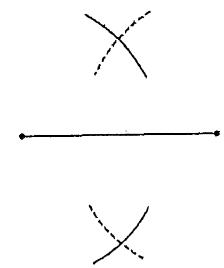
Process demonstration

Step 1 Open your compass to a measure which is more than half of the length of your segment.

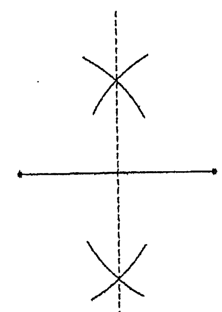
Step 2 Put the point of the compass on one end of the segment and construct an arc above and below the segment.



Step 3 Without changing the measure of the compass put the point of the compass on the other end of the segment and construct an arc above and below the segment.



Step 4 Draw a segment connecting the two intersections of the arcs.



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Congruent Angle

Step 1 – Draw a ray.

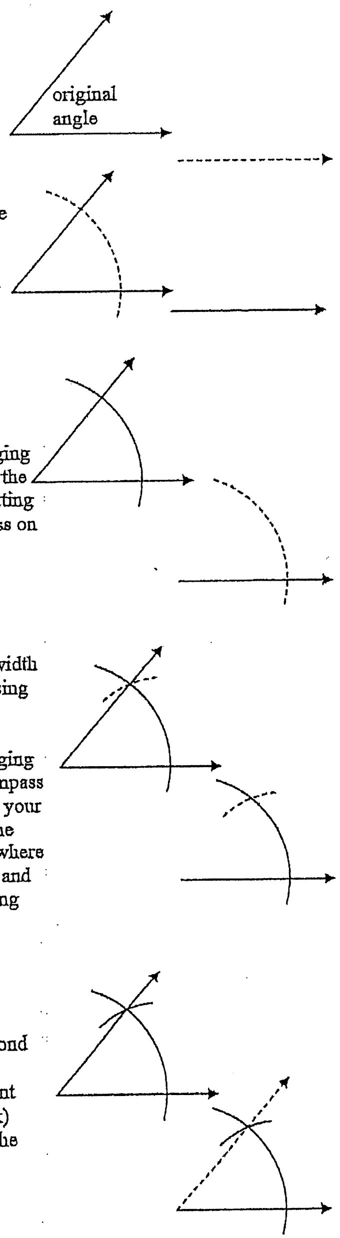
Step 2 – Construct an arc on the original angle with the point of the compass on the vertex of the angle and the arc crossing both sides of the angle.

Step 3 – Without changing the compass, construct the same arc on the ray putting the point of the compass on the end of the ray.

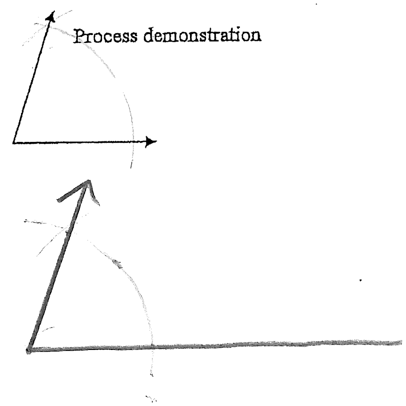
Step 4 – Measure the width of the original angle using the compass.

Step 5 – Without changing the measure on the compass mark off that width on your ray. Put the point of the compass on the point where the arc crosses the ray and construct an arc crossing your arc.

Step 6 – Draw the second side of the angle by connecting the endpoint of the ray (your vertex) with the point where the two arcs intersect.



Process demonstration



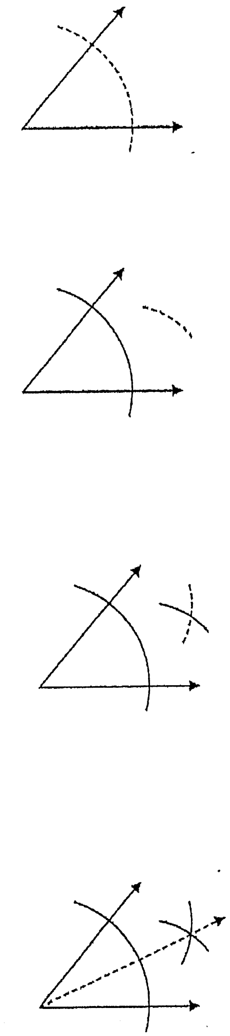
Angle Bisector

Step 1 – Construct an arc crossing both sides of the angle. Put the point of the compass on the vertex of the angle.

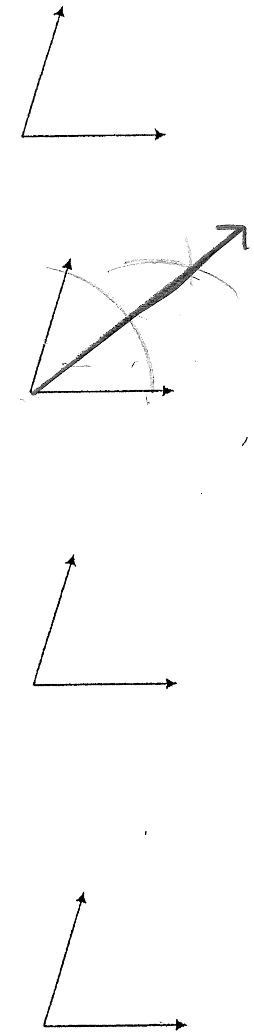
Step 2 – Construct an arc in the interior of the angle putting the compass on one side of the angle where the arc crosses it.

Step 3 – Without changing the compass measure from step 2, put the point if the compass on the other side of the angle where the arc crosses it and draw an arc on the interior of the angle.

Step 4 – Draw the angle bisector by connecting the vertex of the angle with the point where the two arcs from steps 2 and 3 cross.

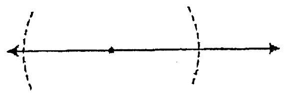


Process demonstration



A line perpendicular to a line through a point on the line

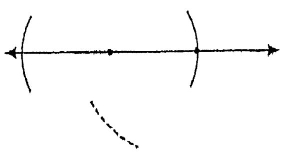
Step 1 – Put the point of the compass on the point and construct two arcs crossing the line one on each side of the point.



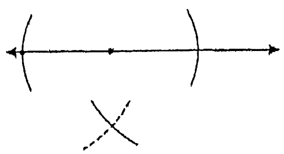
Construct a perpendicular bisector of the line segment.

Step 2 - Open your compass to a measure which is more than half of the length of your segment.

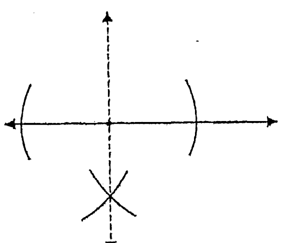
Step 3 – Put the point of the compass on one end of the segment and construct an arc above or below the segment.



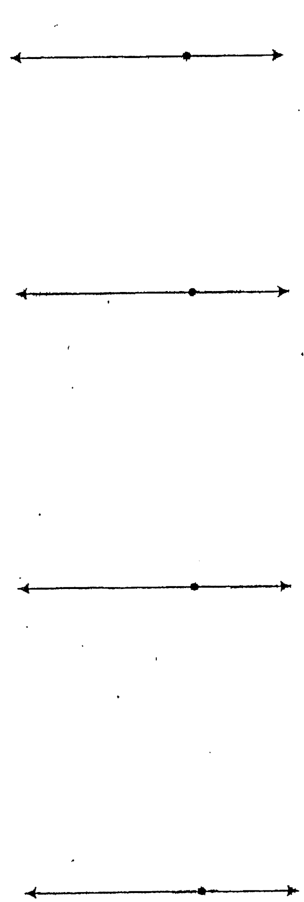
Step 4 – Without changing the measure of the compass put the point of the compass on the other end of the segment and construct an arc above or below the segment.



Step 5 – Draw a segment connecting the intersection of the arcs and the given point.

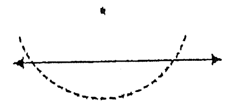


Process demonstration



A line perpendicular to a line through a point not on the line

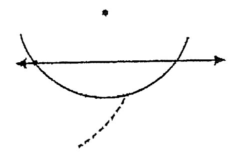
Step 1 – Put the point of the compass on the point and construct an arc crossing the line twice once on each side of the point.



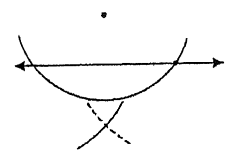
Construct a perpendicular bisector of the line segment.

Step 2 - Open your compass to a measure which is more than half of the length of your segment.

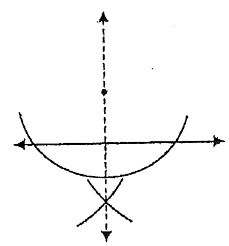
Step 3 – Put the point of the compass on one end of the segment and construct an arc above or below the segment.



Step 4 – Without changing the measure of the compass put the point of the compass on the other end of the segment and construct an arc above or below the segment.



Step 5 – Draw a segment connecting the intersection of the arcs and the given point.



Process demonstration

Construct a line parallel to a given line through a given point

Step 1 – Draw a transversal through the point intersecting the line.

Construct a congruent angle because if the corresponding angles are congruent then the lines must be parallel.

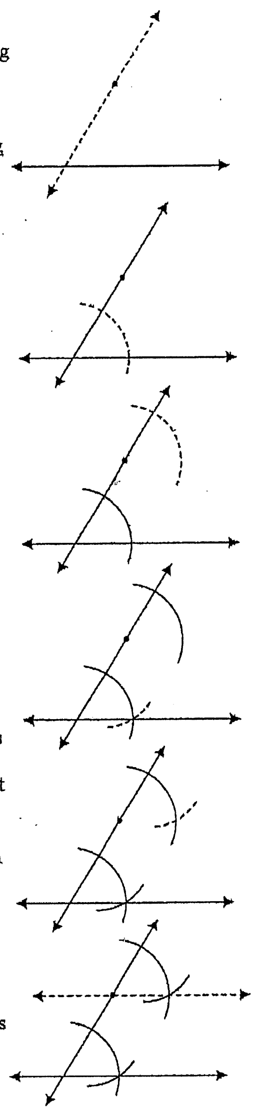
Step 2 – Construct an arc on the angle formed by the transversal and line with the point of the compass on the vertex of the angle and the arc crossing both sides of the angle.

Step 3 – Without changing the compass, construct the same arc at the point crossing the transversal.

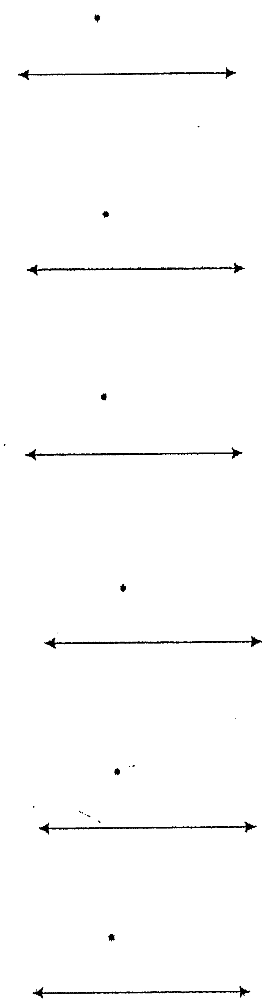
Step 4 – Measure the width of the angle formed by the transversal and the line using the compass.

Step 5 – Without changing the measure on the compass mark off that width at the original point. Put the point of the compass on the point where the arc crosses the transversal and construct an arc crossing your arc.

Step 6 – Draw line through the point where the two arcs cross and the given point.



Process demonstration



Georgia Milestones Assessment System

Analytic Geometry Formula Sheet

Below are the formulas you may find useful as you work the problems. However, some of the formulas may not be used. You may refer to this page as you take the test.

Quadratic Formulas

Quadratic Equations

Standard Form: $y = ax^2 + bx + c$

Vertex Form: $y = a(x-h)^2 + k$

Quadratic Formula

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Average Rate of Change

The change in the y-value divided by the change in the x-value for two distinct points on a graph.

Geometry Formulas

Pythagorean Theorem

$a^2 + b^2 = c^2$

Trigonometric Relationships

$\sin\theta = \dfrac{opp}{hyp}$; $\cos\theta = \dfrac{adj}{hyp}$; $\tan\theta = \dfrac{opp}{adj}$

Equation of a Circle

$(x-h)^2 + (y-k)^2 = r^2$

Circumference of a Circle

$C = \pi d$ or $C = 2\pi r$

$\pi \approx 3.14$

Arc Length of a Circle

Arc Length $= \dfrac{2\pi r\theta}{360}$

Area of a Circle

$A = \pi r^2$

Area of a Sector of a Circle

$\textit{Area of Sector} = \dfrac{\pi r^2\theta}{360}$

Volume

Cylinder	$V = \pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$
Cone	$V = \frac{1}{3}\pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$

Statistics Formulas

Conditional Probability

$P(A|B) = \dfrac{P(A\ and\ B)}{P(B)}$

Multiplication Rule for Independent Events

$P(A\ and\ B) = P(A) \cdot P(B)$

Addition Rule

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

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