

1. Normal systolic blood pressure is sometimes approximated by using a person's age, in years, plus 100. Using this approximation, what is the difference between the systolic blood pressure of a 10-year-old and the systolic blood pressure of that same person at the age of 75?

The systolic blood pressure for the 10-year-old would be 110. The systolic blood pressure for the 75-year-old would be 175. The difference is 65.

The correct answer is A, 65.

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2. What is the denominator of the resulting fraction (reduced to lowest terms) when calculating the following?

$$\left(\frac{3}{4} - \frac{2}{3}\right) + \left(\frac{1}{2} + \frac{1}{3}\right)$$

Punching the expression into a calculator, the answer is  $\frac{11}{12}$ .

The correct answer is G, 12.

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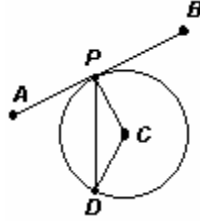
3. Adam tried to compute the average of his 7 test scores. He mistakenly divided the correct sum of all of his test scores by 6, which yields 84. What is his correct average?

If Adam divided by 6 and obtained 84, he must have started with a total of 504 ( $84 \times 6$ ). Correctly dividing 504 by 7 would yield 72.

The correct answer is B, 72.

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4. In the figure below, points D and P lie on the circle centered at C, and AB is tangent to the circle at P. If the measure of  $\angle PCD$  is  $120^\circ$ , what is the measure of  $\angle APD$ ?



Triangle PCD is an isosceles triangle since sides CP and CD are both radii and therefore the same length. Since  $\angle PCD$  measures  $120^\circ$ ,  $\angle DPC$  and  $\angle CDP$  must each measure  $30^\circ$ . Since AB is tangent to the circle,  $\angle APC$  equals  $90^\circ$ . To find the measure of angle  $\angle APD$ , subtract  $90^\circ - 30^\circ = 60^\circ$ .

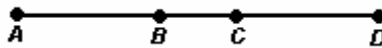
**The correct answer is H,  $60^\circ$ .**

**5. Evaluate  $\sqrt{16 + 9}$**

First add  $16 + 9$  inside the radical. Then  $\sqrt{25} = 5$

The correct answer is A, 5.

**6. If the length of AC is 8 units, the length of BD is 7 units, and the length of AD is 12 units, what is the length in units, of AB?**



Since the entire length AD equals 12,  $AB + BC + CD = 12$ .

We are given that  $AC = 8$  and  $BD = 7$ . Since this totals 15, BC must have length 3 (since it was counted twice, as part of both AC and BD).

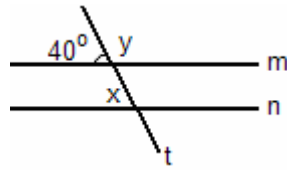
Then we know that AB must have length 5. ( $AC - BC = AB$  or  $8 - 3 = 5$ )

**The correct answer is K, 5.**

# ACT MATH APPLIED TEST 6

# ANSWER KEY

7. In the figure below, lines  $m$  and  $n$  are parallel and are each intersected by transversal  $t$ . What is the sum of the angle measures of  $\angle x$  and  $\angle y$ ?



Since  $\angle x$  and the  $40^\circ$  angle are equal, (they are corresponding angles),  $\angle y$  must equal  $140^\circ$ . Therefore  $\angle x + \angle y = 180^\circ$ .

**The correct answer is E,  $180^\circ$ .**

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8.  $(4 - 3) \div (3 - 4)$

Evaluate each value with the parentheses first.

$$(4 - 3) \div (3 - 4)$$

$$1 \div (-1)$$

$$-1$$

**The correct answer is F,  $-1$ .**

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9. What is the value of  $2x^2 - 3x - 4$  if  $x = -2$ ?

Substitute the value  $-2$  for  $x$  in the expression. Following order of operations, evaluate exponents before multiplying.

$$2(-2)^2 - 3(-2) - 4$$

$$2(4) + 6 - 4$$

$$8 + 6 - 4$$

$$10$$

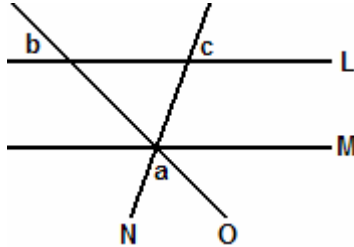
**The correct answer is E, 10.**

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# ACT MATH APPLIED TEST 6

# ANSWER KEY

10. Line L is parallel to line M. Lines N and O both intersect line M at the same point. The measure of  $\angle a$  equals  $70^\circ$  and the measure of  $\angle b$  equals  $50^\circ$ . What is the measure of  $\angle c$ ?



By vertical angles,  $a + b + c = 180$ . Since  $\angle a = 70^\circ$  and  $\angle b = 50^\circ$ ,  $\angle c$  must equal  $60^\circ$ .

The correct answer is F,  $60^\circ$ .

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11. Stacey usually runs 10 kilometers in a 50-minute run, but she wants to increase her distance. If she increases the distance she runs in 50 minutes by  $s$  kilometers, what is a general formula for her new average rate of speed for the 50-minute run, in kilometers per minute?

The fraction  $\frac{10}{50}$  currently reflects Stacey's rate as  $\frac{\text{kilometers}}{\text{min ute}}$ . If Stacey increases the number of kilometers she runs, the fraction would

change by adding  $s$  (kilometers) in the numerator.

The correct answer is D,  $\frac{10 + s}{50}$ .

12. In the following equation, what is the solution for  $x$  in terms of  $a$ ?

$$2x + 3 = 2a + 4$$

To solve for  $x$ , isolate the variable.

$$2x + 3 = 2a + 4$$

$$2x = 2a + 4 - 3$$

$$2x = 2a + 1$$

$$x = \frac{2a + 1}{2}$$

The correct answer is F,  $x = (2a + 1) \div 2$ .

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13. If  $d$  represents the hundreds digit in the 4-digit number  $6d47$ , what is the smallest value of  $d$  that will make  $6d47$  larger than  $6437$ ?

Substitute the answer choices into  $6d47$  until the resulting number is larger than  $6437$ . The number  $6447$  is larger than  $6437$ .

The correct answer is B, 4.

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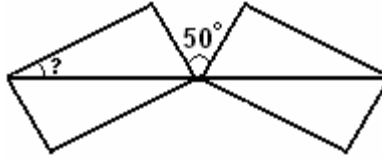
14. Insurance costs \$0.40 per \$100 in value of the house to be insured. How much would insurance cost for a house worth \$40,000?

First, divide 40,000 by 100. The result is 400. Then multiply 400 by 0.40. The result is 160.

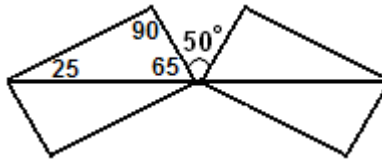
The correct answer is J, \$160.

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15. In the figure below, 2 identical rectangles touch only at a common corner. The diagonals through that common corner are collinear, and an  $\angle$  between the 2 rectangles is  $50^\circ$ . What  $\angle$  does a long side of one of these rectangles make with its diagonals?



The  $50^\circ$  angle and the two inside corners of the rectangle (above the diagonal) must equal  $180^\circ$  since the three angles together form a straight line. The two inside angles of the triangles formed above the diagonal are equal, so must each measure  $65^\circ$  ( $65^\circ + 50^\circ + 65^\circ = 180^\circ$ ). Now focusing on the top triangular section of the left rectangle, the angles must be  $25^\circ$ ,  $90^\circ$ , and  $65^\circ$ .



The correct answer is C,  $25^\circ$ .

**16. Which of the following is equivalent to  $4(3x - 1) < 7x + 2(x + 4)$ ?**

Simplify the inequality to solve for x.

$$4(3x - 1) < 7x + 2(x + 4)$$

$$12x - 4 < 7x + 2x + 8$$

$$12x - 4 < 9x + 8$$

$$3x < 12$$

$$x < 4$$

The correct answer is J,  $x < 4$ .

**17. Which of the following sets contain ONLY divisors of 180?**

The only set which contains factors (divisors) of 180 is  $\{2, 3, 5, 6, 15, 45\}$ .

The correct answer is E,  $\{2, 3, 5, 6, 15, 45\}$ .

18. For all  $x$ ,  $(8x^5 - x^3 + 3x^2 + 4) - (2x^5 - 3x^4 + 3x^2 - 4) = ?$

To subtract the second polynomial, change all signs in the second polynomial. Then combine like terms.

$$\begin{aligned}(8x^5 - x^3 + 3x^2 + 4) - (2x^5 - 3x^4 + 3x^2 - 4) \\ 8x^5 - x^3 + 3x^2 + 4 - 2x^5 + 3x^4 - 3x^2 + 4 \\ 6x^5 + 3x^4 - x^3 + 8\end{aligned}$$

The correct answer is **G**,  $6x^5 + 3x^4 - x^3 + 8$ .

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19. Find  $k$ .

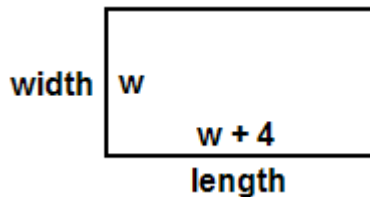
$$\sqrt[k]{54} = 3\sqrt[k]{2}$$

Since the radicand changed from 54 to 2, a factor of 27 was removed. The index of the radical must be 3 since the cube root of 27 is 3.

The correct answer is **C**, 3.

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20. A rectangular room with a floor area of 165 square feet has a length 4 feet longer than its width. Which of the equations could be solved to find  $w$ , the width of the floor?



The area of the rectangle is (width)  $\times$  (length) =  $(w)(w + 4) = 165$ .

The correct answer is **H**,  $w(w + 4) = 165$

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