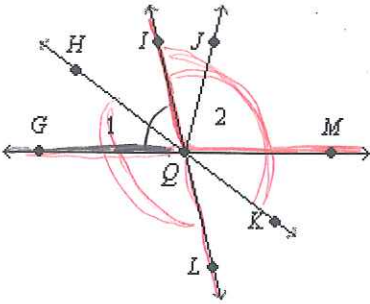


Name: _____ Class: _____ Date: _____

Chapter 3 Cumulative Test

Indicate the answer choice that best completes the statement or answers the question.

Use the figure to find the angles.



1. Name an angle supplementary to $\angle MQI$.

Look for a Linear pair!

- A. $\angle IQG$
- B. $\angle GQI$
- C. $\angle MQK$
- D. $\angle IQH$

2. Name two obtuse vertical angles.

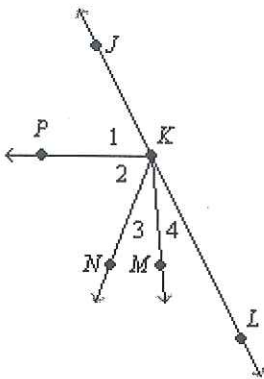
F. $\angle KQL, \angle KQM$ *acute*

G. $\angle KQL, \angle IQH$ *acute*

H. $\angle GQI, \angle IQM$

I. $\angle HQL, \angle IQK$ *obtuse / vertical*

In the figure, \overrightarrow{KJ} and \overrightarrow{KL} are opposite rays. $\angle 1 \cong \angle 2$ and \overrightarrow{KM} bisects $\angle NKL$.



This means $m\angle 3 = m\angle 4$

If $\angle JKN = 90^\circ$, then $m\angle 3 + m\angle 4 = 180 - 90 = 90^\circ$

so $m\angle 3 + m\angle 4 = 90$

$$2(3x+6) + 2(3x+6) = 90$$

$$\frac{4(3x+6)}{4} = \frac{90}{4}$$

$$3x+6 = 22.5$$

$$\frac{3x}{3} = \frac{16.5}{3}$$

$$x = 5.5$$

OR

$$6x + 12 + 6x + 12 = 90$$

$$\frac{12x}{12} = \frac{66}{12}$$

$$x = 5.5$$

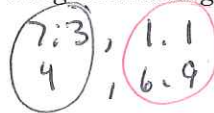
3. Using the figure above, if $\angle JKN$ is a right angle and $m\angle 4 = 2(3x+6)$, what is x ?

- A. 5.5
- B. 9.5
- C. 45
- D. 30

Find the coordinates of the midpoint of a segment having the given endpoints.

4. $Q(7.3, 1.1), R(4, 6.9)$

- F. (5.65, 4)
- G. (4.2, 5.45)
- H. (1.65, -2.9)
- I. (3.3, -5.8)



$$\left(\frac{7.3+4}{2}, \frac{1.1+6.9}{2} \right) = \left(\frac{11.3}{2}, \frac{8}{2} \right) = (5.65, 4)$$

Average endpoints!

Chapter 3 Cumulative Test

① Let $m\angle 1 = x$
 $m\angle 2 = x + 26$ *Declare variables*

5. Two angles are supplementary. One angle measures 26° more than the other. Find the measure of the two angles.

- A. 77, 103 B. 32, 58

- C. 167, 193 D. 76, 104

② Since angles are supplementary
 $m\angle 1 + m\angle 2 = 180$ *← simplify*

③ $x + x + 26 = 180$ *← solve for x*

$$\begin{array}{r} 2x + 26 = 180 \\ -26 \quad -26 \\ \hline 2x = 154 \\ \frac{2x}{2} = \frac{154}{2} \end{array}$$

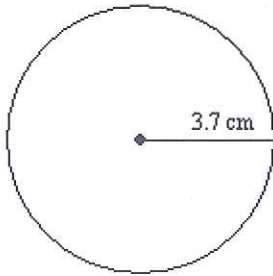
$$x = 77$$

$$m\angle 1 = 77^\circ \quad m\angle 2 = x + 26 = 77 + 26 = 103^\circ$$

④ use x to find angle measures

Find the circumference of the figure.

6.



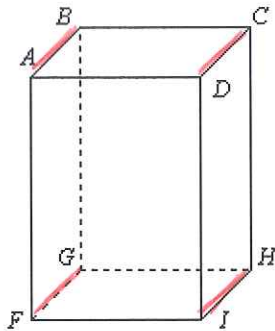
- F. about 43 cm G. about 11.6 cm
 H. about 7.4 cm I. about 23.2 cm

$$C = 2 \cdot \text{radius} \cdot \pi$$

$$= 2(3.7)\pi \approx 23.2$$

↑ this symbol means "approximately equal" / "about"

Refer to the figure below.



7. Name all segments parallel to \overline{GF} . *(in red)*

- A. $\overline{BC}, \overline{AD}, \overline{HI}$ B. $\overline{AB}, \overline{CD}, \overline{HI}$
 C. $\overline{CD}, \overline{HI}$ D. $\overline{AB}, \overline{CD}$

Any segment with pts B or C w it are not skew

8. Name all segments skew to \overline{BC} . *- don't intersect, not on same plane*

- F. $\overline{FI}, \overline{AD}, \overline{FA}, \overline{DI}$ G. $\overline{FG}, \overline{GH}, \overline{HI}, \overline{FI}$
 H. $\overline{CD}, \overline{AB}, \overline{BG}, \overline{CH}$ I. $\overline{GF}, \overline{HI}, \overline{DI}, \overline{AF}$

Parallel

Parallel to BC

BC is horizontal so look for vertical segments that don't intersect BC
 $\overline{DI}, \overline{AF}$
and horizontal segments \perp to BC that don't intersect
 $\overline{FG}, \overline{IH}$

Chapter 3 Cumulative Test

edit

9. Find the value of the variable and LN if M is between L and N .

Hint: draw segment LN and put M between L and N to "see" the equation.

$LM = 5a, MN = 12a, LM = 30$

- A. $a = 1.76, LN = 8.82$ B. $a = 6, LN = 102$
 C. $a = 2.50, LN = 42.50$ D. $a = 6, LN = 72$

we know
 substitute

Looks Like



$$LM + MN = LN$$

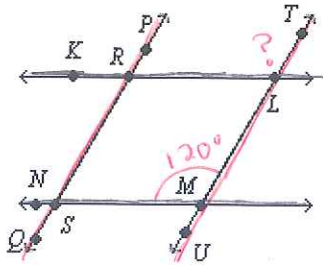
$$5a + 12a = 30$$

$$17a = 30$$

$$a = \frac{30}{17}$$

$$LN = 5\left(\frac{30}{17}\right) =$$

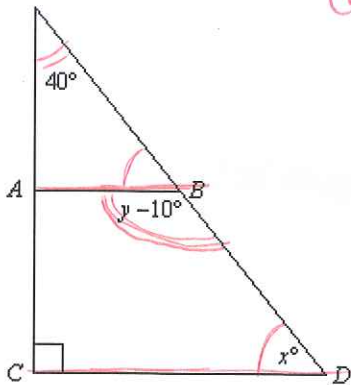
10. In the figure, $m\angle NML = 120$, $PQ \parallel TU$ and $KL \parallel NM$. Find the measure of angle TLR .



corresponding \angle s are congruent

- F. 100 G. 60
 H. 120 I. 40

11. In the figure, $\overline{AB} \parallel \overline{CD}$. Find x and y .



① Find x
 We know the measure of the interior angles of a \triangle have a sum of 180°

$$90 + 40 + x = 180$$

$$130 + x = 180$$

$$\underline{-130 \quad -130}$$

$$x = 50^\circ = m\angle BDC$$

② Find y

Since $\overline{AB} \parallel \overline{CD}$ $\angle ABD$ & $\angle BDC$ are same side interior angles. therefore they are supplementary.

So

$$m\angle ABD + m\angle BDC = 180$$

$$y - 10 + 50 = 180$$

$$y + 40 = 180$$

$$\underline{-40 \quad -40}$$

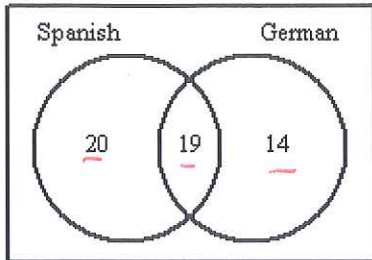
$$y = 140^\circ$$

- A. $x = 40, y = 150$ B. $x = 140, y = 50$
 C. $x = 50, y = 140$ D. $x = 30, y = 140$

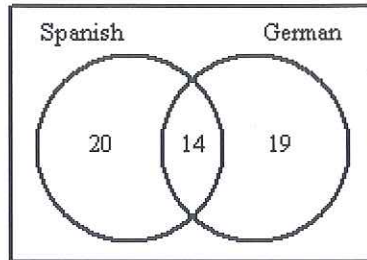
Chapter 3 Cumulative Test

12. Of the 53 students studying foreign languages at Ashley's school, 20 are studying Spanish only, 14 are studying German only, and 19 are studying both languages. Which Venn diagram correctly shows this situation?

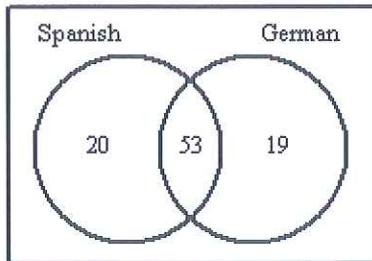
F. Learning Foreign Languages



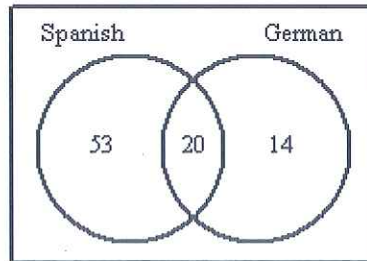
G. Learning Foreign Languages



H. Learning Foreign Languages



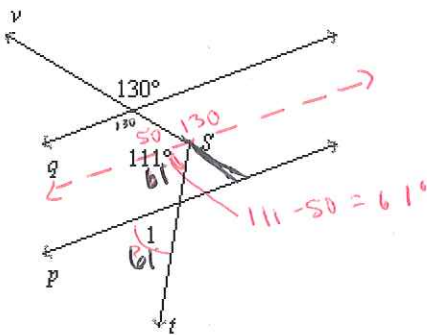
I. Learning Foreign Languages



14. In the figure, $p \parallel q$. Find $m\angle 1$.

(4 points possible, 1 per relevant angle measure found)

Hint: Draw another parallel line through angle S and extend transversals as needed. Then use what you know about parallel lines, transversals, vertical lines, and triangle angle measures to determine the measure of angle 1.



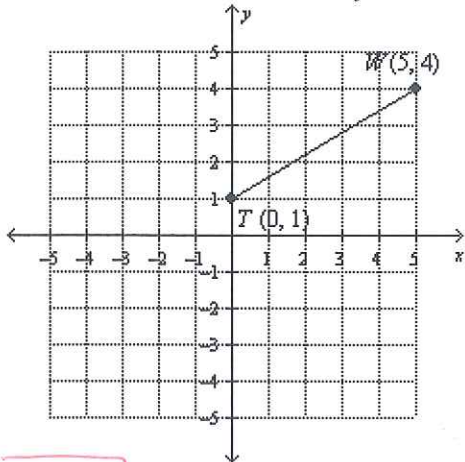
- notice either vertical \angle s congruent or corresponding \angle s congruent to see 130° closer to $\angle 1$
- The top part of 111° must be 50° b/c Linear pair has a sum of 180° and same side interior \angle s are supplementary. ($180 - 130 = 50^\circ$)
- This leaves the bottom part of 111° to equal $111 - 50 = 61^\circ$
- Note that $\angle 1$ is corresponding to the bottom part of 111° so $m\angle 1 = 61^\circ$

- A. $m\angle 1 = 50$ B. $m\angle 1 = 61$
 C. $m\angle 1 = 69$ D. $m\angle 1 = 40$

Chapter 3 Cumulative Test

Use the Distance Formula to find the distance between each pair of points.

14.



$$d = \sqrt{(x-x)^2 + (y-y)^2}$$

$$WT = \sqrt{(5-0)^2 + (4-1)^2}$$

$$WT = \sqrt{5^2 + 3^2}$$

$$WT = \sqrt{25+9}$$

$$WT = \sqrt{34}$$

W (5, 4)
T (0, 1)

← put length #
1st

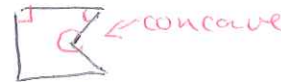
- F. $\sqrt{34}$ G. $\sqrt{50}$
H. 5 I. 6

Determine whether the conjecture is true or false. Give a counterexample for any false conjecture.

15. **Given:** a concave polygon → Looks Like

Conjecture: It can be regular or irregular.

- A. False; to be concave the angles cannot be congruent.
B. True
C. False; all concave polygons are regular.
D. False; a concave polygon has an odd number of sides.



Determine the slope of the line that contains the given points.

16. T(2, 5), V(4, 6)

- F. $\frac{2}{3}$ G. 2

- H. $\frac{1}{2}$ I. -2

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{6 - 5}{4 - 2} = \frac{1}{2}$$

T (2, 5)
V (4, 6)

↑
10
numerator!

Determine whether \overline{WX} and \overline{YZ} are parallel, perpendicular, or neither.

17. W(-3, -5), X(7, 7)

Y(4, 2), Z(2, 7)

- A. perpendicular
B. neither
C. parallel

same ↓ opposite reciprocals ↓

$$\text{slope of } WX = \frac{7 - (-5)}{7 - (-3)} = \frac{12}{10} = \frac{6}{5}$$

← TOP!

$$\text{slope of } YZ = \frac{7 - 2}{2 - 4} = \frac{5}{-2}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$\frac{6}{5} \neq \frac{5}{-2}$
NOT parallel

$\frac{6}{5} \cdot \frac{5}{-2} = \frac{6}{-2} = -3 \leftarrow \text{product NOT } -1$
NOT perpendicular

Chapter 3 Cumulative Test

Write an equation in slope-intercept form of the line having the given slope and y-intercept.

18. $m = -\frac{3}{5}$, $(0, -7)$
 x_1, y_1

F. $y = \frac{21}{5}x$

G. $y = -\frac{3}{5}x - 7$

H. $y = -7x - \frac{3}{5}$

I. $y = -\frac{7}{5}x$

start w/ pt-slope
simplify

$$y - y_1 = m(x - x_1)$$

$$y - (-7) = -\frac{3}{5}(x - 0)$$

$$y + 7 = -\frac{3}{5}x$$

$$y = -\frac{3}{5}x - 7$$

Write an equation in point-slope form of the line having the given slope that contains the given point.

19. $m = -0.25$, $(-8, 2)$
 x_1, y_1

A. $y + 8 = -0.25(x - 2)$

B. $y = -0.25x - 2$

C. $y - 2 = -0.25(x + 8)$

D. $y - 2 = -0.25(x - 8)$

pt slope $y - y_1 = m(x - x_1)$
 $y - 2 = -0.25(x + 8)$

Write an equation in slope-intercept form for the line passing through the pair of points.

20. $(-4, -6)$, $(-2, -5)$
 $(-4, -6)$ on top

F. $y = \frac{1}{2}x + 4$

G. $y = \frac{1}{2}x - 4$

H. $y = -\frac{1}{2}x - 4$

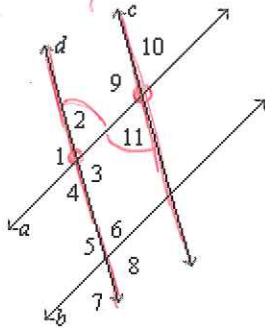
I. $y = -2x + 4$

find slope $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - (-6)}{-2 - (-4)} = \frac{-5 + 6}{-2 + 4} = \frac{1}{2}$

pt slope form $y + 6 = \frac{1}{2}(x + 4)$
 simplify $y + 6 = \frac{1}{2}x + 2$
 $y = \frac{1}{2}x - 4$

Given the following information, determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

21. $\angle 11 \cong \angle 2$



Alternate interior angles w parallel lines
 transversal a

- A. $c \parallel d$; congruent alternate interior angles
- B. $a \parallel b$; congruent alternate interior angles
- C. $a \parallel b$; congruent corresponding angles
- D. $c \parallel d$; congruent corresponding angles

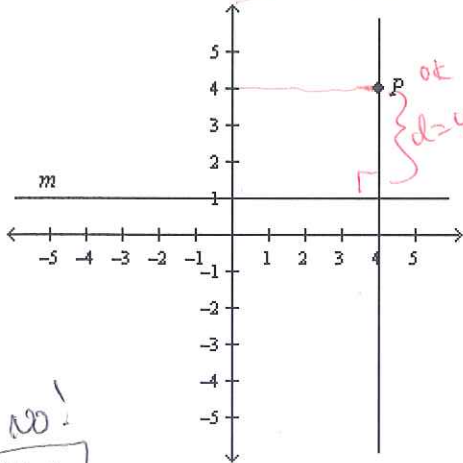
Chapter 3 Cumulative Test

Construct a line perpendicular to m through P . Then find the distance from P to m .

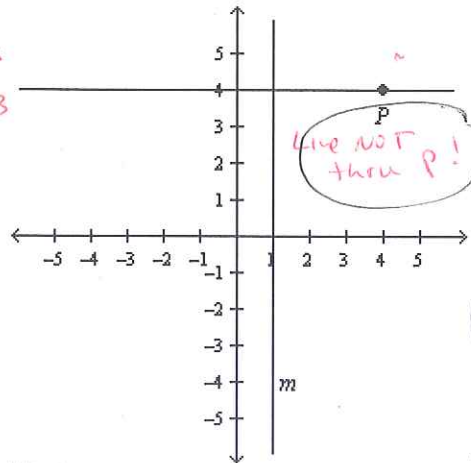
Note the calculated distance for each answer choice in the lower left hand corner of the coordinate plane. ✓

22. Line m contains points $(3, 1)$ and $(1, 1)$. Point P has coordinates $(4, 4)$.

F.



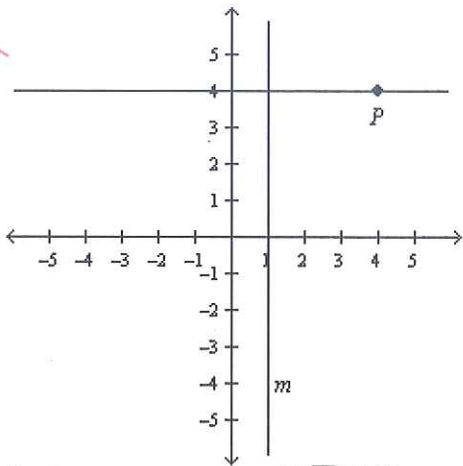
NO!
 $d=4$



$d=4$

- 1) Find $m \perp$ Line thru P
- 2) verify Line m contains points $(3, 1)$ & $(1, 1)$
- 3) Count distance from P to Line m

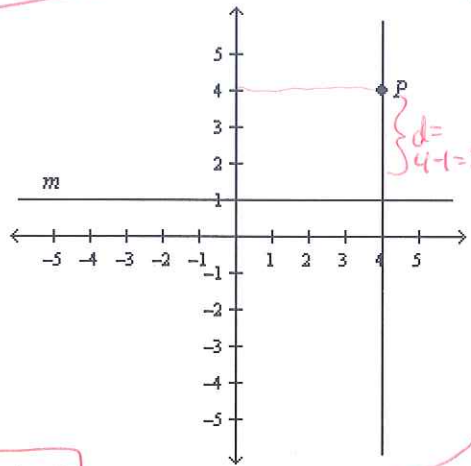
~~H.~~



$d=3$

Line NOT thru P

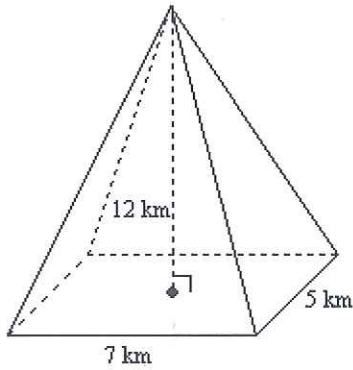
I.



$d=3$

Chapter 3 Cumulative Test

23. Find the volume of the solid.



$$\begin{aligned} \text{Volume} &= \frac{1}{3} \cdot \text{Area of Base} \cdot \text{height} \\ &= \frac{1}{3} (7 \cdot 7) \cdot 12 \\ &= \frac{420}{3} = 140 \text{ km}^3 \end{aligned}$$

- A. 140 km³ B. 112 km³
- C. 420 km³ D. 155.7 km³

edit

24. Find the value of the variable and GH if H is between G and I.

GI = 8b + 3

HI = 4b - 5

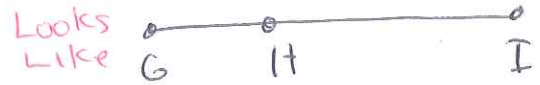
GI = 11

F. b = 1.00, GH = 10.00

G. b = 1.08, GH = 11.67

H. b = 4, GH = 24

I. b = 4, GH = 35



Looks Like

So GH + HI = GI

substitute 8b + 3 + 4b - 5 = 11

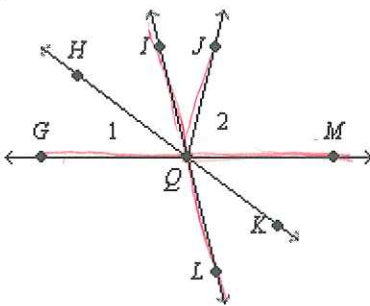
12b - 2 = 11

12b = 13

b = 13/12 ≈ 1.08

Find GH $8 \left(\frac{13}{12} \right) + 3 = \frac{26}{3} + \frac{3}{1} \approx 11.67$

Use the figure to find the angles.



25. Name a linear pair.

A. $\angle KQG, \angle HQM$

B. $\angle GQL, \angle LQJ$

C. $\angle GQL, \angle LQM$

D. $\angle LQG, \angle KQM$

Look for opposite rays forming a straight line! And 1 pair of shared sides

LGQM straight!

Chapter 3 Cumulative Test

Find the coordinates of the midpoint of a segment having the given endpoints.

26. Q(4, -10), R(1, -7)

- F. (2.5, -8.5) G. (-3, -3)
 H. (1.5, -1.5) I. (3, -3)



← Average x
 average y

$$\left(\frac{4+1}{2}, \frac{-10+(-7)}{2} \right) = \left(\frac{5}{2}, -\frac{17}{2} \right)$$

$$= (2.5, -8.5)$$

27. Find the perimeter of A regular pentagon that has a side measuring 3 mm.

- A. 12 mm B. 17 mm
 C. 15 mm D. 18 mm

all sides same length
 pentagon has 5 sides

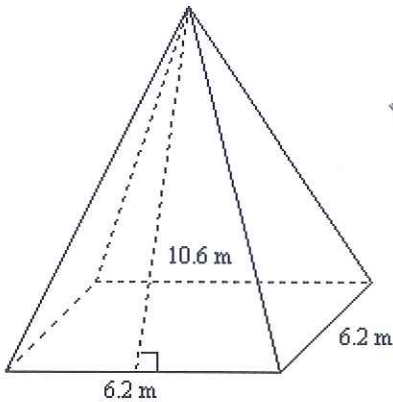
$$P = \# \text{ of sides} \times \text{side length}$$

$$= 5 \times 3$$

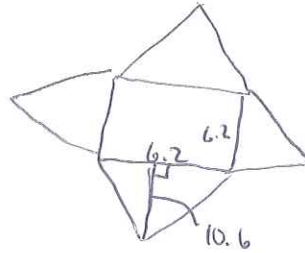
$$= 15 \text{ mm}$$

Find the surface area of the solid.

28.



Looks Like



$$S.A. = \text{Square} + 4 \text{ } \Delta \text{'s}$$

$$= \text{side}^2 + 4 \left(\frac{1}{2} \cdot \text{base} \cdot \text{height} \right)$$

$$= 6.2^2 + 2(6.2)(10.6)$$

$$\approx 169.88$$

$$\approx 169.9 \text{ m}^2$$

- F. 301.3 m² G. 210.7 m²
 H. 135.8 m² I. 169.9 m²

