Mathematics Department
New York City College of Technology
City University of New York

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MAT 1175 – COURSE REVIEW #2

1. **a)** **Divide** and **simplify**: $\dfrac{x^2-9}{x^2+6x-7} \div \dfrac{x^2-x-6}{3x+21}$ **b)** **Divide** by **long division**: $\dfrac{3y^2-4y+3}{y-2}$

2. **a)** **Combine** into one fraction: $\dfrac{2x}{x-3} - \dfrac{3}{4}$ **b)** **Solve** for ***y***: $\dfrac{y+2}{4y} - \dfrac{1}{2} = \dfrac{y-9}{10y}$

3. **a)** **Simplify** and **combine**: $3\sqrt{32x^3} - x\sqrt{18x}$ **b)** **Rationalize** and **simplify**: $3\sqrt{\dfrac{x^2}{6}}$

4. **Solve** the following system ***graphically***:

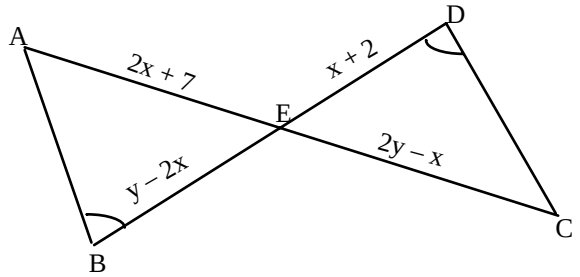
$$2x - y = 5$$
$$x + y = 4$$

5. **Solve** for ***x*** using the **quadratic formula**. Leave the answer in the simplest radical form.

$$x^2 - 10x + 7 = 0$$

6. **a)** **Simplify**: $\dfrac{8}{3-\sqrt{5}}$ **b)** Find the **product**: $\left(x-\sqrt{3}\right)\left(x-\sqrt{3}\right)$

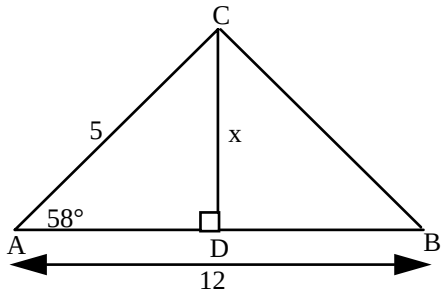
7. If $\angle B = \angle D$ and AE = EC
a) **Show** that $\Delta ABE \cong \Delta CDE$
b) **Solve** for ***x*** and ***y***
c) **Find** the **lengths** of AC and BD



8. **a)** **Solve** for ***x***: $\sqrt{x+1} + 5 = x$ **b)** **Simplify**: $\dfrac{\left(3x^3\right)^2}{5x^{-3}}$

c) **Simplify**: $\dfrac{4x^{-3}y^{-3}}{6xy^{-5}}$

9. If AC = 5, AB = 12, and $\angle A = 58$,
a) **Find** ***x*** (round to the nearest tenth).
Sin 58° = .8480
Cos 58° = .5299
Tan 58° = 1.6003
b) **Find** the **area** of Δ ABC (round to the nearest tenth).



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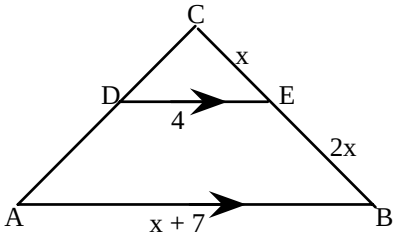
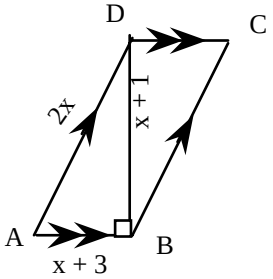
10. If DE is parallel to AB,
- **a) Show** that Δ ACB and Δ DCE are similar (give reasons)
- **b) Solve** for x, CE, CB, and AB

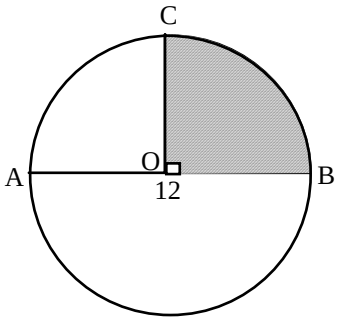


11. If ABCD is a parallelogram and $\angle$ DBA is 90°,
- **a) Solve** for x, AB, DB, and AD.
- **b) Find** the **area** of the parallelogram ABCD.



12. Given Δ ABC with AC = $\frac{3x}{2} - 3y$, AB = $2x - y$ and Δ DEF with DE = $6y + 2$ and DF = $\frac{5x}{4} - 2y$.
If $\angle$ B = $\angle$ E and $\angle$C = $\angle$F and EF = BC, state **why** the triangles are **congruent** and **find** ***x*** and ***y***.

13. If the diameter AOB = 12 and $\angle$COB = 90°
- a) **Find** the **circumference** of the **circle** (round to the nearest tenth).
- b) **Find** the **area** of the **shaded sector** (round to the nearest tenth).

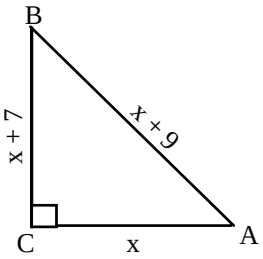


14. Simplify: $\frac{6x^2 - 7x - 3}{3x + 1}$

15. a) Combine: $5\sqrt{12} + 7\sqrt{27}$

b) Find the **product** & **simplify**: $\left(5\sqrt{2}\right)\left(3 - \sqrt{6}\right)$

16. In the right triangle Δ ABC, $\angle$ C = 90°, AC = x, BC = $x + 7$, AB = $x + 9$
- **a) Find** ***x***
- **b) Find** all **three sides** of Δ ABC
- **c) Find** the **area** of Δ ABC



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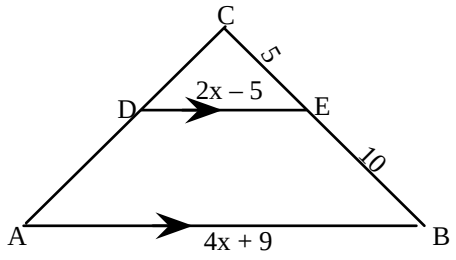
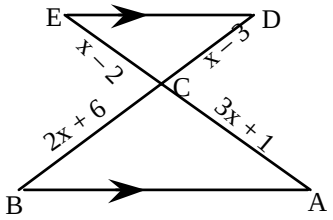
17. If ED ∥ AB, **find *x***.



18. If DE ∥ AB, **solve** for ***x***.

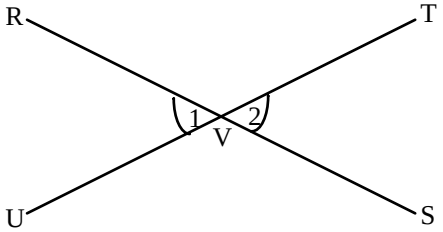


19. Given the vertical angles 1 and 2, **solve** for ***x*** if:

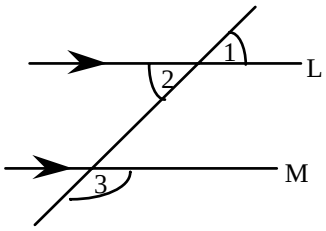
a) $\angle 1 = 48 - 3x$
$\angle 2 = 2x + 43$

b) $\angle 1 = \frac{3}{2}x + 12$
$\angle 2 = \frac{7}{2}x - 12$

c) $\angle 1 = x^2$
$\angle 2 = 6x$



20. If L ∥ M and $\angle 1 = 9x - \frac{8}{3}y$, $\angle 2 = 7x + \frac{y}{3}$, and $\angle 3 = 3x - \frac{y}{3}$, **solve** for ***x*** and ***y***.



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ANSWERS:

1. a) $\dfrac{3(x+3)}{(x-1)(x+2)}$ **b)** $3y+2+\dfrac{7}{y-2}$

2. a) $\dfrac{5x+9}{4(x-3)}$ **b)** $y=4$

3. a) $9x\sqrt{2x}$ **b)** $\dfrac{x\sqrt{6}}{2}$

4. $x=3,\ \ y=1$

5. $5\pm 3\sqrt{2}$

6. a) $2\left(3+\sqrt{5}\right)$ **b)** $x^2-2x\sqrt{3}+3$

7. a) $\angle$ ABE = $\angle$ CED (vertical angles)
$\angle$ABE = $\angle$ CDE given
AE = CE given
AAS = AAS
b) x= 1, y = 5 **c)** AC = 18, BD = 6

8. a) $x=8,\ x=3\ (reject)$ **b)** $\dfrac{9x^9}{5}$ **c)** $\dfrac{2y^2}{3x^4}$

9. a) 4.2 **b)** 25.2 sq. units

10. a$\angle$CDE = $\angle$ CAB; $\angle$CED = $\angle$ CBA
(2 angles on the same side of parallel lines and on the same side of the transversal are =)
If 2 angles in 2 triangles are equal, then the triangles are similar.
b) x= 5; CE = 5; CB = 15; AB = 12

11. a) x = 5; AB = 8; DB = 6; AD = 10 **b)** 48 sq. units

12. ASA = ASA; x = 8; y = 2

13. a) 37.7 **b)** 28.3

14. 2x – 3

15. a) $31\sqrt{3}$ **b)** $15\sqrt{2}-10\sqrt{3}$

16. a) 8 **b)** AC = 8; BC = 15; AB = 17 **c)** 60 sq. units

17. 12

18. $x=9$

19. a) 1 **b)** 12 **c)** 6

20. $x = 18;\ y = 12$