

MATH 95
EXAM 4

Name Key

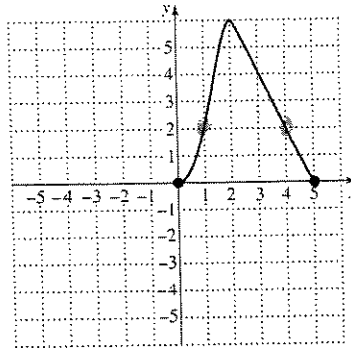
Show all necessary work. Each problem is worth 4 points. Good luck!

1. Is the following a function?

- 3 → 2
- 7 → 4
- 11 → 6
- 13 → 8
- 10

1. NO

2. For the following graph of f , determine the domain and range of f .



2. domain
 $0 \leq x \leq 5$
range
 $0 \leq y \leq 6$

3. For the graph of f above, find $f(3)$ and a value of x for which $f(x) = 2$.

3. $f(3) = 4$,
 $x = 1$ or $x = 4$

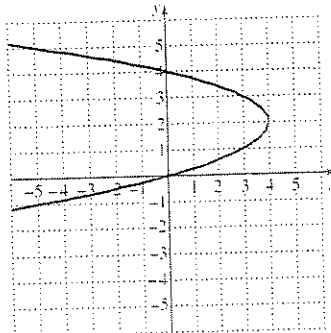
4. Find the domain of the function: $g(x) = \frac{x+3}{x^2+3x-10}$

- a. $\{x \mid x \in \mathbb{R} \text{ and } x \neq -3\}$
- b. $\{x \mid x \in \mathbb{R} \text{ and } x \neq -2, 5\}$
- c. $\{x \mid x \in \mathbb{R} \text{ and } x \neq 2, -5\}$
- d. $\{x \mid x \in \mathbb{R} \text{ and } x \neq -3, 2, -5\}$

$(x+5)(x-2)$
 $x = -5 \quad x = 2$

4. C

5. Determine if the following graph is a function.



5. NO

6. Which equation is NOT linear?

- a. $3y + x - 4 = 3x - 9$
- b. $x = 4y - 3$
- c. $x = 2y^2 - 5$
- d. $x = -8$

6. C

7. For $f(x) = -2x^2 - x + 4$, find $f(-2)$

- a. -2
- b. -6
- c. 10
- d. 14

$$-2(-2)^2 - (-2) + 4$$

$$-8 + 2 + 4 = -2$$

7. A

8. Given $g(x) = -3x - 4$ and $h(x) = x^2 + 2$, find $(g \cdot h)(2)$.

- a. -60
- b. -4
- c. 8
- d. 16

$$g(2) = -3(2) - 4 = -6 - 4 = -10$$

$$h(2) = 4 + 2 = 6$$

$$-10 \cdot 6 = -60$$

8. A

9. Given $f(x) = 3x + 2$ and $g(x) = -x + x^2$, find $(g - f)(x)$.

- a. $x^2 - 4x - 2$
- b. $x^2 - 2x + 2$
- c. $x^2 - 4x + 2$
- d. $3x^3 - 5x^2 + 2x$

$$-x + x^2 - (3x + 2)$$

$$-x + x^2 - 3x - 2$$

$$x^2 - 4x - 2$$

9. A

10. If y varies directly as x and $y = 0.9$ when $x = 0.5$, find the equation of variation.

$$y = kx$$

$$0.9 = k \cdot 0.5$$

$$\frac{0.9}{0.5} = k$$

$$k = 1.8$$

10. $y = 1.8x$

11. Solve $\frac{E}{e} = \frac{R+r}{R}$ for R .

$$ER = eR + er$$

$$ER - eR = er$$

$$R(E - e) = er$$

$$R = \frac{er}{E - e}$$

11. $R = \frac{er}{E - e}$

12. The time T required to do a job varies inversely as the number of people P working. It takes 4 hr. for 5 volunteers to pick up rubbish from 1 mile of roadway. How long would it take 8 volunteers to complete the job? 12. 2.5 hrs.

$$T = \frac{k}{P}$$

$$4 = \frac{k}{5}$$

$$k = 20$$

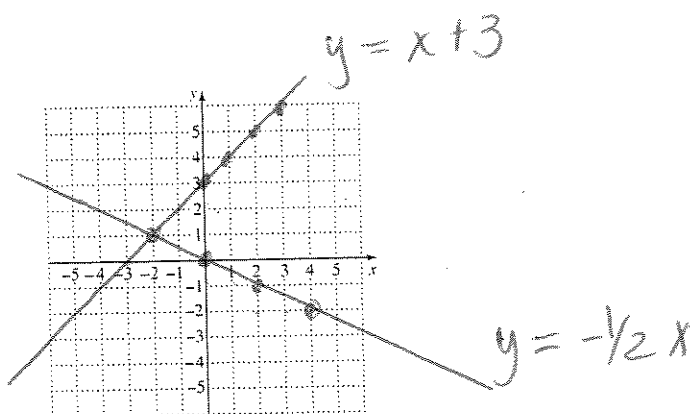
$$T = \frac{20}{P}$$

$$T = \frac{20}{8} = 2.5$$

13. Solve the system of equations graphically:

$$y = x + 3$$

$$y = -\frac{1}{2}x$$



13. (-2, 1)

14. Solve the system of equations using substitution:

$$y = x + 4$$

$$6x - 3y = -15$$

$$6x - 3(x + 4) = -15$$

$$6x - 3x - 12 = -15$$

$$3x - 12 = -15$$

$$3x = -3$$

$$x = -1$$

$$y = -1 + 4$$

$$y = 3$$

14. (-1, 3)

15. Solve the system of equations using elimination:

$$2x + 4y = 8$$

$$3x - 4y = -21$$

$$5x = -13$$

$$x = -\frac{13}{5}$$

$$-\frac{26}{5} + 4y = 8$$

$$4y = \frac{14}{5}$$

$$y = \frac{14}{20} = \frac{7}{10}$$

15. (-\frac{13}{5}, \frac{7}{10})

GEOMETRY

16. What is the measure of one interior angle of a regular 15-gon?

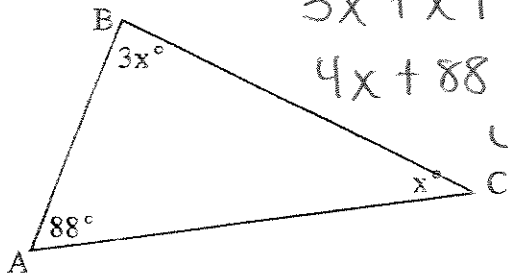
- a. 2340°
- b. 156°
- c. 180°
- d. 24°

$$\frac{(n-2)(180)}{n} = \frac{(15-2)(180)}{15}$$

$$= \frac{2340}{15} = 156$$

16. B (156°)

17. Find the measure of each angle of the triangle.



$$3x + x + 88 = 180$$

$$4x + 88 = 180$$

$$4x = 92$$

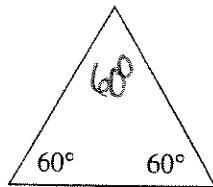
$$x = 23$$

A = 88°

B = 69°

C = 23°

18. Classify the triangle shown as equilateral, isosceles, or scalene. Then classify as right, obtuse or acute.

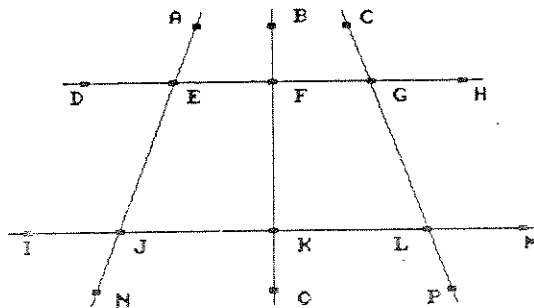


18. equilateral
acute

19. Choose the true statement:

- a. $m\angle PLM + m\angle LGH = 180^\circ$
- b. $\angle FGL$ and $\angle AEF$ are complementary
- c. $\angle FGL$ and $\angle GLK$ are supplementary
- d. $m\angle JEF = m\angle LGH$

19. C

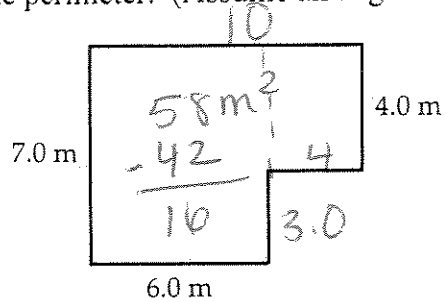


21. Determine if the following are always true:

- (T) F Every square is a rectangle.
- (T) F Every rhombus is a parallelogram.
- (T) F Any fact that is true for every parallelogram is also true for every square.
- (T) (F) Any fact that is true for every rectangle is also true for every quadrilateral.

22. The area of the polygon is 58 m^2 . Find the missing lengths and the perimeter. (Assume all angles are right angles)

22. 34 m

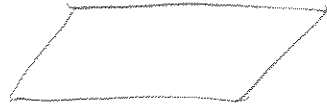


$$P = 7 + 10 + 4 + 4 + 3 + 6 = 34 \text{ m}$$

23. A parallelogram has sides of 6 cm and 10 cm. Which of the following statements is true?

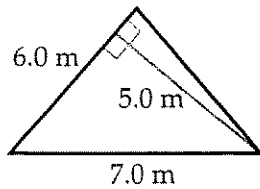
23. C

- a. The area is 60 cm^2
- b. The area is greater than 60 cm^2
- c. The area is less than 60 cm^2
- d. There is not enough information



24. Find the area of the triangle measured as shown.

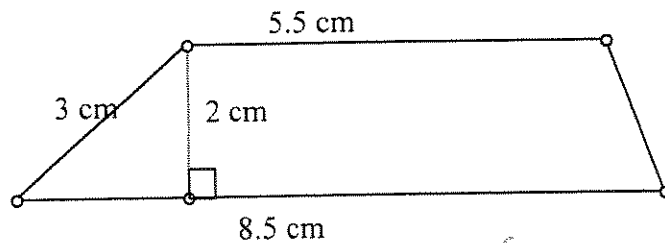
24. 15 m^2



$$\frac{1}{2} (6)(5) = 15$$

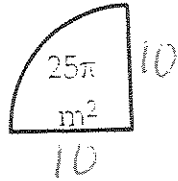
25. What is the area of the trapezoid shown below?

25. 14 cm^2



$$\frac{1}{2} (5.5 + 8.5)(2) = 14$$

26. The quarter circle has an area of $25\pi \text{ m}^2$.
What is the perimeter?

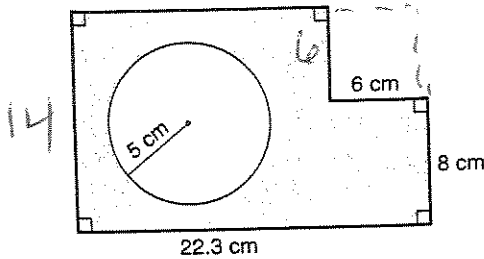


$\frac{\times 4}{100\pi \text{ m}^2}$ for whole circle
SO $r=10$

$\frac{1}{4}(\text{Circumference}) = \frac{1}{4}(2 \cdot \pi \cdot 10) = 5\pi$

≈ 35.7
 $20 + 5\pi$

27. Find the area of the shaded region
(The rectangle has a circle and *square corner* removed)



$A_{\text{rect}} = 22.3 \times 14 = 312.2$

$A_{\text{region}} = 312.2 - 36 = 276.2$

$A_{\text{circle}} = 25\pi \approx 78.5$

$276.2 - 78.5 = 197.7$

27. 197.7

28. Determine if each pair of triangles is congruent. State the theorem used to check.

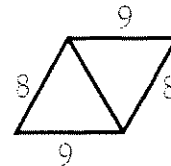
a. YES NO

Theorem: ASA or SAS

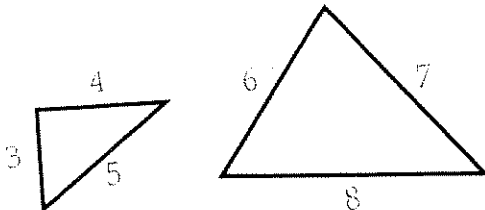


b. YES NO

Theorem: SSS



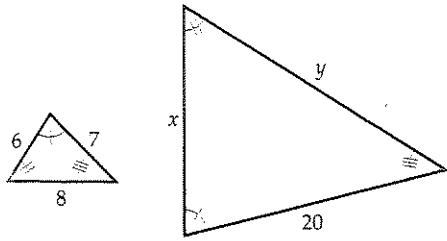
29. Tell why the following two triangles are similar or not similar:



$\frac{6}{3} \neq \frac{7}{4} \neq \frac{8}{5}$

NO
sides are not in ratio

30. Assume the triangles are similar. Find x and y



30. $x = \underline{17.14}$
 $y = \underline{22.86}$

$$\frac{6}{x} = \frac{7}{y} = \frac{8}{20}$$

$$120 = 7x$$

$$x = 17.14$$

$$140 = 7y$$

$$y = 22.86$$

31. Kelly is 63 inches tall. At 11 am her shadow is 44 inches long. The shadow of a nearby flagpole is 216 inches long. How high is the flagpole?



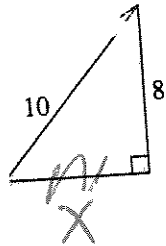
31. $\underline{309.3 \text{ m.}}$

$$\frac{63}{x} = \frac{44}{216}$$

$$13608 = 44x$$

$$x = 309.3$$

32. Use the Pythagorean theorem to find x in the triangle.
 (Hint: you may need to use it more than once)



$$8^2 + y^2 = 10^2$$

$$64 + y^2 = 100$$

$$y^2 = 36$$

$$y = 6$$

32. $x = \underline{6}$

~~(x+6)^2 + 8^2 = 10^2~~

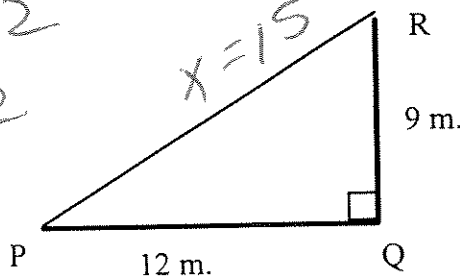
33. EXTRA CREDIT: A plan calls for running a telephone line from P to Q to R. The line costs \$7/meter. If it is feasible to run the line directly from P to R, how much money would one save?

$$9^2 + 12^2 = x^2$$

$$81 + 144 = x^2$$

$$225 = x^2$$

$$x = 15$$



$$6 \times 7 = \underline{\$42}$$

$$12 + 9 = 21$$

$$\underline{-15}$$

$$6$$