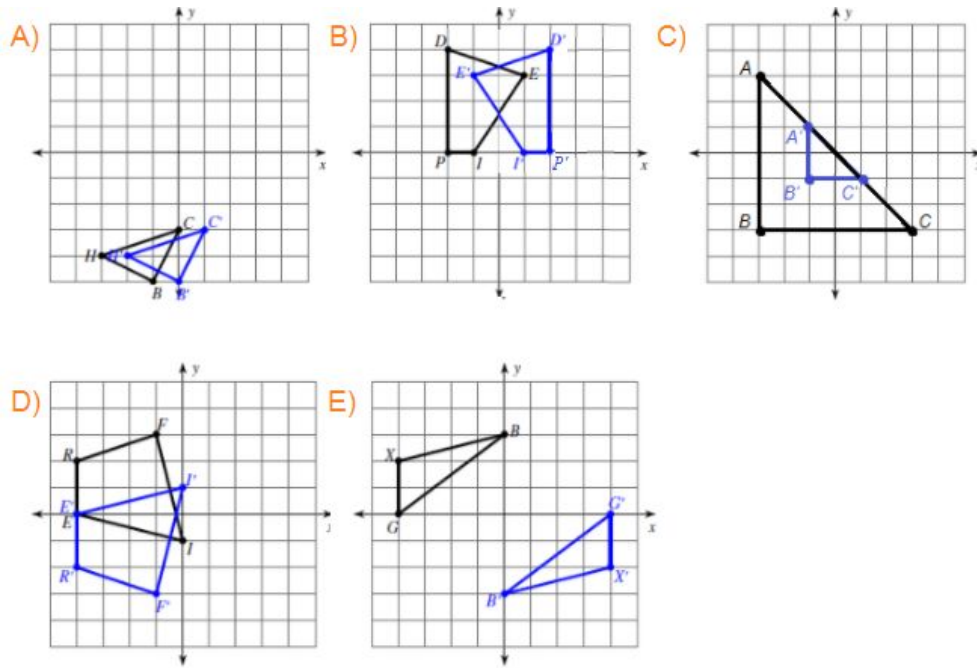


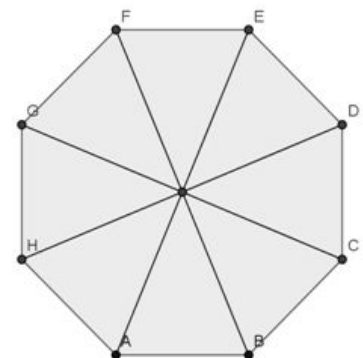
**Study Guide: Math 2 Final Exam**

**Transformations**

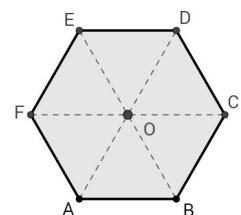
1. What are the four transformations?
2. Which of the transformations are isometries? \_\_\_\_\_
3. What does the rule  $(x,y) \rightarrow (x+4, y- 5)$  mean? \_\_\_\_\_
4. Label each type of transformation below. Be specific! State directions, degrees (rotations), and lines of reflections.



5. Given the octagon  $ABCDEFGH$  on the right, find the image of point  $B$  when it is rotated  $225^\circ$  counter-clockwise.



6. Given the hexagon  $ABCDEF$  on the right, find the image of point  $F$  when it is reflected over the line  $BE$ .



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## Quadratics

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**Algebra:**

7. Simplify:  $(4x - 2)^2$

8. Simplify:  $2\sqrt{60}$

9. Factor:  $x^2 + 5x + 4$

10. Factor:  $x^2 - 16$

11. Factor:  $2x^2 - x - 3$

12. Factor:  $8x^2 - 16x + 6$

13. What is the quadratic formula?

14. Solve:  $2x^2 - 162 = 0$

15. Solve:  $3x^2 + x - 6 = 0$

16. Solve  $2x^2 - 7x - 4 = 0$

17. Solve  $2(x - 1)^2 = 64$

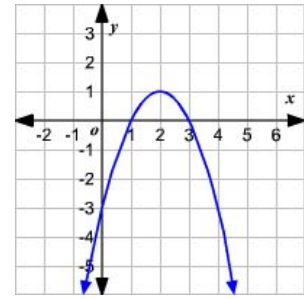
18. Solve  $x^2 - 5x + 9 = 0$

16. How and when do you need to use imaginary numbers in your answers? (Ex:  $3x^2 + 2x + 10 = 0$ )

**Graphing:**

17. Write a vertex form equation for a parabola shifted 3 units left and 8 units down.

18. Write an equation in vertex form for the graph on the right:



19. What are the domain and range of the graph?

20. Complete the square to write an equation in vertex form the parabola given by  $y = x^2 - 6x + 5$ .

21. Put  $y = x^2 + 5x - 1$  into vertex form.

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**Square Root and Inverse Functions**

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**Algebra:**

21. Solve:  $\frac{x}{2} = \frac{x-4}{3}$

22. Solve:  $\sqrt{2x-1} = 3$

23. Solve:  $\sqrt{x+12} = x$

24. Solve  $\frac{x}{2} = \frac{3}{x+1}$

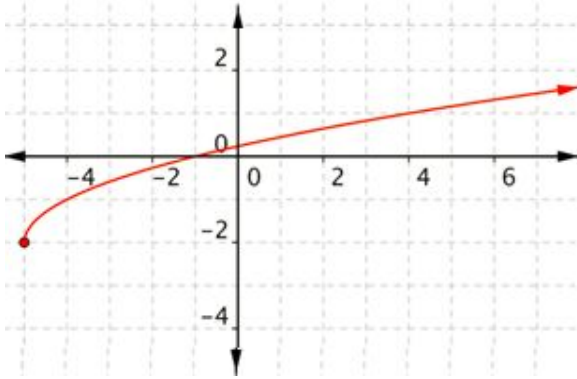
24. a) In an inverse variation as  $x$  increases, what happens to  $y$ ? \_\_\_\_\_

b) The volume  $V$  of gas varies inversely to the pressure  $P$ . The volume of a gas is  $200 \text{ cm}^3$  under pressure of  $32 \text{ kg/cm}^2$ . What will be its volume under pressure of  $40 \text{ kg/cm}^2$ ?

**Graphing:**

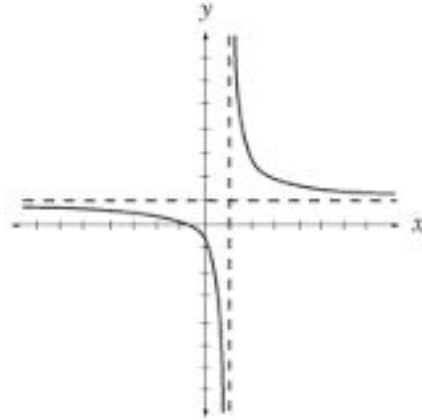
25. a) Write an equation for the graph below.

26. a) Write an equation for the graph below.



$y =$  \_\_\_\_\_

b) What are the domain and range?



$y =$  \_\_\_\_\_

b) What are the asymptotes?

$x =$  \_\_\_\_\_ and  $y =$  \_\_\_\_\_

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**Fundamentals of Geometry & Similarity**

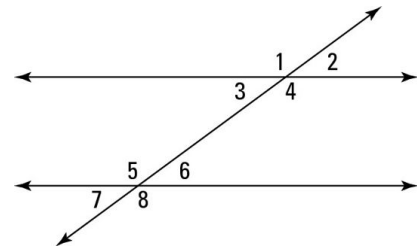
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27. Draw an example of each of the following:

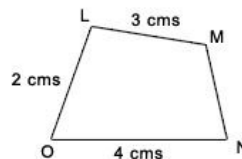
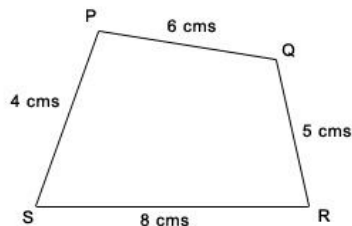
- a) complementary angles
- b) supplementary angles
- c) vertical angles

28. Using the image on the right...

- a) If  $m\angle 3 = 56^\circ$  and  $m\angle 6 = (3x + 2)^\circ$ , find  $x$ .
- b) If  $m\angle 3 = 56^\circ$  and  $m\angle 5 = (6y - 14)^\circ$ , find  $y$ .



29. Are the figures below similar? If so, complete the similarity statement and state the scale factor.



- Yes,  $\square PQRS \sim \square$  \_\_\_\_\_ by a scale factor of \_\_\_\_\_.
- No, the figures are not similar.

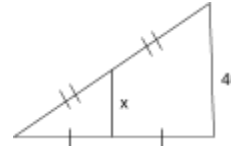
30. In  $\triangle RST$ ,  $RS = 10$ ,  $RT = 15$ , and  $m\angle R = 32^\circ$ . In  $\triangle UVW$ ,  $UV = 12$ ,  $UW = 18$ , and  $m\angle U = 32^\circ$ . Determine whether the triangles are similar. If so, write a similarity statement and determine the scale factor.

- Yes,  $\triangle$  \_\_\_\_\_  $\sim$   $\triangle$  \_\_\_\_\_ by a scale factor of \_\_\_\_\_.
- No, the figures are not similar.

31. What are the 3 postulates for determining similarity? \_\_\_\_\_

32. Find the value of  $x$  in the figure on the right.

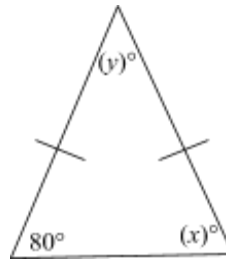
a)  $x =$  \_\_\_\_\_



### Triangle Congruence

33. Given that  $\triangle LUV \cong \triangle MTH$ ,  $m\angle L = 3x - 5$ ,  $m\angle V = 6x - 4$ , and  $m\angle T = 2x + 2$ . Find the value of  $x$ . (Hint: Draw the triangles and label).

34. Find the value of  $x$  and  $y$  in the figure.



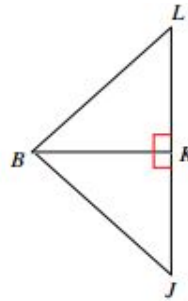
35.  $\overline{AC}$  bisects  $\angle BCD$ , and  $m\angle BCA = 15^\circ$ . What is the measure of  $\angle BCD$ ? How do you know?

36. What are the 5 postulates for proving triangle congruence?

\_\_\_\_\_

37. Complete the proof below.

**Given:**  
 $\angle BKL$  and  $\angle BKJ$  are right angles,  
 K is the midpoint of LJ



**Prove:**  
 $LB = JB$

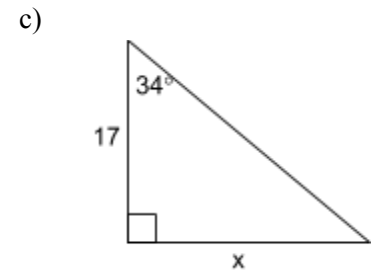
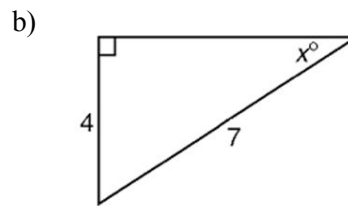
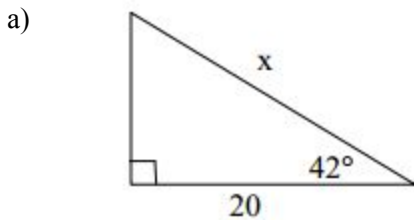
| Statements   | Justifications                |
|--|-------------------------------|
| 1. - $\angle BKL$ and $\angle BKJ$ are right angles<br>- K is the midpoint on LJ | 1. Given                      |
| 2. $\angle BKL \cong \angle BKJ$   | 2. Right angles are congruent |
| 3. _____   | 3. Definition of midpoint     |
| 4. $BK = BK$   | 4. _____                      |
| 5. $\triangle JKM \cong \triangle BKJ$   | 5. _____                      |
| 6. $LB = JB$   | 6. CPCTC                      |

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### Trigonometry

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38. Solve for  $x$  in the right triangles below.



39. Juan is flying his kite on the football field. There is 30 meters of string between Juan and his kite. The string makes an angle of  $42^\circ$  with the ground. Find, to the nearest meter, how far above the ground the kite is flying.

40. Find the angle of elevation of the sun from the ground to the top of a tree when a tree that is 12 feet tall casts a shadow 7 feet long. Round to the nearest degree.

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