Name _____ Class _____ Date _____

For Exercises 1-22 choose the correct letter.

1. The perimeter of a rectangle is 30 in. and the base is 10 in. What is the area?

   A. 15 in.^{2} B. 40 in.^{2}

   C. 150 in.^{2} D. 300 in.^{2}

   E. none of the above

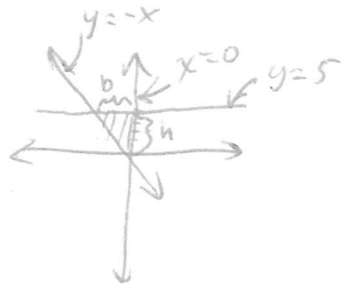*[handwritten: rectangle with h and 10]*
[handwritten: $2(10)+2h=30$, $2h=10$, $h=5$, $A=b\cdot h = 10\cdot 5 = 50$]

2. Find the area of the triangle enclosed by the lines $x = 0, y = 5,$ and $y = -x.$

   A. 12 square units   B. $12\frac{1}{2}$ square units

   C. 25 square units   D. 37 square units

   E. none of the above

[handwritten: graph y=-x, x=0, y=5; $y=-x, y=5$, $5=-x$, $x=-5$, $b=5$, $h=5$, $A=\frac{1}{2}b\cdot h = \frac{1}{2}(5\cdot 5) = \frac{25}{2} = 12.5$]

3. One base of a trapezoid is three times as long as the other. The height is the average of the two bases. If the area of the trapezoid is 64 yd^2, find the length of the longer base.

   A. 4 yd   B. 8 yd   C. 12 yd   D. 16 yd

   E. none of the above

[handwritten: trapezoid with h, x top, 3x bottom; $h=\frac{(x+3x)}{2}$, $A=\frac{1}{2}h(b_1+b_2)$, $A=\frac{1}{2}(\frac{x+3x}{2})(x+3x)=\frac{1}{2}(\frac{4x}{2})(4x)=\frac{1}{2}(2x)(4x)=4x^2$, $A=64=4x^2$, $x^2=16$, $x=4 \Rightarrow 3\cdot x = 12$]
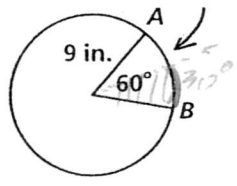
4. Jamal and Grace are going to divide a slice of pizza evenly. The measure of the pizza slice's arc is 60 and the radius of the pizza is 9 in. Find the arc length of Grace's slice.
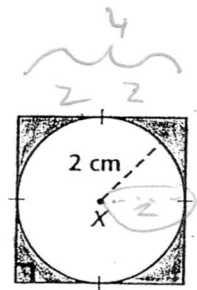
   A. 1.5π in.   B. 3π in.

   C. 6π in.   D. 9π in.

   E. none of the above

[handwritten: circle with 9 in. radius, 60° angle, points A and B; The slice to split; $\frac{30}{360} \cdot 2\pi 9 = \frac{3}{36} 18\pi = \frac{18}{12}\pi = \frac{3}{2}\pi$]

5. Find the area of the shaded region.

   A. 4π + 16 cm^2

   B. 4π − 16 cm^2

   C. 16 − 4π cm^2

   D. 16π − 16 cm^2

   E. none of the above

[handwritten: square with circle inside, 2 cm radius; $A_\square = 4\cdot 4 = 16$, $A_O = \pi(2)^2 = 4\pi$, $A = 16-4\pi$]

6. Find the value of x.
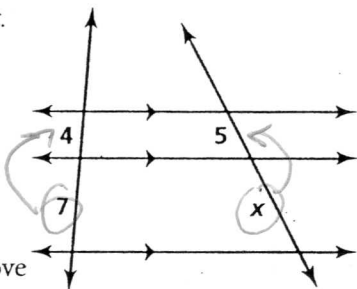
   A. $\frac{28}{5}$

   B. $\frac{20}{7}$

   C. 6

   D. $\frac{35}{4}$

   E. none of the above

$$\frac{x}{5} = \frac{7}{4}$$
$$4x = 35$$
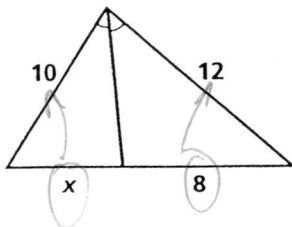$$x = 35/4$$

7. Find the value of x.

   A. 10

   B. $\frac{20}{3}$

   C. 15

   D. $\frac{48}{5}$

   E. none of the above

$$\frac{x}{10} = \frac{8}{12} = \frac{2}{3}$$
$$3x = 20$$
$$x = 20/3$$

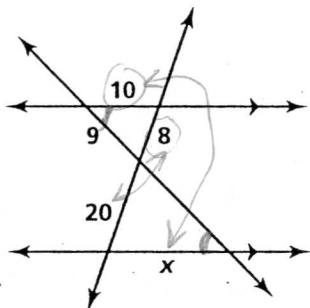8. Find the value of x.

   A. 25

   B. $\frac{200}{9}$

   C. 21

   D. 22

   E. none of the above

$$\frac{x}{10} = \frac{20}{8}$$
$$8x = 200$$
$$x = \frac{200}{8} = 25$$

9. If $\frac{x}{y} = \frac{m}{p}$, what can you conclude?

   A. $xy = mp$ B. $\frac{x}{p} = \frac{m}{y}$ C. $xm = py$

   D. $\frac{p}{y} = \frac{m}{x}$ E. none of the above

try/cross multiply $\frac{xp = my}{xy}$ $\frac{xp}{xy} = \frac{my}{xy}$ $\rightarrow \frac{p}{y} = \frac{m}{x}$
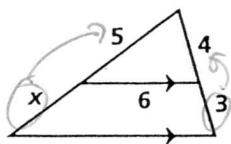$\div$ by y & x

10. Find the value of x.

    A. $\frac{15}{4}$ B. $\frac{12}{5}$

    C. $\frac{20}{3}$ D. 2

    E. none of the above

$$\frac{x}{5} = \frac{3}{4}$$
$$4x = 15$$
$$x = 15/4$$

11. In the figure to the right, what can you conclude?
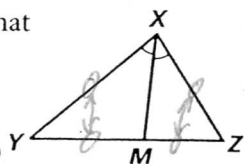
    A. $YM = ZM$

    B. $(XY)(ZM) = (XZ)(YM)$

    C. $m\angle Z = m\angle XMZ$

    D. $m\angle Y = m\angle XMZ$

    E. none of the above

$$\frac{xy}{ym} = \frac{xz}{zm}$$
$$(xy)(zm) = (xz)(ym)$$

12. The perimeter of parallelogram *HIJK* is 32 in. If $HI = 12$ in., find the length of *HK*.

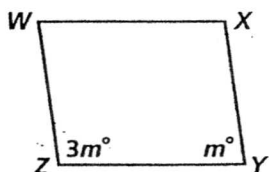A. 4 in.   B. 8 in.   C. 12 in.   D. 20 in.

E. none of the above

Handwritten: H 12 I

$2(12) + 2(x) = 32$
$2x = 8$
$x = 4$

13. Find the value of *m* in parallelogram *WXYZ*.

A. 40

B. 45

C. 90

D. 135

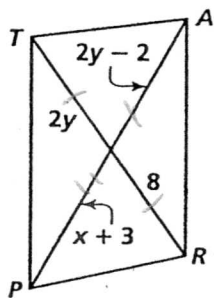*Diagram labels:* W, X, $3m°$, $m°$, Z, Y

Handwritten:
$3m + m = 180$
$4m = 180$
$m = 45$

14. Determine the value of *x* for which *TARP* is a parallelogram

A. 3

B. 4

C. 5

D. 6

E. none of the above

Diagram labels: T, A, $2y - 2$, $2y$, 8, $x + 3$, P, R

Handwritten:
$2y = 8$
$y = 4$

and $2y - 2 = x + 3$
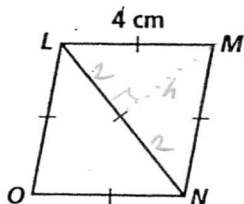$2 \cdot 4 - 2 = x + 3$
$8 \cdot 2 = x + 3$ (i.e. $8 - 2 = x + 3$)
$3 = x$

15. Which is sufficient to prove that a quadrilateral is a rhombus?

A. The diagonals bisect each other.

B. The diagonals are perpendicular.

C. All four sides are congruent.

D. A pair of opposite sides are congruent and parallel.

E. none of the above

16. Find the area of rhombus *LMNO*.

A. 16 cm2

B. $8\sqrt{3}$ cm²

C. 8 cm2

D. $4\sqrt{3}$ cm²

E. none of the above

Diagram labels: 4 cm, L, M, h, O, N

Handwritten:
$2^2 + h^2 = 4^2$
$h^2 = 16 - 4$
$h^2 = 12$
$h = \sqrt{12} = \sqrt{4 \cdot 3} = 2\sqrt{3}$

$A_\triangle = \frac{1}{2}bh = \frac{1}{2}(4)(2\sqrt{3})$
$= 4\sqrt{3}$

2 △'s so
$2(4\sqrt{3}) = 8\sqrt{3}$

or $A = \frac{1}{2}d_1 d_2$
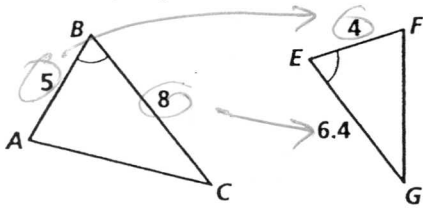$= \frac{1}{2}(4)(4\sqrt{3}) = 8\sqrt{3}$

17. Two similar triangles have perimeters in ratio 5:3. What is the ratio of their areas?

A. 5:3   B. 5:1   C. 25:9   D. 125:27

E. none of the above

Handwritten:
Ratio area $= 5^2 : 3^2$
$= 25 : 9$

18. How can you prove $\triangle ABC \sim \triangle FEG$?

Handwritten: $\frac{4}{5} \stackrel{?}{=} \frac{6.4}{8} \Rightarrow 4 \cdot 8 = 5(6.4)$

$32 = 32$

A. AA ~ Postulate   **B.** SSS ~ Theorem

C. SAS ~ Theorem   **D.** ASA ~ Theorem   *(C circled)*

E. none of the above

19. Which sentence contains enough information to describe a vector?

A. A hiker walks 12 mi.

B. A car travels southeast at 50 mi/h.   *(B circled)*

C. An airplane travels at 600 mi/h.

D. A fish swims upstream.

E. none of the above

Handwritten: direction = southeast

magnitude = 50 mi/h
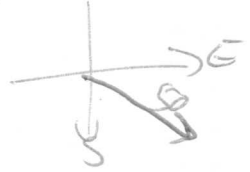
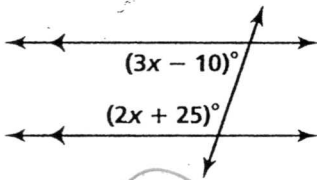20. A circle has radius 12 cm. The central angle of a sector measures 150. What is the area of the sector?

A. 60π **B.** 10π **C.** 144π *(A circled)*

D. 67.5π **E.** none of the above

Handwritten: $\frac{150}{360}\pi(12)^2 = \frac{5}{12}(144)\pi$

$= 60\pi$

21. What is the value of x?

$(3x - 10)°$

$(2x + 25)°$

Handwritten: $(3x-10)+(2x+25)=180$

$5x+15=180$

$5x=165$

$x=33$

A. 29   **B.** 33   **C.** 35   *(B circled)*

D. 15   **E.** none of the above

22. Find the value of x.

A. 12   *(A circled)*   **B.** 16.3
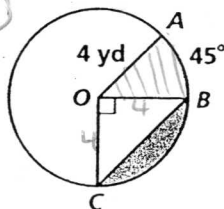
C. 15   **D.** 18

E. none of the above
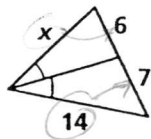
Handwritten: $\frac{x}{6} = \frac{14}{7} = \frac{2}{1}$

$x = 12$

23. Find the area of sector AOB. Leave your answer in terms of π.

4 yd   45°

Handwritten: $\frac{45}{360}\pi(4)^2 = \frac{1}{8}(16\pi) = 2\pi$

$2\pi \ yd^2$

24. Find the area of the shaded segment. Leave your answer in terms of π.

Handwritten: $(4\pi - 8)yd^2$

$A_{sector} = \frac{90}{360}\pi(4)^2 = \frac{1}{4}(16\pi) = 4\pi$

$A_\triangle = \frac{1}{2}b \cdot h = \frac{1}{2}(4)(4) = 8$ $4\pi - 8 \ yd^2$

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

    A. The quantity in Column A is greater.

    B. The quantity in Column B is greater.

    C. The two quantities are equal.

    D. The relationship cannot be determined on the bases of the information supplied.

Column A **Column B**

25.

(handwritten) $\sin x = \frac{7}{12.21}$
$\cos x = \frac{10}{12.21}$
$\tan x = \frac{7}{10}$

(triangle with vertices Y, X, Z; Y to Z side = 7, X to Z side = 10, d along XY)

(handwritten) $d = \sqrt{7^2 + 10^2} = 12.21$

sin X	$<$	cos X

(handwritten) $\frac{7}{12.21}$ $\frac{10}{12.21}$

25. ___**B**___

26.

area of a hexagon with apothem $2\sqrt{3}$	$=$	area of an equilateral triangle with apothem $2\sqrt{2}$

(handwritten) $24\sqrt{3}$ $24\sqrt{3}$

26. ___**C**___

(handwritten box 26)
$n = 6$
$m\angle CL = 60$
$2\sqrt{3}$ *(triangle, angle 60, labeled 2)*
$s = 4 \quad p = 24$
$A = \frac{1}{2}(2\sqrt{3})(24)$

$n = 3$
$m\angle CL = 120$
$2\sqrt{2}$ *(triangle, angles 60, 30, labeled $2\sqrt{6}$)*
$A = \frac{1}{2}(2\sqrt{6})(2\sqrt{2})$
$= 2\sqrt{12} = 24$

27.

the magnitude of $\vec{a}\langle -5, 2\rangle$	$>$	the magnitude of $\vec{b}\langle 3, 3\rangle$

(handwritten) $\sqrt{(-5)^2 + (2)^2} = \sqrt{29}$ $\sqrt{3^2 + 3^2} = \sqrt{18}$

27. ___**A**___

(figure with angles $x°$, $y°$, $80°$, $78°$)
(handwritten) don't know if parallel

28.

x	$<$	y

28. ___**D**___

(handwritten) $80 + x + 78 = 180$ 80
$x = 22$
~~don't do this!~~   not enough info

(triangle figure with 5, x, 4, z, y)
(handwritten) don't know ... don't know if midseg!

29.

x	$>$	y

29. ___**A**___

30.

z		y

30. ___**D**___

(handwritten) separate & redraw
(two triangles) 5, x, z, 9, x+y
$\frac{5}{9} = \frac{x}{x+y}$
$9x = 5x + 5y$
$4x = 5y$
If x is 1 then y is $\frac{4}{5}$
so x is bigger

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

A. The quantity in Column A is greater.

B. The quantity in Column B is greater.

C. The two quantities are equal.

D. The relationship cannot be determined on the basis of the information supplied.
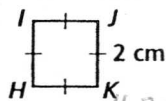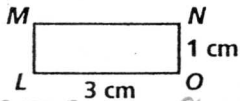
Column A	Column B

6 m A

P 120°

B
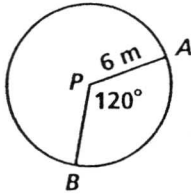
$\frac{120}{360} \pi(12) = 4\pi = (4)(3.14)$

12.56

$d = 12$

31. | diameter of $\odot P$ | $<$ | (Use $\pi = 3.14$) length of $\widehat{AB}$ |
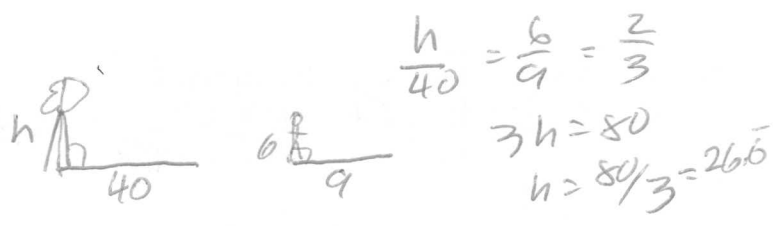
31. __B__

M ____ N
1 cm
L 3 cm O

$2 \cdot 3 + 2 \cdot 1 = 8$

I ┌┬┐ J
2 cm
H └┴┘ K

$4 \cdot 2 = 8$

32. | perimeter of rectangle $LMNO$ | $=$ | perimeter of square $HIJK$ |

32. __C__

$3 \cdot 1 = 3$

$2 \cdot 2 = 4$

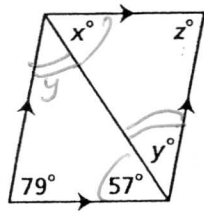**33.** | area of rectangle $LMNO$ | $<$ | area of square $HIJK$ |

33. __B__

34. A tree casts a shadow 40 ft long. A man who is 6 ft tall stands nearby and casts a shadow 9 ft long. Find the height of the tree.

$\frac{h}{40} = \frac{6}{9} = \frac{2}{3}$

h
40

6
9

$3h = 80$

$h = 80/3 = 26.6$

__26.6 ft or 26⅔ ft__

35. Find the values of the variables.

x°   z°
y
y°
79°   57°

$79 + 57 + y = 180$
$y = 44$

$x + y + z = 180$
$57 + 44 + z = 180$
$z = 79$

x = __57__

y = __44__

z = __79__