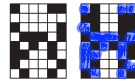
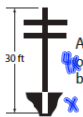


21. In the two grids shown, some of the squares are black, and the remaining squares are transparent. If the grid on the left were translated so that it completely covers the grid on the right, what letter would be formed by the black squares?



H

22. A 30-ft-long telephone pole is perpendicular to the ground, as shown. The height of the pole above ground is four times the length of the portion of the pole located below ground. How many feet above ground is the top of the pole?



$x = \text{length below ground}$. $4x = \text{length above ground}$
 $4x + x = 30$
 $5x = 30$
 $x = 6 \text{ ft}$
 $4x = 4(6) = 24 \text{ ft above}$

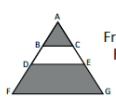
123. The units digit of a positive three-digit integer is 0. The sum of the other two digits is 12. Interchanging the tens and hundreds digits increases the number by 540. What is the original number?

$x = \text{hundreds digit}$
 $y = \text{tens digit}$
 $x + y = 12 \rightarrow x = 12 - y$
 $100x + 10y + 540 = 100y + 10x$
 $100(12 - y) + 10y + 540 = 100y + 10(12 - y)$
 $1200 - 100y + 10y + 540 = 100y + 120 - 10y$
 $1740 - 90y = 90y + 120$
 $1740 = 180y + 120$
 $1620 = 180y$
 $9 = y$
 $x = 12 - 9 = 3$
 The number is $\begin{matrix} x & y & 0 \\ 3 & 9 & 0 \end{matrix}$

124. A student rolls three standard, six-sided dice (one red, one blue and one green). How many possible outcomes are there for the three values showing on the top faces of the dice?

$6 \cdot 6 \cdot 6 = 216$

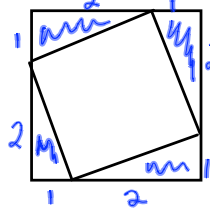
125. From a piece of striped material, Tanya cut out the isosceles triangle shown here. If the measure of the vertex angle of this large isosceles triangle is 50° and $BC \parallel DE \parallel FG$, what is the measure of $\angle BCE$?



$\angle A = 50^\circ$

ΔABC is similar to ΔDFG and is isosceles
 so $\angle ABC = \angle ACB$
 $180^\circ - 50^\circ = 130^\circ \div 2 = 65^\circ$
 $\angle ABC = \angle ACB = 65^\circ$
 $\angle ACB + \angle BCE = \text{st. line} = 180^\circ$
 $\angle BCE = 180^\circ - \angle ACB$
 $= 180^\circ - 65^\circ$
 $= 115^\circ$

126. _____ % If the vertices of the smaller square divide each side of the larger square in the ratio of 2:1, in the figure shown, what percentage of the larger square is shaded? Express your answer to the nearest whole number.

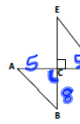


Area of lg square = $3 \cdot 3 = 9$
 4 shaded triangles are equal area.
 $A = \frac{1}{2}(1)(2) = 1$ so 4 Ds have area of 4
 therefore $\frac{4}{9}$ of area shaded
 $\frac{4}{9} = .444... = 44\%$

127. _____ If the probability that Christoph will get an A on a test is 0.25, what is the probability that he will get an A on the next two tests? Express your answer as a common fraction.

$$\frac{1}{4} \cdot \frac{1}{4} = \left(\frac{1}{16}\right)$$

128. _____ units



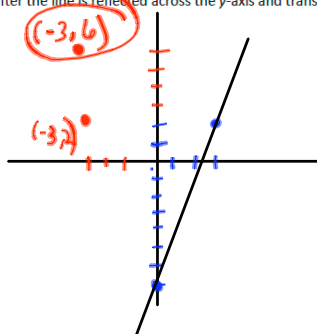
In the figure shown, point C is the midpoint of segment AD, and $BC = \frac{2}{3} EC$. If $AD = 10$ units, and the area of $\triangle CDE$ is 30 units², how long is segment AB? Express your answer in simplest radical form.

Since C is midpoint of AD, $AC = CD$
 Since $AD = 10$ then $AC = CD = 5$
 Area of $\triangle CDE \Rightarrow 30 = \frac{1}{2}bh$
 $2[30 = \frac{1}{2}(5)h]^2$
 $60 = 5h$
 $12 = h = CE$
 $BC = \frac{2}{3}(CE) = \frac{2}{3}(12) = 8$
 $\angle ACB$ is vertical + $\angle ECD = 90^\circ$
 So $\triangle ACB$ is rt \triangle - use Pythagorean theorem
 $5^2 + 8^2 = C^2$
 $25 + 64 = C^2$
 $89 = C^2$
 $\sqrt{89} = C = AB$

129. _____ milk balls Mandy had a box of chocolate malted milk balls. She ate 5 and gave her brother 3. Then she passed around the remaining milk balls to the 8 members of the math team. The first team member took 1, the second took 3, the third took 5, and so on, with each team member taking the next higher odd number of milk balls. There were just enough milk balls in the box for the last team member to take her correct amount. What was the original number of milk balls in Mandy's box?

$x = \#$ of milk balls
 $x - 5 - 3 - 1 - 3 - 5 - 7 - 9 - 11 - 13 - 15$ exact left for 8
 1 2 3 4 5 6 7 8 member
 $15 + 13 + 11 + 9 + 7 + 5 + 3 + 1 + 3 + 5 = 72$

130. (. .) Point P(3,2) lies on the graph of the equation $y = 3x - 7$. What are the coordinates of the image of point P after the line is reflected across the y-axis and translated up 4 units?



131. _____ Each pair of numbers below can be combined using one of the operations addition, subtraction, multiplication or division to obtain the same result. What is the common result for the three pairs?

Pair A: 6, 4
 Pair B: 16, 8
 Pair C: 36, 12

$$6 \cdot 4 = 24$$

$$16 \div 8 = 24$$

$$36 \div 12 = 24$$

24

132. ⁵ _____ Grandpa has 18 coins in his pocket. Three of the coins are quarters and the rest are dimes and nickels. There are twice as many dimes in his pocket as nickels. What is the total value of the nickels and dimes in his pocket?

	#	value	total value
Quarter	3	25	75
Nickels	x	5	5x
Dimes	2x	10	20x

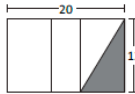
$$5x + 20x = 18 - 3 = 15$$

$$25 + 100 = 1.25$$

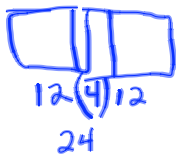
$$5 = x$$

$$15 = 3x$$

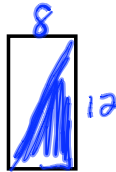
133. _____ units²



Two squares of side length 12 units overlap to form a 20×12 rectangle, as shown. What is the area of the shaded triangle?



$$12 - 4 = 8$$



$$A = \frac{1}{2}(8 \cdot 12)$$

$$= 48$$

134. _____ The product of a set of distinct, positive integers greater than 1 is 84. What is the least possible sum of these integers?

$$84$$

$$\uparrow$$

$$2 \cdot 42$$

$$\uparrow$$

$$2 \cdot 6 \cdot 7$$

$$\uparrow$$

$$2 \cdot 3 \cdot 2 \cdot 7$$

$$2 + 3 + 2 + 7 = 14$$

135. _____ ^{pics} An artist draws 20 pictures, one after the other, in 240 minutes. If she draws 3 times as fast, how many pictures will the artist draw in 6 hours?



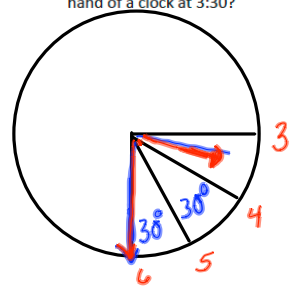
$$20 \overline{) 240} \quad 1 \text{ picture per } 12 \text{ min.}$$

$$3 \text{ times faster} = 3 \text{ pictures per } 12 \text{ min}$$

$$6 \text{ hr} = 6 \cdot 60 = 360$$

$$12 \overline{) 360} \quad 30 \cdot 3 = 90 \text{ pictures}$$

136. _____ ° What is the degree measure of the smaller angle formed by the minute hand and the hour hand of a clock at 3:30?



30 for each section
 $12 \overline{) 360}$
 2 sections = 60°
 hr hand is $\frac{1}{2}$ distance from 3 to 4 since minute hand is at 3:30 so $\frac{1}{2}$ of $30 = 15$
 $60 + 15 = 75^\circ$

137. _____ cm² Gerard glues together 14 bricks to form the solid shown. Each brick is a cube with edge length 1 cm. Adjacent bricks are glued together so that faces entirely overlap. What is the surface area of Gerard's solid, including the bottom face?

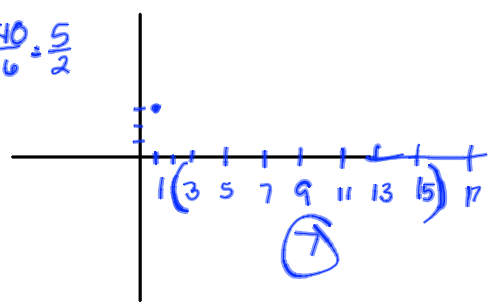


1st stack - $5 + 2 + 3 + 4 + 2 + 5 = 21$
 2nd stack - $4 + 2 + 3 = 9$
 3rd " - $3 + 3 + 4 + 5 = 15$
 4th " - 5
 (50)

138. _____ points A line contains the points P(1, 3) and Q(17, 43). How many points on this line lie strictly between points P and Q and have two integer coordinates?

slope = $\frac{43-3}{17-1} = \frac{40}{16} = \frac{5}{2}$

up 5
 right 2



139. _____ ways In how many ways can the numeral 20 be written as the sum of three distinct positive integers? (Note: 3 + 4 + 13 and 13 + 3 + 4 are to be considered the same.)

- 1 2 17 2 3 15 3 4 13 4 5 11 ② 5 6 9
 - 1 3 16 2 4 14 3 5 12 ③ 4 6 10 ② 5 7 8
 - 1 4 15 2 5 13 ⑤ 3 6 11 ③ 4 7 9
 - ⑧ 1 5 14 ⑥ 2 6 12 ⑤ 3 7 10
 - 1 6 13 2 7 11 3 8 9
 - 1 7 12 2 8 10
 - 1 8 11
 - 1 9 10
- $8 + 6 + 5 + 3 + 2 = 24$

140. _____ ways If a room has 7 doors, in how many ways can a person enter through one door and exit through a different door?

(Enter) (Exit)
 $7 \cdot 6 = 42$

