

Honors Geometry

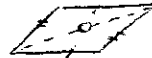
3rd Quarter Exam Review

Name Key
Hour 2008

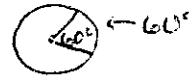
Use your test-taking skills - highlight and *code* and/or *eliminate any obviously wrong answers*- as you practice for the

Quarter 3 Exam. If the exact answer is not given, choose the closest value.
Figures are not necessarily drawn to scale

1. a) True b) False
2. Each diagonal of a parallelogram divides the parallelogram into two congruent triangles.



2. a) True b) False
2. If two radii of a circle form a 60° angle, then the degree measure of the intersected arc is 30° .



3. a) True b) False
3. The lateral faces of a prism are rectangular regions.

4. a) True b) False
4. The bases of a prism are polygon-shaped regions.

5. a) True b) False
5. If the lateral edges of a prism are perpendicular to the bases, the prism is a right prism.

6. a) True b) False
6. An exterior angle of a regular polygon is always less than each interior angle.

7. a) True b) False
7. The sum of the lengths of the sides of a triangle is less than the length of the third side.

8. a) True b) False
8. The number of diagonals is equal to or greater than the number of sides in a polygon. *triangle 3 sides 0 diagonals*

9. a) True b) False
9. The sum of the measures of the exterior angles of a pentadecagon is 360° .

10. In a rhombus, the sum of the angles is

- a. 90° b. 180° c. 270° d. 360° e. 540°

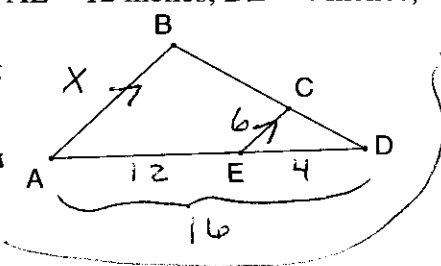
11. Suppose that ABCD is a parallelogram and that $m\angle A = 60^\circ$. The total number of pairs of congruent angles in ABCD is

- a. 4 b. 3 c. 2 d. 1 e. cannot be determined

12. In the figure below, \overline{AB} and \overline{CE} are parallel, $AE = 12$ inches, $DE = 4$ inches, and $CE = 6$ inches. What is the length of AB in inches?

- a. 8
- b. 10
- c. 12
- d. 18
- e. 24**

$\triangle DCE \sim \triangle DBA$
 $\frac{DC}{DB} = \frac{DE}{DA} = \frac{CE}{BA}$
 $\frac{4}{16} = \frac{6}{X}$



$4x = 96$
 $x = 24$

13. The ratio of the side lengths for a triangle is exactly 12:14:15. In a second triangle similar to the first, the shortest side is 6 inches long. To the nearest tenth of an inch, what is the length of the longest side of the second triangle?

short 1 $\frac{6}{12} = \frac{x}{15}$ long 1
 short 2 $\frac{6}{12} = \frac{x}{15}$ long 2

$x = 7.5$ inches

14. Your friend shows you a scale drawing of her apartment. The drawing of the apartment is a rectangle 4 inches by 5 inches. Your friend wants to know the length of the shorter side of the apartment. If she knows that the length of the longer side of the apartment is 30 feet, how many feet long is the shorter side of her apartment?

4" short $\frac{4}{5} = \frac{x}{30}$ long $x = 24'$

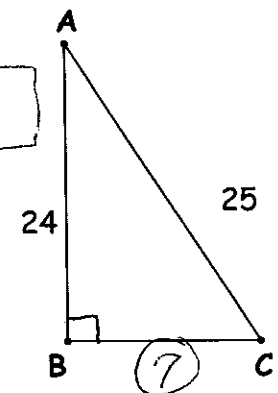
15. Find the edge of a cube whose diagonal is $7\sqrt{6}$.

$d_{\text{cube}} = \sqrt{3(\text{side})^2} \Rightarrow \text{side} \sqrt{3} = \frac{7\sqrt{6}}{\sqrt{3}}$ side = $7\sqrt{2}$

16. $\sin \angle A = \frac{7}{25}$

17. $\cos \angle B =$ cannot be determined ($m\angle B = 90^\circ$)

18. $\tan \angle A = \frac{7}{24}$

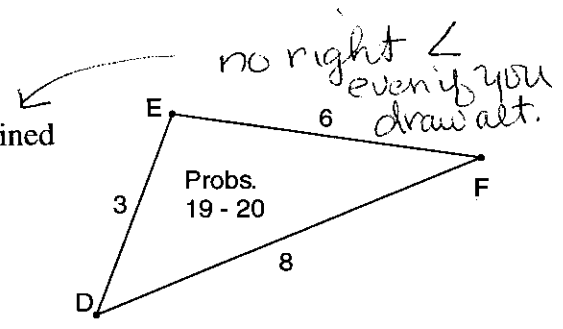


Problems 16-18

19. Refer to the figure at right. $\sin \angle F =$

- a. $\frac{3}{4}$
- b. $\frac{2}{1}$
- c. $\frac{3}{8}$
- d. $\frac{4}{3}$

e. cannot be determined



20. Refer to the figure at right. $\triangle DEF$ is a(n) ___? ___ triangle.

- a. acute
- b. obtuse**
- c. isosceles
- d. right

$3^2 + 6^2 = 9 + 36 = 45$
 $8^2 = 64$
 $45 < 64 \Rightarrow$ obtuse

21. Match the total measure of all the interior angles in a polygon to the polygon. How many sides does the polygon have? $(n-2)180 = \text{measures of polygon's angles}$

- | | |
|----------------|------------------|
| <u>e</u> 900° | a. hexagon |
| <u>d</u> 540° | b. octagon |
| <u>g</u> 1440° | c. quadrilateral |
| <u>c</u> 360° | d. pentagon |
| <u>f</u> 1800° | e. heptagon |
| <u>a</u> 720° | f. dodecagon |
| <u>b</u> 1080° | g. decagon |
| | h. none of these |

Problem 21: Choose all that apply for each answer from the following

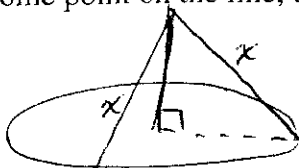
- a. parallel b. skew c. oblique d. intersecting e. none of these

22. a. If two lines ~~are~~ share one point with each other, then they could be c, d
- b. If two lines do not ever intersect, then they could be a, b
- c. If two lines do not lie in the same plane, then they could be b
- d. If two lines are coplanar, then they could be a, c, d

23. Name the four ways to determine a plane?

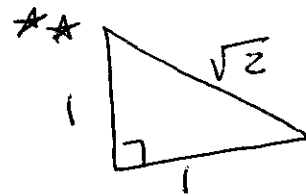
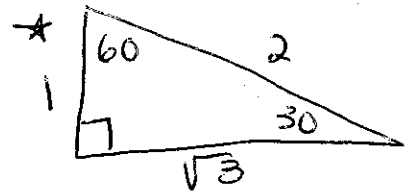
- a. 3 non collinear points
- b. 2 intersecting lines
- c. 2 parallel lines
- d. 1 line and a point not on the line

24. A line is perpendicular to a plane. A circle lies on the plane with its center at the foot of the line. If P is some point on the line, then it is equidistant from every point on the circle.



25. Match the trig ratio to angle measure (to the nearest degree).

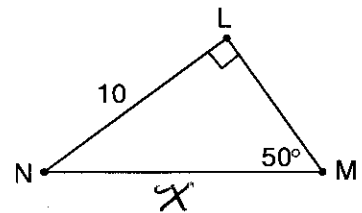
- c $\tan \angle A = 1.9626$ $[\tan^{-1}(1.9626)]$ a. 45°
e $\sin \angle B = 3/5$ $[\sin^{-1}(3/5)]$ b. 60°
a $\cos \angle C = \frac{\sqrt{2}}{2}$ $\star\star$ c. 63°
b $\tan \angle D = \sqrt{3}$ \star d. 55°
f $\sin \angle B = \frac{1}{2}$ \star e. 37°
d $\cos \angle C = .5736$ $[\cos^{-1}(.5736)]$ f. 30°



26. Find the measure of \overline{NM} in $\triangle LMN$ to the nearest tenth.

$$\sin 50^\circ = \frac{10}{x}$$

$$x = \frac{10}{\sin 50^\circ} = 13.1$$



27. Fill in the missing measures

Triangle angles	Short leg	Long leg	hypotenuse
30-60-90	$\frac{50}{2}$ 25 cm	$25\sqrt{3}$ cm	50 cm
	$5\sqrt{2}$ in	$5\sqrt{2}\sqrt{3}$ $5\sqrt{6}$ in	$2(5\sqrt{2}) = 10\sqrt{2}$ in.
	$\frac{15}{3}\sqrt{3} = 5\sqrt{3}$ ft	15 feet	$2(5\sqrt{3}) = 10\sqrt{3}$ ft.
45-45-90	Leg	Hypotenuse	
	6 m	$6\sqrt{2}$ m	
	$\frac{24}{2}\sqrt{2} = 12\sqrt{2}$ yds	24 yards	
	$5\sqrt{3}$	$(5\sqrt{3})\sqrt{2}$ $5\sqrt{6}$	

28. Matching:

a A central angle of a circle equals ?_.

b An inscribed angle of the circle equals ?_.

d The measure of the arc of a circle

e The length of an arc of a circle

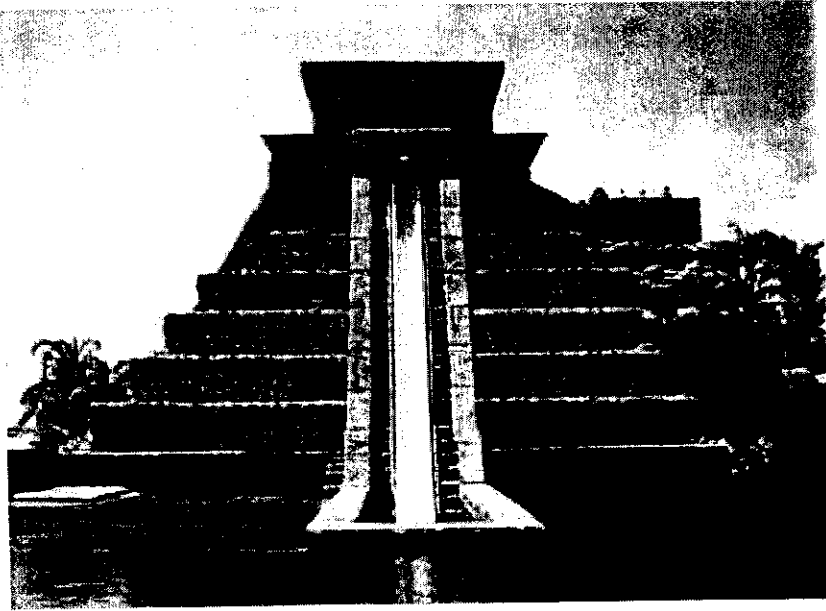
a. The measure of the intercepted arc.

b. One-half the measure of the intercepted arc.

c. $\frac{m(\text{central } \angle)}{360} (\pi r^2)$

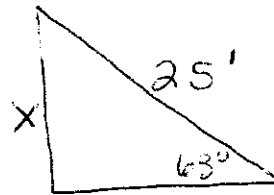
d. The measure of its central angle

e. $\frac{m(\text{central } \angle)}{360} (2\pi r)$



Picture for #28 and #29

29. Taylor was sitting on top of a water slide at an amusement park ready to slide down the slide. The straight slide is 25 feet long and the angle the slide makes with the ground is 63° . How tall is the ladder if it is perpendicular to the ground? Give your answer to the nearest hundredth of a foot.

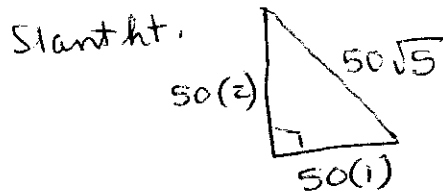
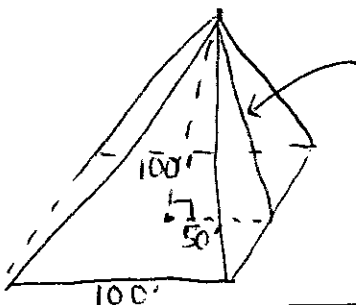


$$\sin(63^\circ) = \frac{X}{25}$$

$$25 \sin(63^\circ) = X$$

$$22.28' = X$$

30. King Tut was sunbathing at the top of a 100 foot tall regular square pyramid. Each side of the base was 100 feet long. He decided to slide down the water slide (along the slant height of the pyramid). If King Tut could slide at a rate of 20 feet/second, find the amount of time it would take him to reach the bottom. Give your answer to the nearest tenth of a second.

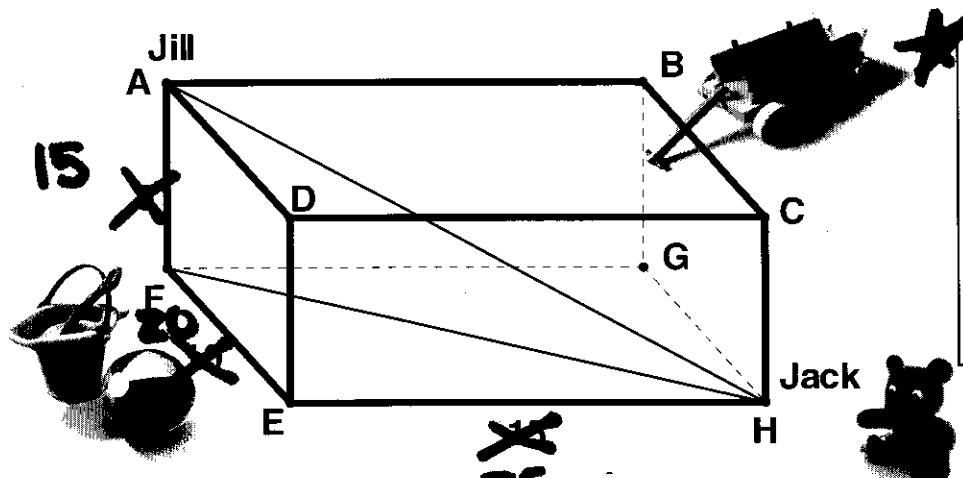


$$\frac{50\sqrt{5}}{20} \approx 5.6 \text{ seconds}$$

31. Jack and Jill's parents own a rectangular toy store. The play hide and seek before closing every night but Jack needs some help. He knows exactly where Jill hides but wants to get there as quick as possible. Jack can either go to the stairs and travel straight up (Route #1) or go through a secret pathway (Route #2).

Which way will get him there faster? Route # 2

Find the length of the shorter route. $25\sqrt{2}$ feet feet

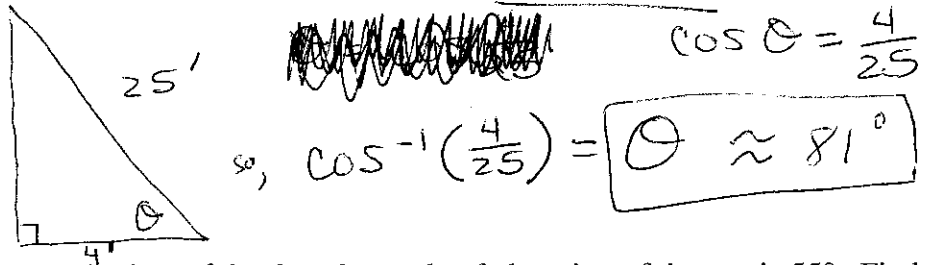


- Given information:
- Jill is hiding at point A
 - Jack is located at point H.
 - Route #1 – H to F to A
 - Route #2 – H straight to A
 - Width of the shop is 25 feet
 - Length of the shop is 20 feet
 - Height of the shop is 15 feet

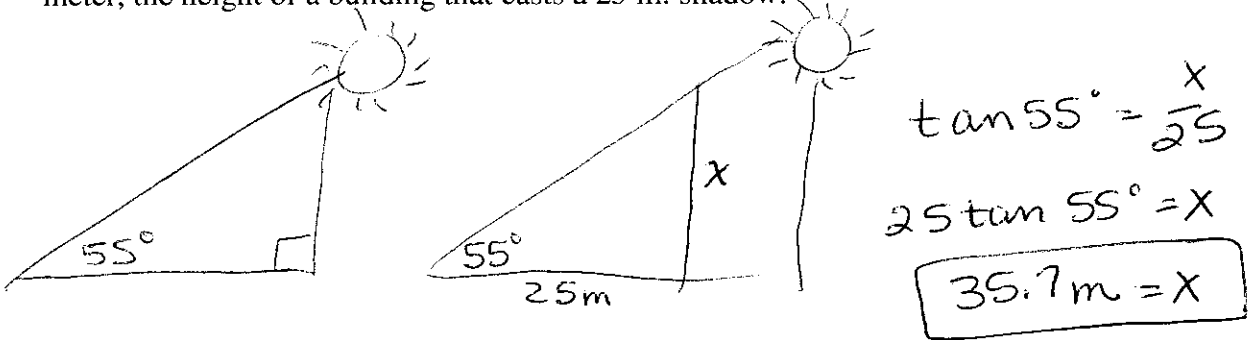
(diagram has the wrong measures on it!)

$HF \rightarrow \begin{matrix} 20 \\ 4(5) \end{matrix}$ $\begin{matrix} 25 \\ 5(5) \end{matrix}$ $(5)\sqrt{41} = HF \approx 32.02 \text{ feet}$
 $AH = \sqrt{15^2 + 20^2 + 25^2} = 25\sqrt{2} \approx 35.36 \text{ feet} \approx \text{Route # 2}$
 $\text{Route # 1} \approx 32.02 + 15 \approx 47.02 \text{ feet}$

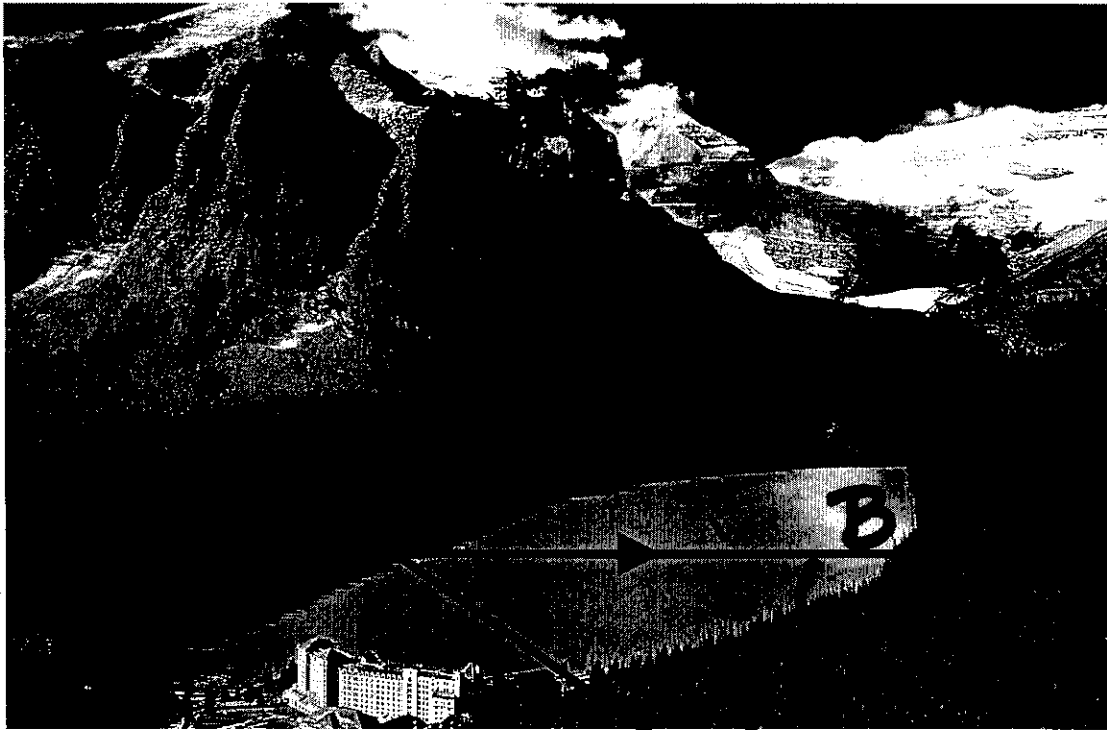
32. Suppose a 25-foot ladder leans against a building so that the foot of the ladder is 4 ft. from the base of the building. Find the measure, to the nearest degree, of the angle of elevation of the ladder.



33. At a certain time of the day, the angle of elevation of the sun is 55° . Find, to the nearest tenth of a meter, the height of a building that casts a 25 m. shadow.



34. Lake Louise is a hamlet located in the Canadian province of Alberta in Banff National Park.
How wide is the lake at the marked spot? Find x .

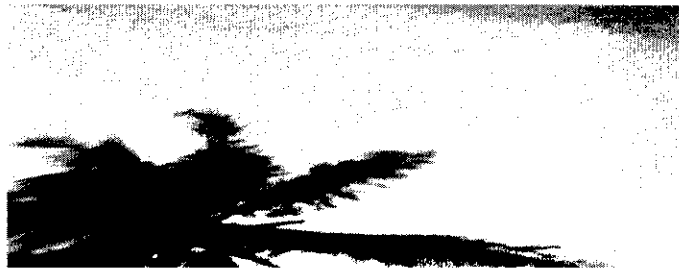
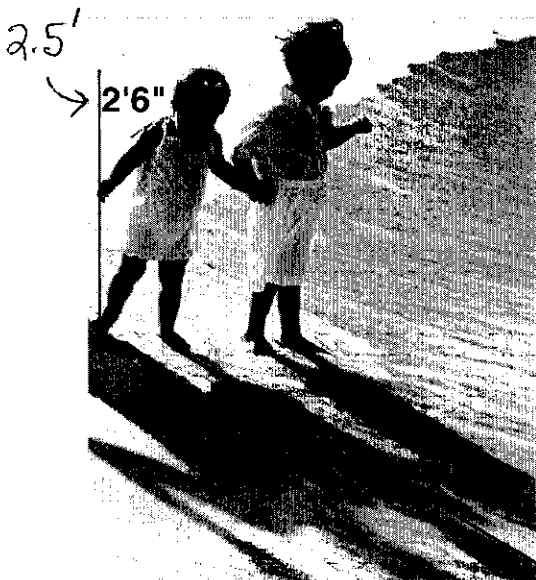
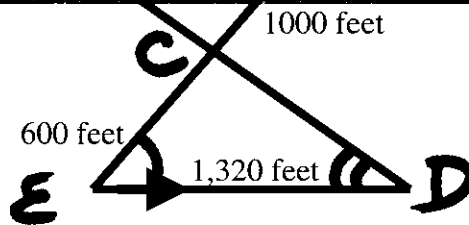


$$\triangle ABC \sim \triangle DEC$$

$$\frac{AB}{DE} = \frac{BC}{EC} = \frac{AC}{DC}$$

$$\frac{x}{1320} = \frac{1000}{600}$$

$$x = 2200 \text{ feet}$$



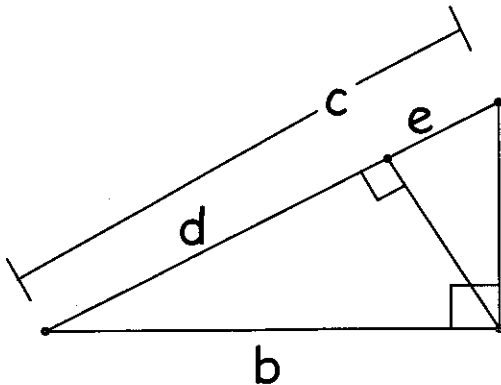
35. The young child in the picture is 2' 6" tall and her shadow is 4' 0" long. The shadow of the palm tree is 24' long. How tall is the palm tree?

$$\frac{\text{Child ht}}{\text{tree ht}} = \frac{2.5'}{x} = \frac{4'}{24'} \quad \begin{array}{l} \text{child shadow} \\ \text{tree shadow} \end{array}$$

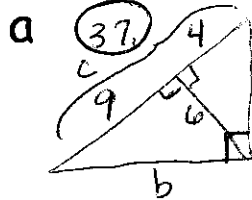
$$x = 15'$$

36. The acute angles of a right triangle are in a ratio of $\frac{4}{5}$. What is the measure of the LARGER angle?

- a. 4:5 $4x + 5x = 90$ $x = 10$ a. 50°
- b. 8:7 $8x + 7x = 90$ $x = 6$ b. 48°
- c. 1:2 $x + 2x = 90$ $x = 30$ c. 60°



Fill in each of the missing sides using the given information and the diagram to the left.

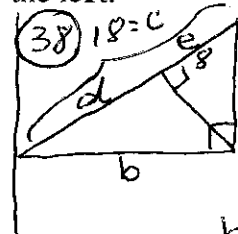


$$a^2 = 4(13)$$

$$a = 2\sqrt{13}$$

$$b^2 = 9(13)$$

$$b = 3\sqrt{13}$$



$$12^2 = e(18)$$

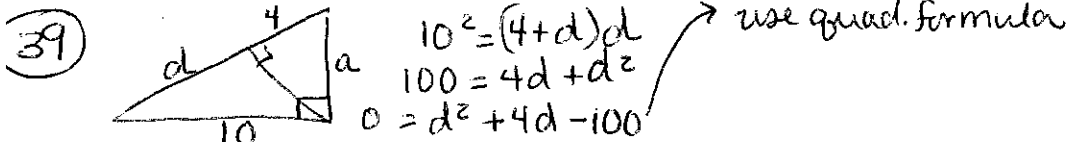
$$12 \frac{144}{18} = e$$

$$8 = e$$

$$b^2 = 10(18)$$

$$b = 6\sqrt{5}$$

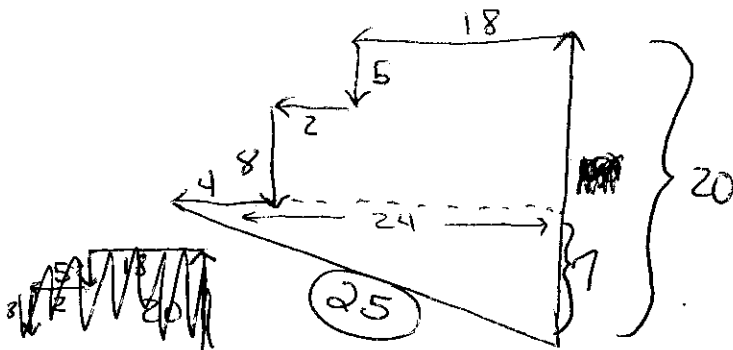
	a	b	c	d	e
37.	$2\sqrt{13}$	$3\sqrt{13}$	13	9	4
38.	12	$6\sqrt{5}$	18	$18 - 8$ 10	8
39.		10			4



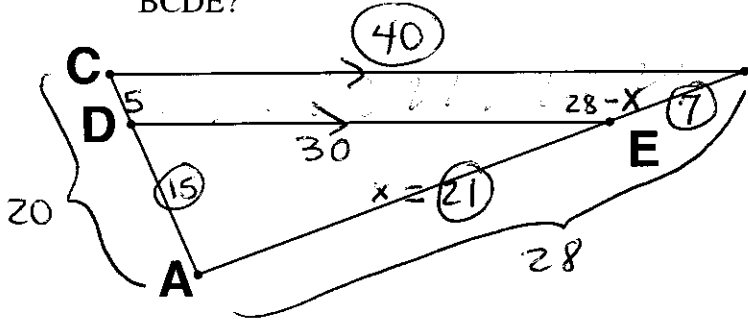
40. Haley Hiker hiked 20 miles North, 18 miles West, 5 miles South, 2 miles West, 8 miles South, and 4 miles West and then returned via a straight line back to her starting point. How far did Haley hike in all? Draw a picture to support your answer!

$$20 + 18 + 5 + 2 + 8 + 4 + 25$$

82 miles



41. In $\triangle ABC$, $\overline{DE} \parallel \overline{BC}$, $AB = 28$, $AC = 20$, $DE = 30$, and $CD = 5$. What is the perimeter of BCDE?



$$\frac{15}{20} = \frac{x}{28}$$

$$x = 21$$

$$\frac{15}{20} = \frac{30}{CB}$$

$$CB = 40$$

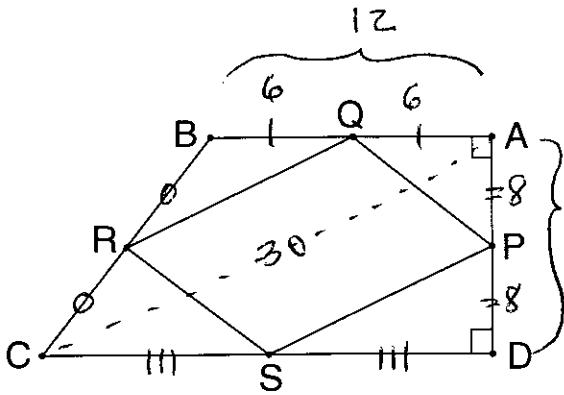
$$\triangle ADE \sim \triangle ACB$$

$$\frac{AD}{AC} = \frac{DE}{CB} = \frac{AE}{AB} = \frac{3}{4}$$

Perimeter BCDE

$$5 + 40 + 7 + 30$$

$$\boxed{82}$$



42. In trapezoid ABCD, P, Q, R, and S are midpoints of the sides. $AB = 12$, $AD = 16$, and $AC = 30$. What is the perimeter of quadrilateral PQRS?

$$RQ + SP = AC = 30 \quad \triangle AQP \text{ is a right } \triangle$$

$$RQ = SP = 15$$

$$QP = RS = 10$$

$$P_{PQRS} = 30 + 20 = \boxed{50}$$

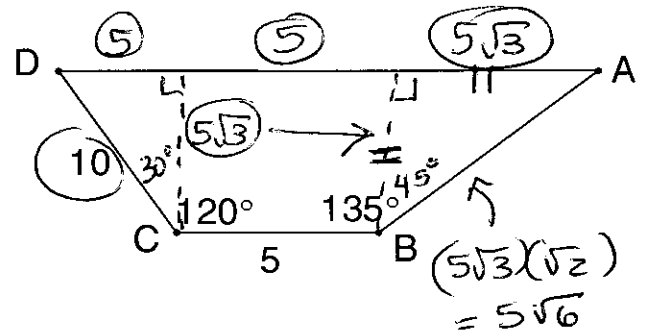
43. Complete this table for an octagon?

Sum of measures of the angles	Sum of the measures of the exterior angles	Number of diagonals	Measure of one angle if it is regular
$(8-2)180 = 1080^\circ$	360°	$\frac{8(8-3)}{2} = 20$	135°

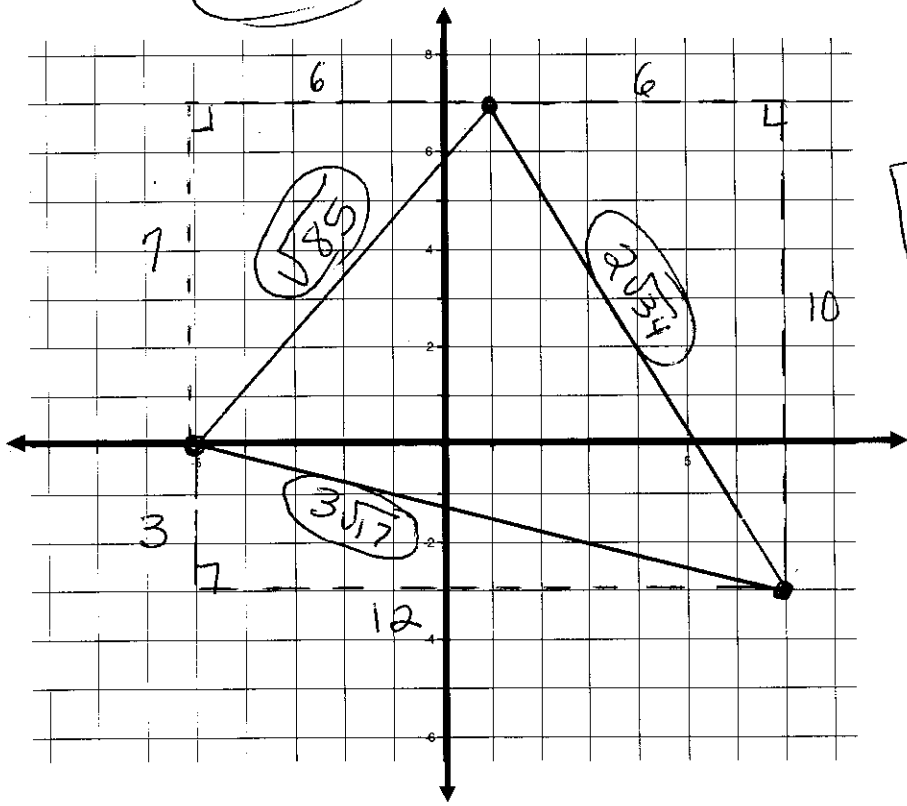
44. What is the perimeter of the trapezoid at right?

$$P = 10 + 5 + 5 + 5\sqrt{3} + 5\sqrt{6} + 5$$

$$= \boxed{25 + 5\sqrt{3} + 5\sqrt{6}}$$



45. Find the perimeter of $\triangle ABC$ with $A(-5, 0)$, $B(7, -3)$, and $C(1, 7)$.



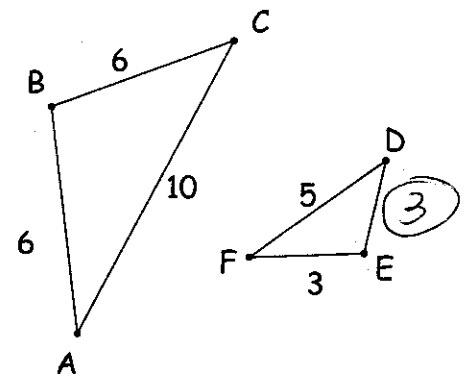
$$P = \sqrt{85} + 2\sqrt{34} + 3\sqrt{17}$$

46. Pentagons have 5 diagonals. How many diagonals does an octagon have? $\frac{8(5)}{2}$

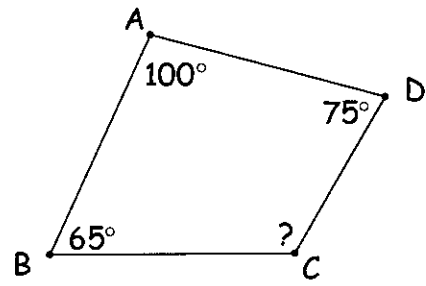
a. 8 b. 16 c. 20 d. 30 e. 40

47. In the figures to the right, $\triangle ABC$ and $\triangle DEF$ are similar triangles with the given side lengths in meters. What is the perimeter, in meters, of $\triangle DEF$.

- a. 3 b. 8 c. 11 d. 12 e. 13



48. The figure below shows a quadrilateral ABCD. What is the measure of $\angle C$?



- a. 120° b. 115° c. 105° d. 100° e. 80°

$$180 - (100 + 75 + 65) = m\angle C$$

$$120^\circ$$

C 49. What is the distance, in coordinate units, between the points (-3,5) and (4, -1) in the standard (x,y) coordinate plane?

- a. $\sqrt{13}$ b. $\sqrt{17}$ c. $\sqrt{85}$ d. 13 e. 85

$$\sqrt{(-3-4)^2 + (5-(-1))^2}$$

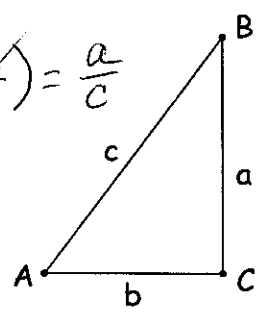
$$\sqrt{(-7)^2 + 6^2} = \sqrt{49+36}$$

$$= \sqrt{85}$$

a 50. A right triangle that has its sides measured in the same unit of length is shown below. For any such triangle, $(\tan A)(\sin B)$ is equivalent to:

- a. $\frac{a}{c}$ b. $\frac{ab}{c^2}$ c. $\frac{a^2}{bc}$ d. $\frac{b^2}{ac}$ e. $\frac{c}{a}$

$$\tan A = \frac{a}{b} \quad \sin B = \frac{b}{c} \quad \left(\frac{a}{b}\right) \left(\frac{b}{c}\right) = \frac{a}{c}$$



a 51. If the angles of a triangle are $3x$, $x + 10$, and $2x - 40$, what is the measure of the smallest angle?

- a. 30° b. 35° c. 40° d. 45° e. 50°

$$3x = 105^\circ \quad x + 10 = 45^\circ$$

$$2x - 40 = 30^\circ$$

$$3x + x + 10 + 2x - 40 = 180$$

$$6x = 210$$

$$x = 35$$

d 52. How many degrees are there in each interior angle of a regular decagon?

- a. 15 b. 18 c. 120 d. 144 e. 172

$$180 - \left(\frac{360}{10}\right) = 144^\circ$$

C 53. what is the length, in feet, of the diagonal of a square if the area of the square is 12 square feet?

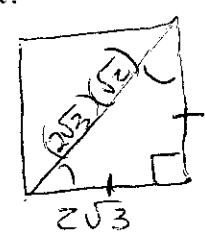
- a. $12\sqrt{2}$ b. 6 c. $2\sqrt{6}$ d. $\frac{6\sqrt{3}}{2}$ e. $2\sqrt{3}$

$$\text{diag} = (2\sqrt{3})(\sqrt{2}) = 2\sqrt{6}$$

$$\text{area} = \text{side}^2$$

$$\sqrt{12} = \sqrt{\text{side}^2}$$

$$2\sqrt{3} = \text{side}$$



e 54. Which of the following is equivalent to $\frac{(\sqrt{5+2})(\sqrt{3})}{\sqrt{3}} = \frac{\sqrt{15+2\sqrt{3}}}{3}$

- a. $\frac{\sqrt{5+\sqrt{6}}}{3}$ b. $\sqrt{15+\sqrt{6}}$ c. $\frac{\sqrt{5+2\sqrt{3}}}{3}$ d. $\frac{2\sqrt{15+\sqrt{3}}}{3}$ e. $\frac{\sqrt{15+2\sqrt{3}}}{3}$

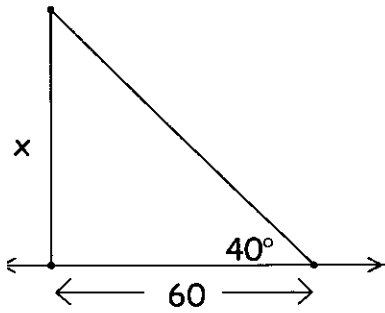
C 55. If the diagonal of a square is $2\sqrt{3}$ inches long, what is the perimeter of the square?

- a. 4 b. 8 c. $4\sqrt{6}$ d. $8\sqrt{3}$ e. 36

$$\text{side} = \frac{2\sqrt{3}\sqrt{2}}{2} = \sqrt{6}$$

$$P = 4\sqrt{6}$$

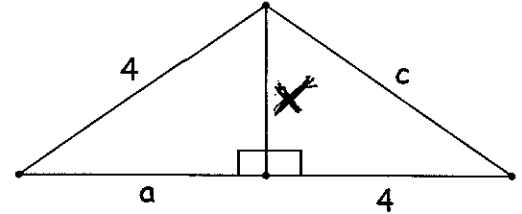
- b** 56. As shown in the figure below, a tower casts a shadow 60 feet long. If the angle of elevation of the sun is 40° , what is the height of the tower?



- a. $60 \sin 40^\circ$ b. $60 \tan 40^\circ$ c. $60 \tan 50^\circ$
 d. 60 e. $60 \cos 40^\circ$

$\tan 40^\circ = \frac{x}{60}$
 $60 \tan 40^\circ = x$

- a** 57. Given this figure, which of the following is true?

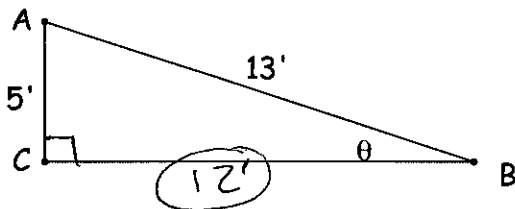


- a. $c^2 = 32 - a^2$ b. $c^2 = a^2 - 16$
 c. $c^2 = a^2 + 32$ d. $c = \frac{10}{a}$ e. $c^2 = \frac{32}{a^2}$

$16 - a^2 = c^2 - 16$
 $32 - a^2 = c^2$

$16 = a^2 + x^2$ $c^2 = x^2 + 16$
 $x^2 = 16 - a^2$ $x^2 = c^2 - 16$
 $16 - a^2 = c^2 - 16$

- d** 58. Given $\triangle ABC$ with $\angle ACB = 90^\circ$ (see figure), what is the value of $\frac{\tan \theta}{\sin \theta}$?

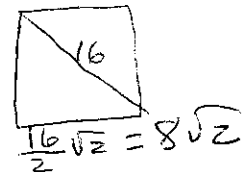


- a. $\frac{5}{12}$ b. $\frac{12}{5}$ c. $\frac{12}{13}$
 d. $\frac{13}{12}$ e. $\frac{13}{5}$

$\tan \theta = \frac{5}{12}$ $\tan \theta \div \sin \theta$
 $\sin \theta = \frac{5}{13}$ $= \frac{5}{12} \div \frac{5}{13} = \frac{5}{12} \times \frac{13}{5} = \frac{13}{12}$

- d** 59. What is the length of a side of a square in inches, if the length of the diagonal is 16 inches?

- a. 4 b. $4\sqrt{2}$ c. $4\sqrt{3}$ d. $8\sqrt{2}$ e. $8\sqrt{3}$



- ?** 60. Given the triangle below, what is the sine of angle B?

- a. $-\frac{1}{2}$ b. $\frac{\sqrt{5}}{3}$ c. 2 d. $\frac{2\sqrt{5}}{5}$ e. $\frac{5\sqrt{5}}{2}$

missing \triangle