Math 6d: Homework 9
Due: December 2

Be prepared to hand in your work.

Formulas Used Today

Distance	Midpoint
$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	$\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}$

1.	Use the distance formula to find the distance of line AC. A(-2, -2) C(3, 5). Then plot the points on graph paper and use the Pythagorean Theorem to find the distance between points A and C by drawing point B(3, -2).	2.	Find the midpoint of CD, C(6, –4) and D(12, –2).
3.	The vertices of triangle JEN are $J(2, 10)$, $E(6, 4)$, and $N(12, 8)$. Use coordinate geometry to prove that triangle JEN is an isosceles right triangle.	4.	The coordinate of the midpoint of the line joining (3p, 4) and (-2, 2q) are (5, p). Find the values of p and q.
5.	Let *A* be (−3,5) and *B* be (5,−10). Find a) the distance *AB* b) the midpoint *P* of *AB* c) the point *Q* which divides *AB* in the ratio 2 : 5.	6.	What is the perimeter of triangle ΔABC with vertices $A(-1, -2)$, $B(2, -6)$, $C(-3, -6)$? Give your answer in the simplest radical form
7.	There are two men. One of them is wearing a red shirt, and the other is wearing a blue shirt. The two men are named Andrew and Bob, but we do not know which is Andrew and which is Bob. The guy in the blue shirt says, “I am Andrew.” The guy in the red shirt says, “I am Bob.” If we know that at least one of them lied, then what color shirt is Andrew wearing?	8.	There are 3 boxes, exactly one of which has a car. You can keep the car if you pick the correct box! On each box there is a statement, exactly one of which is true. Box 1: The car is in this box. Box 2: The car is not in this box. Box 3: The car is not in box 1. Which box has the car?
9.	A parent rewards a child with 50 cents for each correctly solved mathematics problem and fines the child 30 cents for each incorrectly solved problem. If the child nets $22.00 after 100 problems. How many problems were solved correctly?	10.	Suppose that P and Q are statements for which P → Q is true and for which ~Q is true. What conclusion (if any) can be made about the truth value of each of the following statements? (a) P (b) P ∧ Q (c) P ∨ Q

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11. **Looking at the following truth table, find the missing operator if** result $= p \bigstar q$.

p	q	result
T	F	F
T	T	T
F	T	F
F	F	T

A. ↔

B. →

C. ∧

D. ∨

12. **Looking at the following truth table, find the missing operator if** result $= p \bigstar q$.

p	q	result
T	F	T
T	T	T
F	T	T
F	F	F

A. ↔

B. →

C. ∧

D. ∨

13. $\dfrac{5^{-2}x^{-1}}{x^4y^2} =$

a. $\dfrac{1}{25x^3y^2}$.

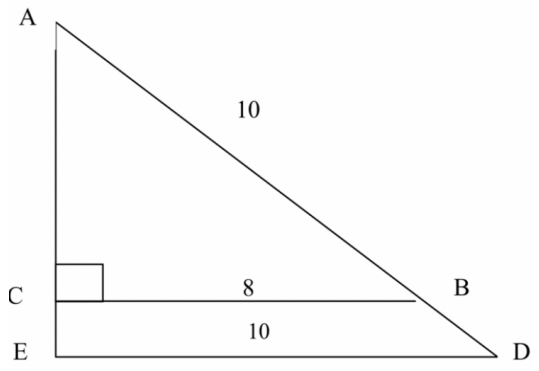
b. $\dfrac{1}{10x^5y^2}$.

c. $\dfrac{25x^5}{y^2}$.

d. $\dfrac{10}{x^3y^2}$.

e. $\dfrac{1}{25x^5y^2}$.

14. Given the following figure, find the length of AD.



15. If $z = \dfrac{x-8}{2x}$, then $x =$

a. $\dfrac{8}{1-2z}$.

b. $\dfrac{8}{2z-1}$.

c. $\dfrac{z-8}{2}$.

d. $\dfrac{z+8}{2}$.

e. $2z-1$.

16. Alan, Ben, Chris, Dave and Emma are eating a big cake. After eating, there was one slice left, and they decided to leave it for Frank but someone ate it! Frank knows that these 5 people are each telling one truth and one lie:

Alan says, "It wasn't Emma. It was Ben."
Ben says, "It wasn't Chris. It wasn't Emma."
Chris says, "It was Emma. It wasn't Alan."
Dave says, "It was Chris. It was Ben."
Emma says, "It was Dave. It wasn't Alan."

Who ate the last slice of cake?

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17. The east-west streets and north-south avenues of a certain city are numbered consecutively from south to north and east to west. All blocks are squares with the same side lengths. Mandy is standing on the corner of 56th Street and 12th Avenue. Mark is standing on the corner of 32nd Street and 18th Avenue. Mark calls Mandy and asks her to meet him at a spot halfway between their current locations.

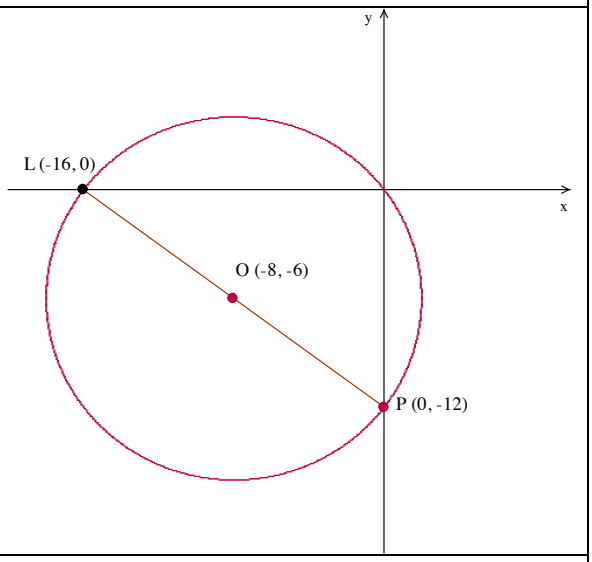
a. Use the Midpoint Formula to find out where Mark wants to meet. Show your work.

b. Mandy says that Mark walks faster than she does, so he should have to walk farther. Assume that Mark walks 1.25 times as fast as Mandy. If Mandy's distance walked in a given time period is *d*, what is the distance Mark can walk in the same time period?

c. Use your results in part **b** to write and solve an equation to find the distances Mark and Mandy should each walk.

18. Using the diagram, answer the questions that follow.

a. Find the measure of the radius of the circle.
b. Find the area of the circle.
c. Find the circumference of the circle.



19. Given: a point X not on *AB*

Construct: the line perpendicular to *AB* through point X

1. Construct a circle with a center at X and a radius of *XD* , where *XD* is greater than the distance from X to *AB*. Let E and F be the points of intersection of the circle and *AB*.
2. Construct a circle with a center at E and a radius of *EF* . Construct a circle with a center at F and a radius of *EF* . Let H and G be the points of intersection of the two circles.
3. Construct *HG*

Then *HG* is perpendicular to *AB* through point X.

20. Given: Δ*ABC*

Construct: a circle inscribed in Δ*ABC*

1. Construct the angle bisectors of the angles of Δ*ABC* . (Only two of the three are really necessary to construct.)
2. Let O be the point of intersection of the angle bisectors.
3. Construct an altitude from O to any of the three sides.
4. Let X be the point of intersection of the altitude with the side of the triangle.
5. Construct a circle with center O and radius |OX|.
6. Then this circle is inscribed in the triangle ABC.