Final Exam Practice

Rational Numbers

1. Evaluate each of the following square roots:

a. $\sqrt{276} =$ _____

b. $\sqrt{81} =$ _____

c. $\sqrt{400} =$ _____

d. $\sqrt{2.25} =$ _____

e. $\sqrt{0.64} =$ _____

f. $\sqrt{0.01} =$ _____

g. $\sqrt{\frac{64}{121}} =$ _____

h. $\sqrt{\frac{196}{169}} =$ _____

2. Circle the rational numbers:

$\sqrt{324}$	π	$2.\overline{681}$	$\frac{49}{0}$	18	-2⅓
$\frac{0}{-15}$	$0.3894\ldots$	$\sqrt{33}$	1.25	$-\frac{19}{5}$	-7

3. Circle the perfect squares:

256	$\frac{1}{10}$	0.169	$\frac{9}{25}$	200	$-\frac{49}{100}$
$\frac{18}{36}$	1.21	$\frac{2.25}{25}$	0.09	$\frac{81}{361}$	-16

4. Evaluate and write your final answer in reduced form:

a. $\frac{1}{4}+\frac{7}{20}=$

b. $2\frac{4}{5}+1\frac{9}{10}=$

c. $\frac{7}{8}-\frac{5}{6}=$

d. $3\frac{1}{6}-2\frac{2}{3}=$

e. $\frac{4}{15}\times 9=$

f. $\left(2\frac{1}{2}\right)\left(1\frac{1}{15}\right)=$

g. $\frac{2}{5}\div\frac{4}{15}=$

h. $5\frac{1}{2}\div 3\frac{1}{3}=$

i. $\left(\frac{5}{8}-\frac{1}{4}\right)\div\frac{2}{3}=$

j. $\frac{3}{4}+\left(\frac{1}{2}\times\frac{2}{3}\right)=$

k. $-\frac{4}{5}\left(-\frac{3}{4}+\frac{1}{3}\right)=$

l. $\frac{-5}{6}+\frac{-2}{3}\times\frac{3}{4}=$

5. Complete the following substitution questions:

a. $3x-24$ if $x=-9$

b. $-2a^2+10a$ if $a=4$

c. $-y^3+9y^2-14$ if $y=-2$

d. $6b^2-11b-7$ if $b=-5$

e. $-17a^2+9ab-3b^2$ if $a=3$ and $b=-6$

Powers and Exponents

1. Simplify the following expressions:

a. $4^3 \times 4^5 =$

b. $9^2 \times 9 \times 9^8 =$

c. $\left(3^3\right)\left(3^{11}\right) =$

d. $\dfrac{10^{14}}{10^3} =$

e. $\dfrac{x^5}{x} =$

f. $\left(6^2\right)^7 =$

g. $\left((-3)^5\right)^2 =$

h. $\left(-4^3\right)^9 =$

i. $\left(\dfrac{3}{7}\right)^x =$

j. $\dfrac{\left(x^4\right)\left(x^3\right)^5}{x^2 \times x} =$

2. Evaluate the following expressions:

a. $\dfrac{2^3 \times 2^4}{2^5} =$

b. $\left(\dfrac{\left(5^7\right)\left(5^2\right)}{5\left(5^5\right)}\right) =$

c. $11^{10} \div 11^8 =$

d. $0.5^6 \div 0.5^4 =$

e. $7^0 =$

f. $d^0 =$

g. $(-5)^2 =$

h. $-9^2 =$

i. $\left(-3^2\right)^2 =$

j. $\left(\dfrac{1}{6}\right)^3 =$

k. $\left(\dfrac{-2}{5}\right)^2 =$

l. $\left(\dfrac{(-2)^3 \times (-8)}{4^2}\right)^4 =$

m. $\left(\dfrac{-22^4}{-3^3(-8)^3}\right)^0 =$

Polynomials

1. Determine the degree of each expression:

a. $3xy^2$ degree = _____

b. 17 degree = _____

c. $15ab^3c^5$ degree = _____

d. $7x+2y$ degree = _____

e. $-2x^3+4x-11$ degree = _____

f. $8cd^4-c^5+4d^4$ degree = _____

g. $-xy+7-9x^2y^2+y^3$ degree = _____

2. Rewrite in descending order of x:

a. $13+x-4x^4-9x^2$ _____

b. $-3x^3y^2+5x^4-x-2-9x^2y$ _____

3. Rewrite in ascending order of x:

a. $8x^5-3x^2+x-x^7$ _____

b. $-6xy^2+x^4-1-x^2y+7x^3y^2$ _____

4. Simplify the following expressions:

a. $3a^2+5a-9a^2=$

b. $-10b^2+5b-2b^2-3b=$

c. $-4w^2z-3z^3+2-3w^2z-11=$

d. $(9m-4m)+(2m+m)=$

e. $(-11s-12t)+(-3s+9t)=$

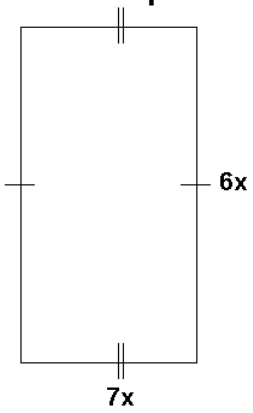
f. $(7x-y)-(9x+5y)=$

g. $5a-6y-(7a-10y)=$

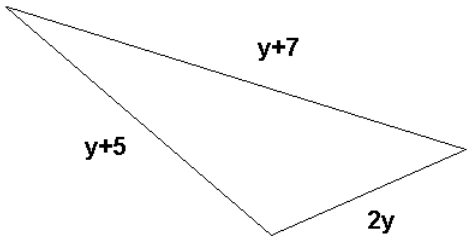
h. $(8d^2+9d-13)-(d^2+11d-5)=$

5. Write a simplified expression for the perimeter of the following shapes:

a.



b.



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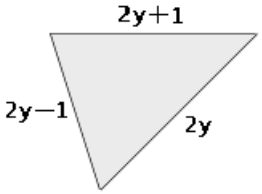
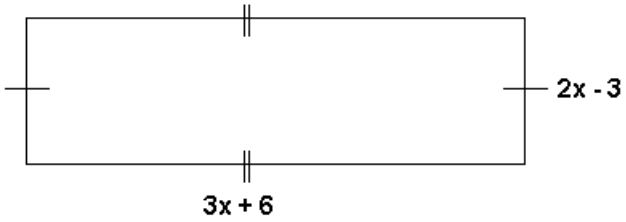
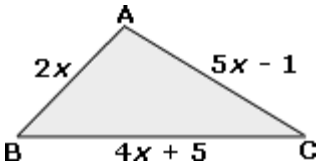


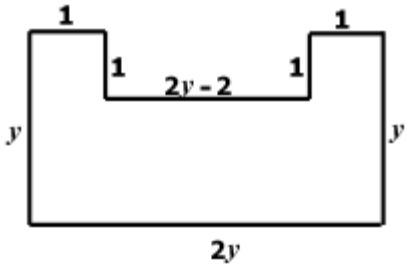
d.



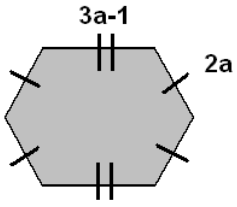
e.



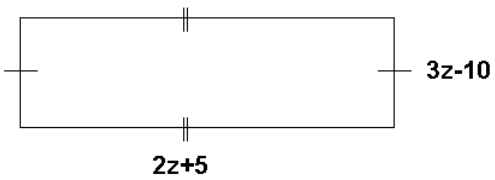
f.



g.



h.



Linear Relations

1. Write the linear equation corresponding to each table of values below:

X	Y
-2	-2
-1	0
0	2
1	4
2	6

a. _____

X	Y
-1	6
0	2
1	-2
2	-6
3	-10

b. _____

X	Y
-3	15
-2	10
-1	5
0	0
1	-5

c. _____

X	Y
0	-7
1	-10
2	-13
3	-16
4	-19

d. _____

X	Y
-2	3
-1	3.5
0	4
1	4.5
2	5

e. _____

X	Y
1	1.666…
2	1.333…
3	1
4	0.666…
5	0.333…

f. _____

2. List 3 points that can be found on the line of the following linear equations:

a. $y = 2x$ i. _____ ii. _____ iii. _____

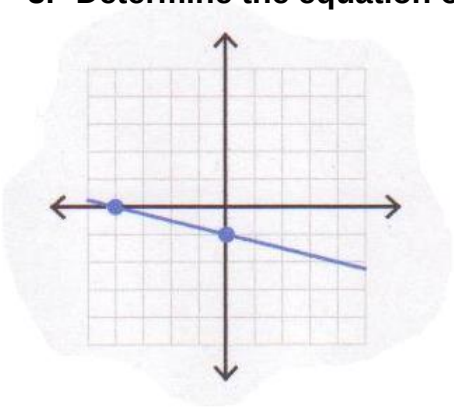
b. $y = -x + 3$ i. _____ ii. _____ iii. _____

c. $y = 3x - 5$ i. _____ ii. _____ iii. _____

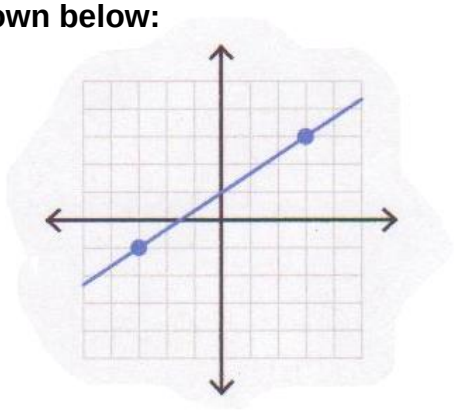
d. $y = \frac{1}{2}x + 1$ i. _____ ii. _____ iii. _____

e. $y = -\frac{1}{4}x - 6$ i. _____ ii. _____ iii. _____

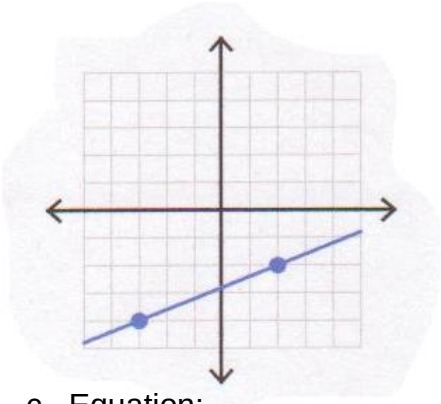
3. Determine the equation of the lines shown below:



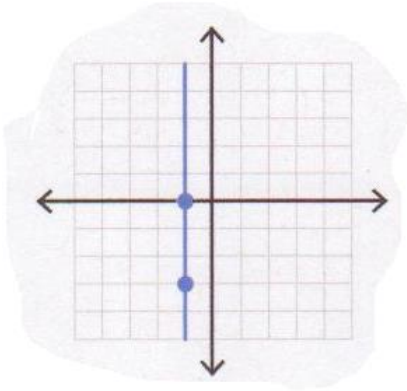
a. Equation: _____



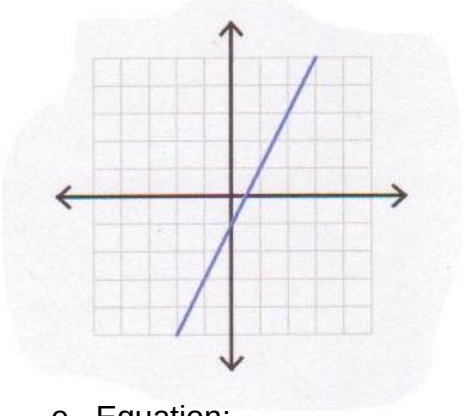
b. Equation: _____



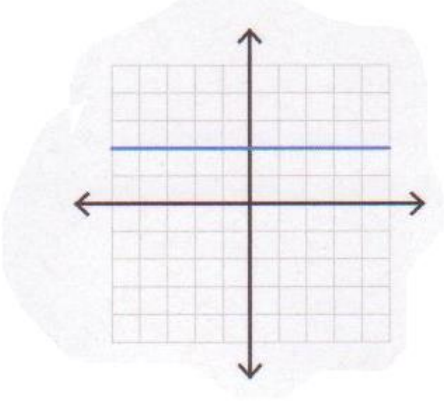
c. Equation: _____



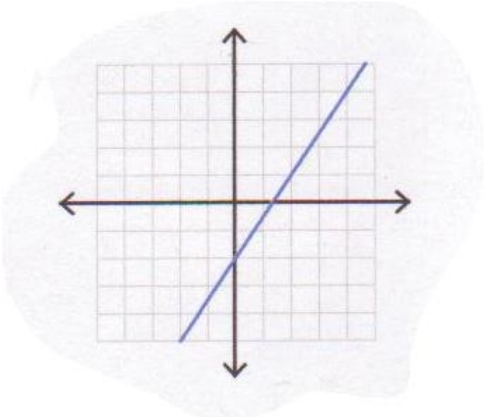
d. Equation: _____



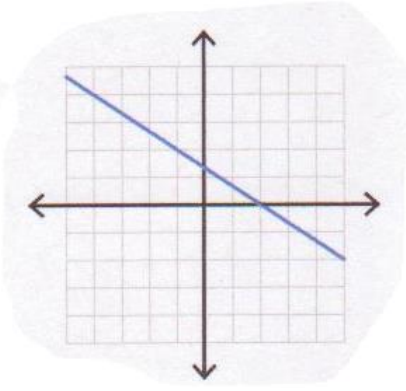
e. Equation: _____



f. Equation: _____



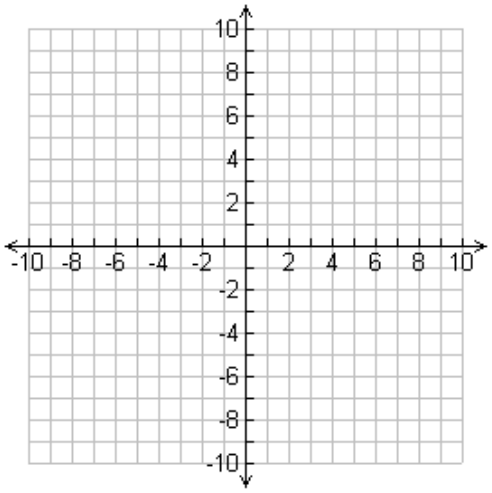
g. Equation: _____



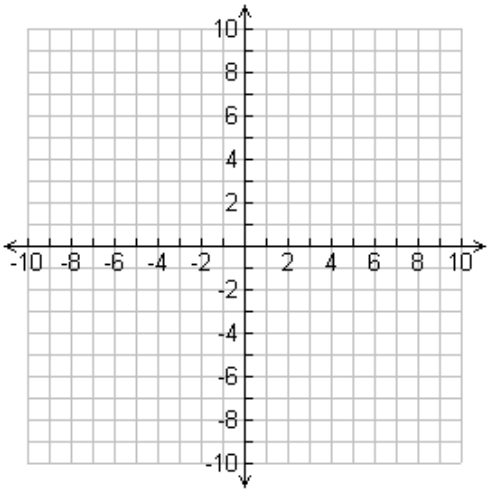
h. Equation: _____

4. Graph each of the following linear equations:

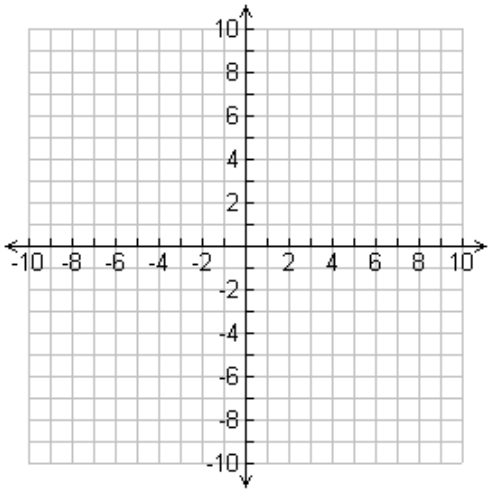
a. $y = 2x + 5$



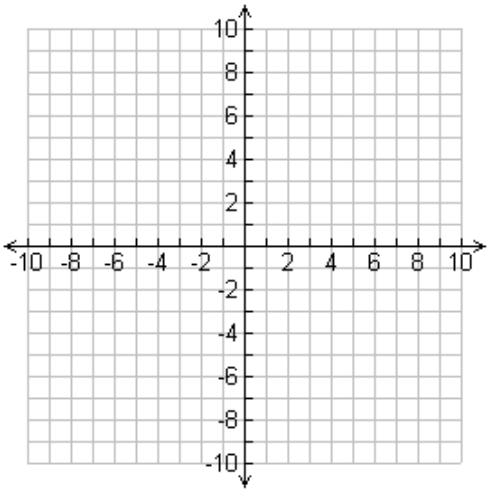
b. $y = -3x$



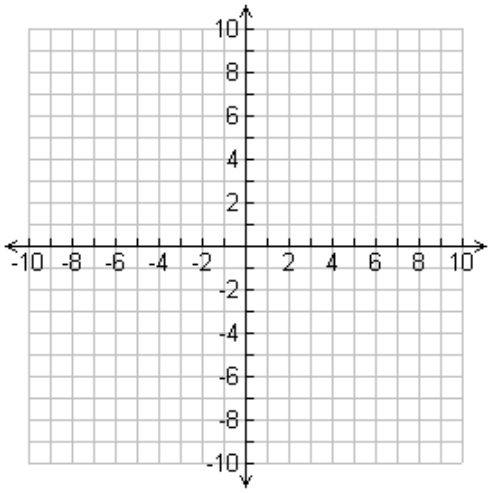
c. $y = \frac{1}{2}x - 2$



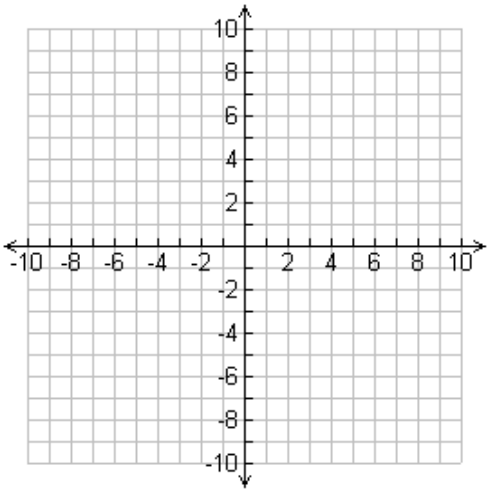
d. $y = 5$



e. $y = -x + 4$



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



Multiplying and Dividing Polynomials

1. Simplify the following expressions:

a. $3x\left(4x^2\right)=$

b. $(-10y)(7x)=$

c. $\left(3^2a^2b^2\right)\left(-7ab^3\right)=$

d. $-8m^2n\left(2^3m^2n^3\right)=$

e. $x(x+1)=$

f. $-5k(k-6)=$

g. $-3\left(b^2+b-1\right)=$

h. $-xy\left(3x^2+2xy-2y^3\right)=$

i. $-7p^2\left(5p^3+8p-11\right)=$

j. $4x\left(-x^2-x+7\right)+3x=$

k. $5z(z-10)-8z(z+4)=$

l. $-x^3(x-2)+3x\left(x^3+1\right)-5x=$

m. $8t(t-4)-3t(t+1)+t(t-9)=$

n. $-6r(r-5)+8(r-3)-4(r^2-2)=$

o. $-8(x^2-x)+5(x^2)-3x(10+2x)=$

p. $3x(7-x)-6(x^2-3x)+8x^2=$

q. $\dfrac{10x}{5}=$

r. $\left(\dfrac{-35x^2}{7x}\right)=$

s. $\dfrac{18a^2b^2}{-6ab}=$

t. $\left(\dfrac{-72m^2np^5}{-8mnp^3}\right)=$

u. $\dfrac{4x^2+3x}{x}=$

v. $\dfrac{5s^3-15s^2+25s}{-5s}=$

w. $\dfrac{18b^3-27b^2+9x}{-9x}=$

x. $\dfrac{-24a^2b+12ab-20ab^2}{4ab}=$

Solving Linear Equations

1. Solve the following equations:

a. $w-3=-2$

b. $14-k=3$

c. $-2p=36$

d. $121=-11p$

e. $\frac{x}{7}=-6$

f. $-5=\frac{40}{m}$

g. $2x-12=x+3$

h. $6m=9+3m$

i. $4m+11=6m-5$

j. $5x+8-x=18$

k. $7x+3-2x=23$

l. $3(x+2)=-3$

m. $3(4y-20)=3y+75$

n. $3(x-2)+x=2(x+1)$

o. $2y-5-(y-3)=7$

p. $5(2y-1)-3(4y-6)=7$

q. $\frac{m-34}{8} = -2m$

v. $\frac{11j-3}{10} = \frac{3j+15}{6} - 2$

r. $\frac{7x}{6} - \frac{x}{3} = \frac{11}{3} - x$

w. $\frac{4k+5}{3} - \frac{3k}{2} = -k$

s. $\frac{d}{2} - \frac{3d}{4} = \frac{3}{4} - d$

x. $\frac{p+1}{3} + \frac{p-2}{7} = 1$

t. $\frac{(y-7)}{3} = \frac{(y-2)}{4}$

y. $\frac{n-1}{4} + 2 = \frac{3n+1}{5} - \frac{1}{5}$

u. $\frac{(n+1)}{3} = \frac{(n-1)}{5}$

2. Solve the following word problems: Write an equation and solution

a. The sum of two numbers is 39. One number is 7 less than the other. What are the two numbers?

b. The difference between two numbers is 65. If the larger number is 112, what is the smaller number?

c. The product of two numbers is -60. If the larger number is 15, what is the smaller number?

d. The quotient of two numbers is -6. If the smaller number is 24, what is the larger number?

e. A number and one-quarter of the number total 245. What is the number?

f. One fifth of a number is added to one third of the same number. If the sum is 96, find the number.

g. Find three consecutive numbers whose sum is 87.

h. Find three consecutive inters whose sum is -147.

i. The length of a rectangle is 8cm more than the width. If the perimeter is 64cm, find its dimensions.

j. The perimeter of a rectangular plot is 114m. If the length is 3m less than three times the width, find the dimensions.

k. A rectangle is 5cm longer than twice its width. The width of another rectangle is 3cm less than the width of the first rectangle and its length is 6cm more than 3 times its width. If the perimeters are equal, find the dimensions of both rectangles.

l. Rita has two more dimes than quarters. If she has $3.35 altogether, how many of each type of coin does she have?

m. A cash box has seven times as many dimes as quarters. The total value in the box is $8.55. How many of each coin are there?

n. Abigail, Jerome and Klaus were given a total of $2750 in scholarships. Klaus received 3 times the amount Abigail received. Jerome received $250 more than Abigail. How much did each student receive?

o. To stay in shape you work out at the Commonwealth Pool. Your annual (1 year) pass costs $280.00. You also pay an additional $5.00 for each specialty class that you attend. If you attended 22 specialty classes throughout the year, what is your yearly cost?

p. Your monthly cell phone charge is $40.00 for unlimited local calling. You also pay an additional 0.15¢ for each minute (m) that you call long distance. What is the amount of your monthly cell phone bill if you have spent 60 minutes talking long distance?

q. The flying distance between two cities is 2175 km. If this distance on a map is 15cm, how many km does each cm represent?

r. The CN Tower in Toronto is 553.3m tall. A LEGO version of the CN Tower was created using a scale factor of 1:184. What is the height of the model, rounded to the nearest metre?

Linear Inequalities

1. Solve and graph the following inequalities:

a. $x - 5 > 2$

b. $6x - 12 \geq 9$

c. $3y + 12 < 5y$

d. $5x - 5 < 7 + x$

e. $6(y - 2) > 3y - 11$

f. $2(x + 3) < 3(x + 5)$

g. $15 - x > 2(-3 + x) + 3$

h. $\frac{-3b}{4} \leq 2$

i. $6 < \frac{3y}{2}$

j. $\frac{8+r}{4} \geq 3$

k. $-2 < \frac{n-2}{3}$

l. $-14 + \frac{p}{8} \geq -18$

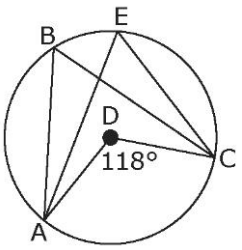
m. $-3 + \frac{k}{3} > -5$

Circle Geometry

1. Solve for the indicated angles:

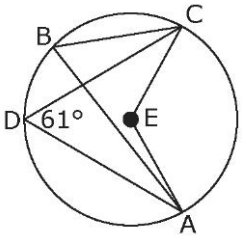
a. $\angle ABC =$ _____

$\angle AEC =$ _____



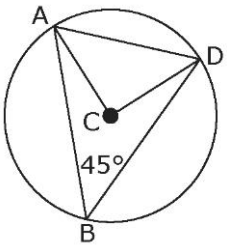
b. $\angle ABC =$ _____

$\angle AEC =$ _____

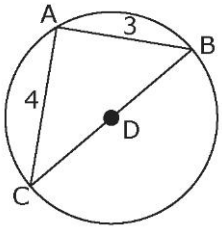


c. $\angle ACD =$ _____

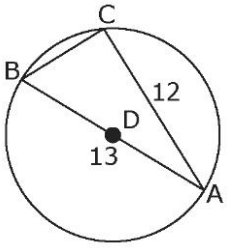
$\angle ADC =$ _____



d. $\angle CAB =$ _____

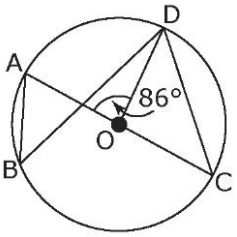


e. $\angle BCA =$ _____



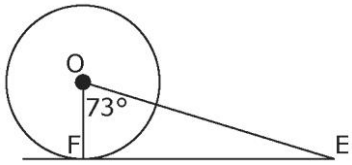
f. $\angle ACD =$ _____

$\angle ABD =$ _____



g. $\angle EFO =$ _____

$\angle FEO =$ _____

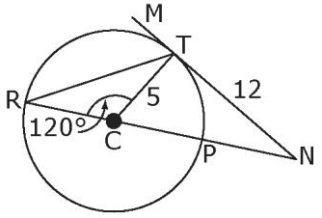


h. $\angle CTN =$ _____

$\angle NCT =$ _____

$\angle CNT =$ _____

$\angle CTR =$ _____



2. Define the following terms:

a. Chord –

b. Inscribed Angle –

c. Central Angle –

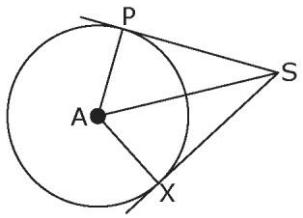
d. Perpendicular Bisector –

e. Tangent Line –

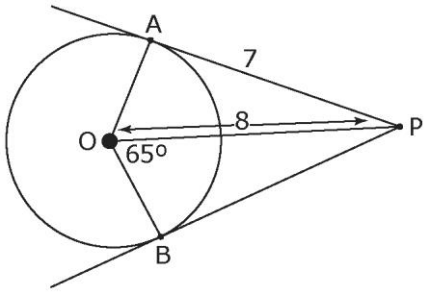
f. Point of Tangency –

3. Solve for the indicated side length:

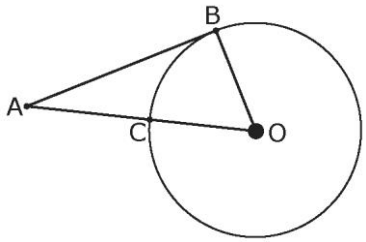
a. In the diagram, SP is tangent to the circle at P. SX is tangent to the circle at X. SP = 6 cm, SA = 10 cm, and A is the centre of the circle. What is the length of AX?



b. The centre of the circle is O. Points A and B are tangent to the circle. What is the length of $\overline{OB}$?



c. In the diagram, $\overline{AB}$ is tangent to the circle. The length of $\overline{AB}$ is 24 cm and the length of $\overline{OB}$ is 10 cm. What is the length of $\overline{AO}$ and what is the length of $\overline{AC}$?



d. A subway track must pass through a cylindrical tunnel. The tunnel is 6 m in diameter. How wide should the track bed be so that the maximum height at the centre of the tracks is 4.5 m? Express your answer to the nearest tenth of a metre.