

- 1) Dr. Prince is preparing a quiz for his MI 2 class. The quiz contains 5 true and false questions and 6 multiple choice questions, each with 4 choices.
 - a) How many ways can the 5 true and false questions be answered?
 - b) How many ways can the multiple choice questions be answered?
 - c) What is the total number of ways to answer all the questions on the quiz?

- 2) Mr. Stalmack is also writing a for his MI 2 class, but he decided to make it a matching quiz. He has 8 questions with 10 possible answers to match.
 - a) How many ways can the 8 questions be answered if no answer repeats?
 - b) How many ways can the 8 questions be answered if answers are allowed to repeat?

- 3) In problem set 6 you graphed the greatest integer function $y = \lfloor x \rfloor$. You should have found the graph created 'steps', each one unit long and one unit high. Your calculator will graph this function if you use the INT command, that is, set $y = \text{int}(x)$. Be careful though, the calculator does not indicate which end of the step has an open circle. In making the graphs below, clearly indicate which end is open and which is closed. In this problem you will graph the greatest integer function the involves some multiplication.
 - a. Graph $y = 2 \lfloor x \rfloor$

 - b. Graph $y = \left\lfloor \frac{1}{3} x \right\rfloor$

 - c. Graph $y = 2 \left\lfloor \frac{1}{3} x \right\rfloor$

 - d. Generalize your results and describe, in complete sentences, the effect of a and b has on the graph of $y = \lfloor x \rfloor$ when we graph $y = a \lfloor bx \rfloor$. You may need to experiment a bit more to reach your conclusions.

- 4)
 - a) **NC** Simplify: $\frac{78!}{76!} + \frac{163!}{160!}$ (Show work!)

 - b) Find the largest prime factor of $49! + 50! + 51!$

- 5) x is within 12 units of -3.
- a) Graph this set on the number line.
- b) Write this set in set builder notation: $x: |x-h| < r$

Solving Absolute Value Inequalities

$$|x| > a \Leftrightarrow x > a \text{ or } x < -a$$

$$|x| < a \Leftrightarrow x < a \text{ and } x > -a$$

Example 1: $|4x+2| \leq 8$ then

$$4x+2 \leq 8 \quad 4x+2 \geq -8$$

$$4x \leq 6 \quad \text{and} \quad 4x \geq -10$$

$$x \leq \frac{3}{2} \quad x \geq \frac{-5}{2}$$

Solution in interval notation: $\left[\frac{-5}{2}, \frac{3}{2} \right]$

Example 2: $|2x-1| > 4$

$$2x-1 > 4 \quad 2x-1 < -4$$

$$2x > 5 \quad \text{or} \quad 2x < -3$$

$$x > \frac{5}{2} \quad x < \frac{-3}{2}$$

- 6) Solve and give answers in interval notation.
- a) $\left| \frac{1}{3}x + 3 \right| \geq 11$ b) $\left| \frac{3}{4}x + 1 \right| < 11$
- 7) Find a matrix W so that: $\begin{bmatrix} 2 & -1 \\ 4 & 6 \end{bmatrix} W + 3 \begin{bmatrix} -5 & 2 \\ -7 & -6 \end{bmatrix} = \begin{bmatrix} -17 & 20 \\ 8 & 10 \end{bmatrix}^T$ May use a calculator but show your steps.
- 8) NC Simplify: $\left(7 \cdot \begin{bmatrix} 3 & 6 \\ -2 & 5 \\ -3 & 1 \end{bmatrix}^T + \begin{bmatrix} 5 & -3 & 11 \\ -2 & 7 & -4 \end{bmatrix} \right)^T$

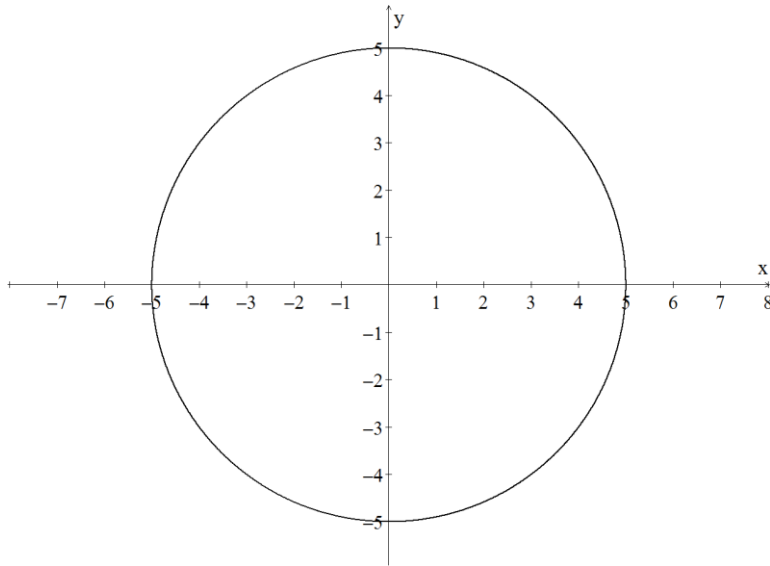
Equation of a Circle

The equation of a circle of radius r is given by

$$x^2 + y^2 = r^2$$

where r is the radius of the circle centered at the origin. So

$x^2 + y^2 = 25$ is graphed below



9) Given the circle with center $(-3,6)$ and line m tangent to the circle at $(7,1)$

- a) Find the exact length of the radius of the circle.
- b) Find an equation of line m .

10) Given the parametric equations
$$\begin{aligned} x &= 3 - 2t \\ y &= 7 - 4t \end{aligned}$$

- a) If $0 \leq x \leq 7$, find the range for y . Give your answer in interval notation.
- b) If $0 \leq x \leq 7$ what is the set of possible values for t ? Use interval notation.
- c) Find the slope and y -intercept of the graph these equations generate.

If a general quadratic equation $ax^2 + bx + c = 0$ is solved using the completing the square technique, the result is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. This is called the *quadratic formula*.

11) Use the quadratic formula to solve each equation exactly.

a) $3x^2 - 4x - 7 = 0$

b) $\frac{2x+3}{x-5} = \frac{x-9}{x+4}$

12) Solve for (x, y) : $\begin{bmatrix} 2 & 4 & -1 \\ -1 & 0 & 5 \end{bmatrix} \cdot \begin{bmatrix} 3x+5 \\ 4 \\ x+y \end{bmatrix} = \begin{bmatrix} 12 \\ 11 \end{bmatrix}$

13) Given the sequence 4, 7, 10, 13, . . .

a) Write a recursive definition for this sequence

b) Write an explicit equation to relate a_n to n .

c) Find a_{500}

14) Line L has equation $y = -3x + 5$. Find the equation of L' if L' is

a. the reflection of L over the y-axis.

b. the reflection of L over the x-axis.

c. the reflection of L over the line $y = x$.

Another kind of average (mean) is the Harmonic Mean. To compute the

Harmonic Mean, take the reciprocal of each number, average the results and then reciprocate

back. The Harmonic Mean of a and b is $\left(\frac{\frac{1}{a} + \frac{1}{b}}{2}\right)^{-1}$

15) a) Find the Harmonic Mean of 12 and 16

b) Find the Harmonic Mean of 4, 6, and 10