




6

Workout 5

141. 6 What number is 75% of the positive difference between 40% of 80 and 32% of 75?

142. 6.368×10^9
 phone numbers A telephone number consists of a three-digit area code followed by a seven-digit local code. Neither the area code nor the local code may have a first digit of 0 or 1. If the codes 800, 888, 877 and 866 are toll-free codes and are not used as area codes, how many ten-digit telephone numbers are possible? Express your answer in scientific notation with four significant digits.

143. 2.17 in²  A regular hexagon is inscribed in a circle with a radius of 2 in, as shown. What is the area of the shaded region? Express your answer as a decimal to the nearest hundredth.

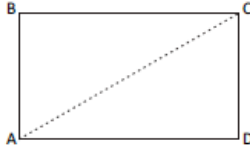
144. $\frac{1}{3}$ Paulo bought and then sold two bikes. He made a 30% profit on the sale of the first bike and a 50% profit on the second one. If Paulo's total profit was 45%, what was the ratio of his cost for the first bike to his cost for the second bike? Express your answer as a common fraction.



145. 39 If each of the digits 2, 3, 4, 6, 7 and 8 is used exactly once to construct two three-digit numbers m and n , what is the smallest possible positive value of the difference $m - n$?

2771.3

146. mm²



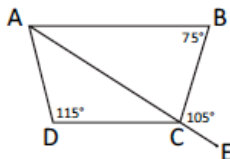
In rectangle ABCD, shown here, $\angle ACB$ measures 30° and $CD = 40$ mm. What is the area of rectangle ABCD? Express your answer as a decimal to the nearest tenth.

147. 5 points In the game of Smitch, a quitch and two gritches are worth 20 points, whereas a gritch and two quitches are worth 25 points. How many points is each gritch worth?

148. 39 mi Sam leaves home at the same time each morning and drives directly to work. If his travel speed averages 30 mi/h, he will be 18 minutes late for work. If his travel speed averages 45 mi/h, he will arrive 8 minutes early. What is the total number of miles between Sam's home and work?

149. 512 sub-sets How many subsets containing an odd number of elements does a set with 10 elements have?

150. 35 In trapezoid ABCD, shown here, diagonal \overline{AC} is extended to point E. What is the degree measure of $\angle DAC$?



141. _____ What number is 75% of the positive difference between 40% of 80 and 32% of 75?

$$\frac{2}{5}(80) = 32$$

$$\frac{8}{25}(75) = 24$$

$$\frac{32}{4} - \frac{24}{4} = \frac{8}{4} = 2$$

$$\frac{3}{4}(2) = \frac{6}{4} = 1.5$$


42. _____ phone numbers A telephone number consists of a three-digit area code followed by a seven-digit local code. Neither the area code nor the local code may have a first digit of 0 or 1. If the codes 800, 888, 877 and 866 are toll-free codes and are not used as area codes, how many ten-digit telephone numbers are possible? Express your answer in scientific notation with four significant digits.

$$8 \cdot 10 \cdot 10 = 800$$

$$8 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 8 \times 10^6$$

$$796 \cdot (8 \times 10^6) = 6,368,000,000$$

$$6.368 \times 10^9$$

143. _____ in'  A regular hexagon is inscribed in a circle with a radius of 2 in, as shown. What is the area of the shaded region? Express your answer as a decimal to the nearest hundredth.

Area of circle - Area of 6 triangles = shaded area

$$\pi(2)^2$$


$$4\pi - 6 \frac{(2)^2 \sqrt{3}}{4}$$

$$4\pi - \frac{24\sqrt{3}}{4}$$

$$4\pi - 6\sqrt{3} \text{ (use calc.)}$$

$$2.1711$$

144. _____ Paulo bought and then sold two bikes. He made a 30% profit on the sale of the first bike and a 50% profit on the second one. If Paulo's total profit was 45%, what was the ratio of his cost for the first bike to his cost for the second bike? Express your answer as a common fraction.



$$x = \text{cost of 1st bike} \quad .3x = \text{profit}$$

$$y = \text{cost of 2nd bike} \quad .5y = \text{profit}$$

$$.3x + .5y = .45(x+y)$$

$$.3x + .5y = .45x + .45y$$

$$-.15x + .5y = .45y$$

$$.5y = .15x + .45y$$

$$.05y = .15x$$

$$\frac{.05y}{.15} = \frac{.15x}{.15}$$

$$\frac{1}{3}y = x$$

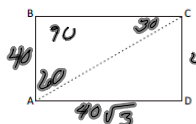
$$\frac{x}{y} = \frac{1}{3}$$

45. _____ If each of the digits 2, 3, 4, 6, 7 and 8 is used exactly once to construct two three-digit numbers m and n , what is the smallest possible positive value of the difference $m - n$?

$823 - 764 = 59$
 $723 - 684 = 39$
 $426 - 387 = 39$

Pick 2 #s that differ by 1.
 (3,2) (4,3) (7,6) (8,7)
 Then next 2 digits for larger #
 want smallest #
 or next 2 digits for smaller #
 want largest #
 smallest = 39

146. _____ mm² In rectangle ABCD, shown here, $\angle ACB$ measures 30° and $CD = 40$ mm. What is the area of rectangle ABCD? Express your answer as a decimal to the nearest tenth.



$30-60-90$
 $1 : 2 : \sqrt{3}$
 $a : 2a : a\sqrt{3}$

$A = 40(40\sqrt{3})$
 $1600\sqrt{3} \approx 2771.3$

147. _____ points In the game of Smitch, a quitch and two gritches are worth 20 points, whereas a gritch and two quitches are worth 25 points. How many points is each gritch worth?

$q = \text{quitch}$
 $g = \text{gritch}$

$q + 2g = 20$
 $g + 2q = 25$

$q = 20 - 2g$
 $g + 2(20 - 2g) = 25$
 $g + 40 - 4g = 25$
 $-3g + 40 = 25$
 $-3g = -15$
 $g = 5$

148. _____ mi Sam leaves home at the same time each morning and drives directly to work. If his travel speed averages 30 mi/h, he will be 18 minutes late for work. If his travel speed averages 45 mi/h, he will arrive 8 minutes early. What is the total number of miles between Sam's home and work?

	r	t	d
1st trip	30	t	$30t$
2nd trip	45	$t - \frac{26}{60}$	$45(t - \frac{26}{60})$

$30t = 45(t - \frac{26}{60})$

$30t = 45t - \frac{470}{60}$

$\frac{470}{60} = 15t$

$\frac{470}{60 \cdot 15} = t$

$\frac{78}{60} = t$

78 min for 30 mph or $\frac{13}{10}$

$30 \cdot \frac{13}{10} = 39 \text{ mi}$

49. _____ sub-sets How many subsets containing an odd number of elements does a set with 10 elements have?

of subsets of a set = 2^n $n = \#$ of elements in a set

(Ex 1) $\{1, 2\} = 2^2 = 4$
 $\{\emptyset, \{1\}, \{2\}, \{1, 2\}\}$

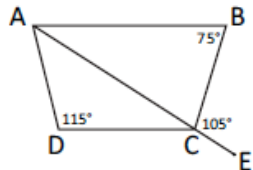
$$2^{10} = 1024$$

$\frac{1}{2}$ of these contain an odd # = 512

(Ex 2) $\{1, 2, 3\} = 2^3 = 8$

$\{\emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\}$

150. _____



In trapezoid ABCD, shown here, diagonal \overline{AC} is extended to point E. What is the degree measure of $\angle DAC$?

$\angle ACB$ is supp to $\angle BCE$

$$180 - 105 = 75 = \angle ACB$$

$$\triangle ABC = 180 \text{ so } \angle BAC = 180^\circ - 75 - 75 = 30^\circ$$

$$AB \parallel DC \quad \angle BAD + \angle ADC = 180^\circ$$

$$x = \angle DAC \quad (30 + x) + 115 = 180^\circ$$

$$x + 145 = 180^\circ$$

$$x = 35^\circ$$