

Complete each problem to the best of your ability. SHOW ALL WORK. If the calculator was the only thing used then please state this. You must complete 3 problems per unit. If you complete all three then please cross out what you do not want graded. If nothing is crossed out then only the first 3 problems will be graded in each unit.

Unit 1

<p>1. Simplify $(13x^2 + 3x - 5) - (3x^2 + 2x - 5)$ $13x^2 + 3x - 5 - 3x^2 - 2x + 5$ $10x^2 + x$</p>	<p>2. Factor $8x^3 - 32x$ $8x(x^2 - 4)$ $8x(x-2)(x+2)$</p>	<p>3. Simplify $(3x - 4y)(7x - 6y)$ $21x^2 - 18xy - 28xy + 24y^2$ $21x^2 - 46xy + 24y^2$</p>
<p>4. Factor and Solve $5x^2 + 4x = 12$ $5x^2 + 4x - 12 = 0$ $5x^2 + 10x - 6x - 12 = 0$ $5x(x+2) - 6(x+2) = 0$ $(5x-6)(x+2) = 0$ $5x-6=0 \implies x = \frac{6}{5}$ $x+2=0 \implies x = -2$</p>	<p>5. Factor $4y^2 - 121$ $(2y-11)(2y+11)$</p>	

Unit 2

<p>6. Simplify $\sqrt{900x^3y}$ $30 \cdot 30 \cdot x \cdot x \cdot y$ $30x\sqrt{xy}$</p>	<p>7. Complete the Square: $x^2 - 6x + \underline{9}$ $\left(\frac{-6}{2}\right)^2 = (-3)^2 = \underline{9}$ $(x-3)^2$</p>	<p>8. Solve $3(x-2)^2 = 12$ $(x-2)^2 = 4$ $x-2 = \pm 2$ $x-2 = 2 \implies x = \underline{4}$ $x-2 = -2 \implies x = \underline{0}$</p>																												
<p>9. Solve using any methods you have learned (factoring, quadratic formula, completing the square). $a:2 \quad b:8 \quad c:3 \quad 2x^2 + 8x + 3 = 0$ $x = \frac{-8 \pm \sqrt{(8)^2 - 4(2)(3)}}{2(2)}$ $x = \frac{-8 \pm \sqrt{40}}{4} = \frac{-8 \pm 2\sqrt{10}}{4} = \frac{-4 \pm \sqrt{10}}{2}$ <i>*does not factor!</i> <i>could also do this ☺</i></p>																														
<p>10. Complete the table by placing checks in all boxes which are appropriate for each number as it pertains to the number system.</p>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 15%;">Number</th> <th style="width: 15%;">Real</th> <th style="width: 15%;">Imaginary</th> <th style="width: 15%;">Rational</th> <th style="width: 15%;">Irrational</th> </tr> </thead> <tbody> <tr> <td>6. 0</td> <td>✓</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>7. $\sqrt{-3}$</td> <td></td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>8. $\sqrt{5}$</td> <td>✓</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>9. $\frac{2}{3}$</td> <td>✓</td> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table>					Number	Real	Imaginary	Rational	Irrational	6. 0	✓		✓		7. $\sqrt{-3}$		✓			8. $\sqrt{5}$	✓			✓	9. $\frac{2}{3}$	✓		✓	
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Unit 3

11. Solve the systems using one of the methods from class (elimination, substitution, graphing).

$$y = 3x + 1$$

$$4x - 3y = -13$$

$$4x - 3(3x + 1) = -13$$

$$4x - 9x - 3 = -13$$

$$-5x - 3 = -13$$

$$-5x = -10$$

$$x = 2$$

$$y = 3(2) + 1$$

$$y = 7$$

$$(2, 7)$$

12. Solve the systems using one of the methods from class (elimination, substitution, graphing).

$$y = x^2 - 6x + 9$$

$$y = -x + 5$$

$$x^2 - 6x + 9 = -x + 5$$

$$x^2 - 5x + 4 = 0$$

$$(x - 4)(x - 1) = 0$$

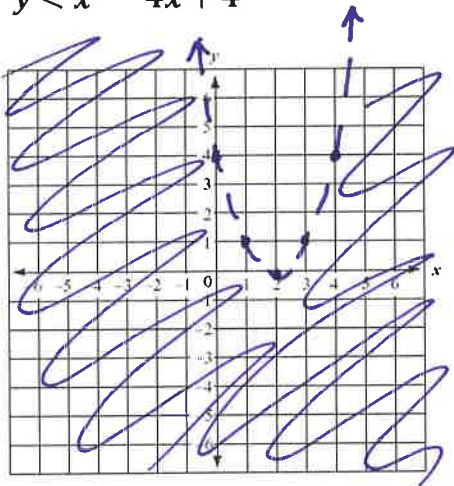
$$x = 4 \quad x = 1$$

$$y = -4 + 5 = 1 \quad y = -1 + 5 = 4$$

$$(4, 1)$$

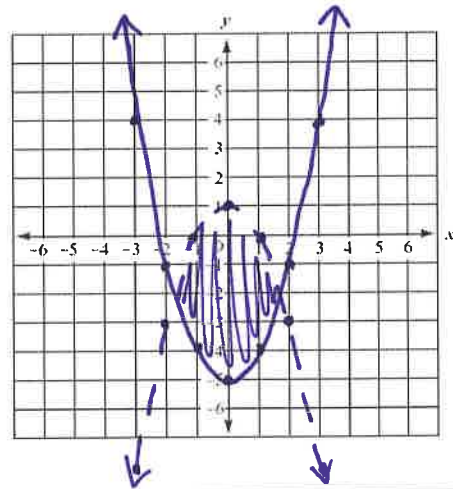
$$(1, 4)$$

13. Graph $y < x^2 - 4x + 4$



14. Graph the system: $y \geq x^2 - 5$

$$y < -x^2 + 1$$



Unit 4

15. Simplify $\frac{28x^4y^7}{16x^{-3}y^{-3}}$

$$\frac{7x^7y^{10}}{4}$$

16. Simplify $(8x^{\frac{1}{3}}y^{\frac{4}{3}}z^{-5})^{-\frac{2}{3}}$

$$8^{-2/3} x^{-2/9} y^{-8/9} z^4$$

$$\frac{z^4}{4x^{2/9}y^{8/9}}$$

17. Solve $\sqrt{8x - 1} + 5 = 100$

$$\sqrt{8x - 1} = 95$$

$$8x - 1 = 9025$$

$$8x = 9026$$

$$x = 1128.25$$

18. Y varies directly as x. When $y = 9, x = 15$. What does x equal when $y = 45$?

$$y = kx$$

$$9 = k(15)$$

$$k = .6$$

$$y = .6x$$

$$45 = .6x$$

$$x = 75$$

19. The time it takes for a train to travel varies inversely with the speed the train is traveling. If a train travels between two cities in 3 hours at 65 miles per hour, how long would it take at a speed of 195 miles per hour?

t: time (hr)
s: speed (mph)

$$t = \frac{k}{s}$$

$$3 = \frac{k}{65}$$

$$k = 195$$

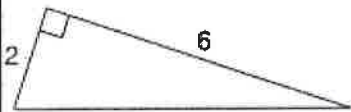
$$t = \frac{195}{s}$$

$$t = \frac{195}{60}$$

$$t = 3.25 \text{ hours}$$

Unit 5

20. Find the missing side. Round to the nearest tenth if needed.



$$2^2 + 6^2 = c^2$$

$$4 + 36 = c^2$$

$$40 = c^2$$

$$c = \sqrt{40} \approx \boxed{6.3 \text{ units}}$$

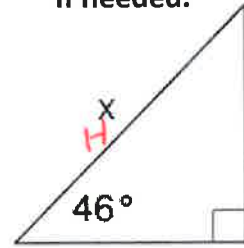
21. If the sides lengths are 12 cm, 5 cm, 13 cm, is the triangle acute, right, or obtuse?

$$5^2 + 12^2 \stackrel{?}{=} 13^2$$

$$169 \stackrel{?}{=} 169$$

Right

22. Find x. Round to the nearest tenth if needed.



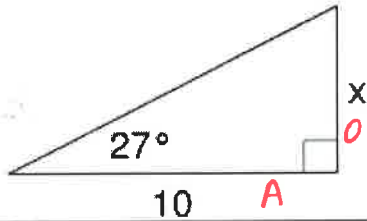
$$\sin(46) = \frac{8}{x}$$

$$x \cdot \sin(46) = 8$$

$$x = \frac{8}{\sin(46)}$$

$$x \approx \boxed{11.1 \text{ units}}$$

23. Find x. Round to the nearest tenth if needed.

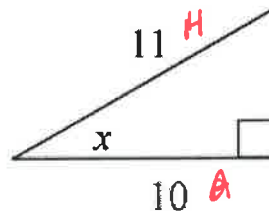


$$\tan(27) = \frac{x}{10}$$

$$10 \cdot \tan(27) = x$$

$$x \approx \boxed{5.1 \text{ units}}$$

24. Find x. Round to the nearest tenth if needed.



$$\cos(x) = \frac{10}{11}$$

$$x = \cos^{-1}\left(\frac{10}{11}\right)$$

$$x \approx \boxed{24.6^\circ}$$

Unit 6

25. Rotate 270°. $y, -x$
L(-8, 0) J(-6, 1) W(-9, -4)

$$L'(0, 8)$$

$$J'(1, 6)$$

$$W'(-4, 9)$$

26. Reflect over $y = x$, and then Rotate 180°. (y, x)
 $(-x, -y)$
G(-9, -2) D(0, 4) S(-1, -1)

$$G'(-2, -9) \rightarrow G''(2, 9)$$

$$D'(4, 0) \rightarrow D''(-4, 0)$$

$$S'(-1, -1) \rightarrow S''(1, 1)$$

27. Translate left 10 and up 5.
U(-1, 2) N(3, -6) O(0, 5)

$$U'(-11, 7)$$

$$N'(-7, -1)$$

$$O'(-10, 10)$$

28. Rotate 90°, dilate by 2, and then reflect over the y-axis. $(-y, x)$
 $(2x, 2y)$
M(-2, 2) A(-5, 10) T(0, -5)

$$M'(-2, -2) \rightarrow M''(-4, -4) \rightarrow M'''(4, 4)$$

$$A'(-10, -5) \rightarrow A''(-20, -10) \rightarrow A'''(20, -10)$$

$$T'(5, 0) \rightarrow T''(10, 0) \rightarrow T'''(-10, 0)$$

29. Translate down 10, then reflect over the x-axis, and then rotate 90° clockwise. $(y, -x)$
 $(x, -y)$
C(-4, 1) U(5, 0) B(0, -10)

$$C'(-4, -9) \rightarrow C''(-4, 9) \rightarrow C'''(9, 4)$$

$$U'(5, -10) \rightarrow U''(5, 10) \rightarrow U'''(10, -5)$$

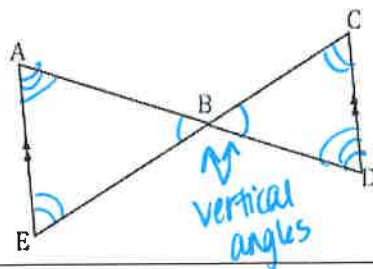
$$B'(0, -20) \rightarrow B''(0, 20) \rightarrow B'''(20, 0)$$

Unit 7

30. Are these triangles similar? If so, state how.

Yes or No

Why? AA ~ Thm.

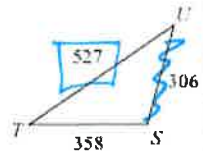
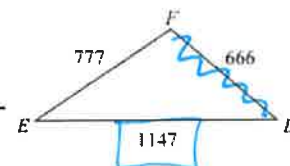


vertical angles
alternate interior angles too!

31. Are these triangles similar? If so, state how.

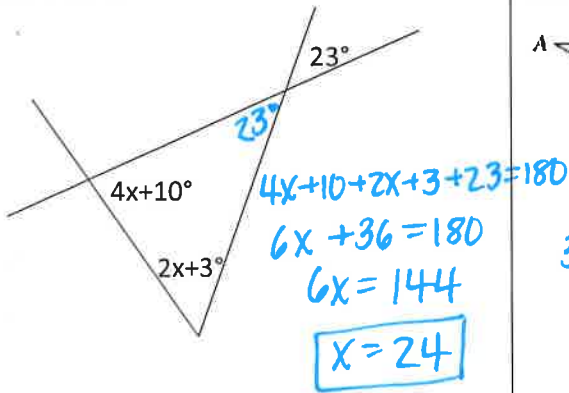
Yes or No

Why?

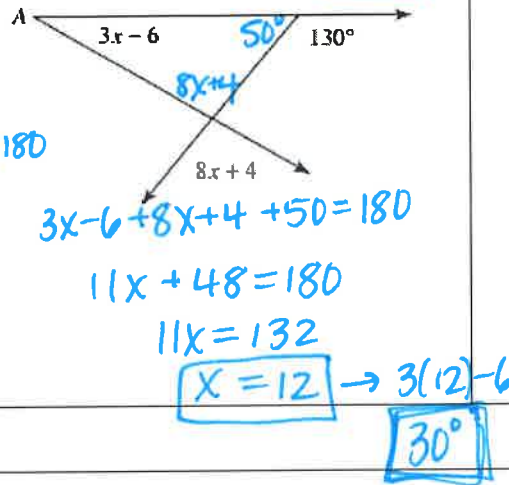


$$\frac{666}{306} = \frac{777}{358} = \frac{1147}{527}$$

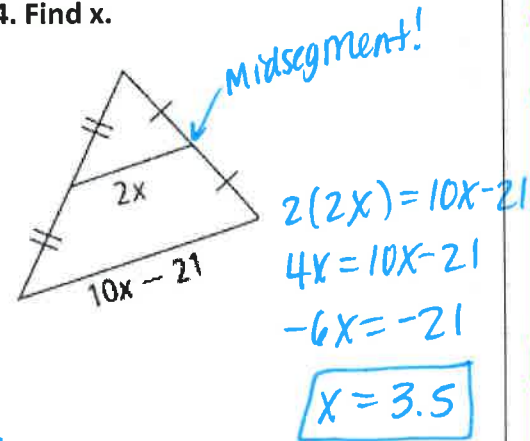
32. Find x.



33. Find the measure of angle A.



34. Find x.

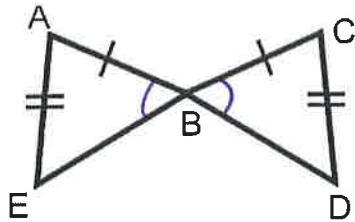


Unit 8

35. Determine if these triangles are congruent. If so, state how.

Yes or No

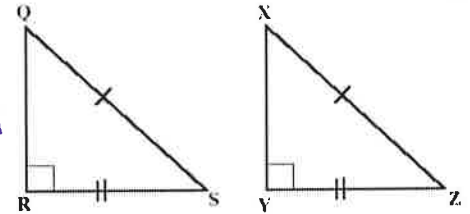
Why? _____



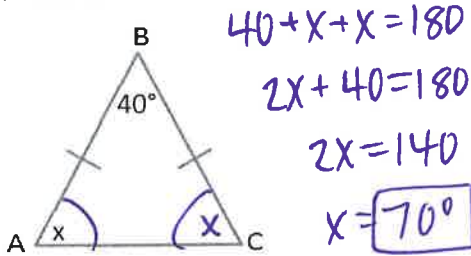
36. Determine if these triangles are congruent. If so, state how.

Yes or No

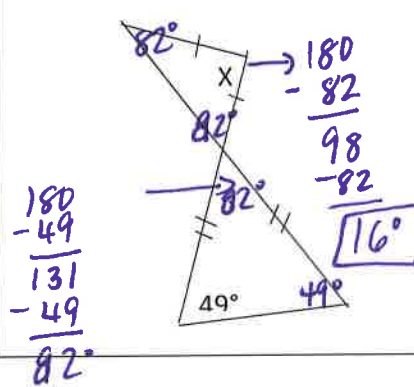
Why? HL ≅ Thm



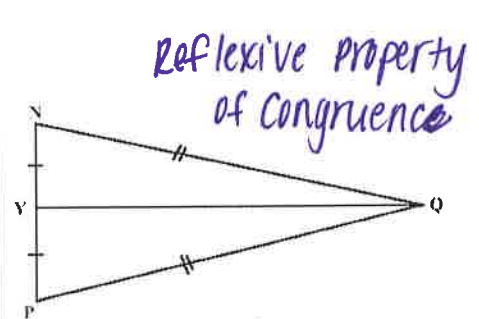
37. Find x.



38. Find x.



39. In the diagram why is $\overline{QY} \cong \overline{QY}$?



Unit 9

40. P(6 of diamonds)

$$\left(\frac{1}{52}\right)$$

41. P(Ace, Ace)

$$\left(\frac{4}{52}\right)\left(\frac{3}{51}\right) = \left(\frac{1}{221}\right)$$

42. P(Queen, Face Card)

$$\left(\frac{4}{52}\right)\left(\frac{11}{51}\right) = \left(\frac{11}{663}\right)$$

43. A drawer contains 4 red t-shirts, 5 black t-shirts, 3 blue t-shirts, and 2 white t-shirts. What is the probability that Sarah will randomly select a black t-shirt, return it to the drawer, and then select a red t-shirt?

total: 14 shirts

$$\left(\frac{5}{14}\right)\left(\frac{4}{14}\right) = \left(\frac{5}{49}\right)$$

44. A teacher is making a 5 question test. The first two questions are multiple choice with options of A, B, C, and D. The last three questions are either true or false. How many ways could you select answers for this test?

$$\underline{4} \cdot \underline{4} \cdot \underline{2} \cdot \underline{2} \cdot \underline{2} = \underline{128 \text{ ways}}$$

45. How many elements are in the sample space of the alphabet?

$$\underline{26}$$