

Answers:

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|------|------|-------|
| 1) A | 4) F | 7) B |
| 2) H | 5) D | 8) J |
| 3) D | 6) G | 9) A |
| | | 10) G |

Subject Areas Tested:

- | | | |
|-------------------------------------|-----------------------|------------------|
| 1. Fundamental Operations Solutions | 6. Decimals | 11. Mixtures & |
| 2. Using Algebra Problems | 7. Percents | 12. Work |
| 3. Roots and Radicals Geometry | 8. Averages | 13. Coordinate |
| 4. Inequalities | 9. Motion Problems | 14. Geometry |
| 5. Fractions | 10. Ratio/Proportions | 15. Trigonometry |

Solutions:

- 1) **Answer: A** **Subject Review Areas: 1, 5, 10**

The ratio can be expressed as $2a : 5b$ or as a fraction, $\frac{2a}{5b}$.

We know that $\frac{2a}{5b} = \frac{1}{6}$ We need to know: $\frac{6a}{5b} = ?$

Note that $\frac{6a}{5b}$ is exactly three times $\frac{2a}{5b}$.

So if $\frac{2a}{5b} = \frac{1}{6}$, then $\frac{6a}{5b}$ must equal $(3)(\frac{1}{6}) = \frac{1}{2}$ or

1 to 2.

- 2) **Answer: H** **Subject Review Areas: 1, 2, 3, 5**

To solve, multiply the numerator and denominator by the conjugate of the denominator.

$$\frac{4}{7 - \sqrt{5}}$$

$$= \frac{4}{7 - \sqrt{5}} \cdot \frac{(7 + \sqrt{5})}{(7 + \sqrt{5})}$$

Distribute in the numerator and FOIL the denominator.
 Note: since the denominator is a product of a sum and difference, the middle terms cancel out.

$$= \frac{28 + 4\sqrt{5}}{49 - 5}$$

Simplify by dividing each term by 4.

$$\frac{7 + \sqrt{5}}{11}$$

3) Answer: D

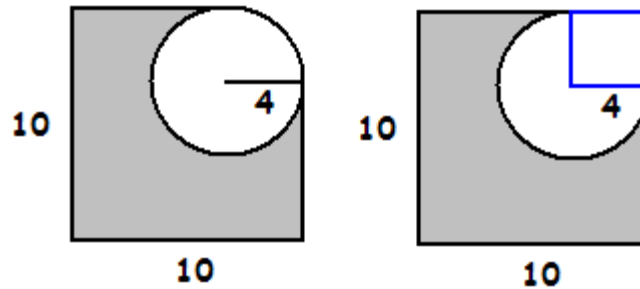
Subject Review Areas: 1, 14

The shaded area can be determined by calculating the area of the large square and then subtracting $\frac{3}{4}$ of the area of the circle and the area of the smaller square (with side 4):

AREA of Shaded Region =
 Area of large Square - $\frac{3}{4}$ Area of Circle - Area of Small Square

Divide circle and missing corner into sections, as in diagram below.

Now subtract the area of the large square $10 \times 10 = 100$, minus $\frac{3}{4}$ of the area of the circle = $\frac{3}{4}(16\pi)$, minus the area of the small square $4 \times 4 = 16$.

ACT MATH REVIEW DRILL**Z - Key**

$$\text{Shaded Area} = 100 - 3/4(16\pi) - 16 = 84 - 12\pi.$$

4) **Answer: F**

Subject Review Areas: 1, 2, 13

The standard form for a line equation is: $ax + by = c$.

When an equation is in standard form, the slope is simply $-a/b$.

So the slope of $3x + y = 6$ is $-3/1$.

The slope of a line perpendicular to this one is the opposite reciprocal or $1/3$.

The solution which has a slope of $1/3$ is $x - 3y = -7$ since in this case

$$-a/b = -(1/-3) = 1/3.$$

5) **Answer: D**

Subject Review Areas: 1, 2, 3

Σ is the summation sign; the four over the Σ and the $k = 1$ under it indicate that the value of k in the term $3k^2$, goes from 1 to 4. To solve, sum up:

$$3(1)^2 + 3(2)^2 + 3(3)^2 + 3(4)^2 = 3 + 12 + 27 + 48 = 90$$

ACT MATH REVIEW DRILL

Z - Key

Remember order of operations, perform exponent operations before multiplying.

- 6) **Answer: G** **Subject Review Areas: 1, 14**

The measure of arc WY = $(360 - 260)^\circ = 100^\circ$. An angle formed by a chord (WY) and a tangent line (WZ) is measured by half of the intercepted arc. Thus the measure of \angle YWZ = $(\frac{1}{2})(100^\circ) = 50^\circ$.

- 7) **Answer: B** **Subject Review Areas: 1, 2**

To solve, use F.O.I.L. Multiply the first terms, the outside terms, the inside terms, and then the last terms:

$$(7x - 3)(7x - 3) = 49x^2 - 21x - 21x + 9 = 49x^2 - 42x + 9$$

- 8) **Answer: J** **Subject Review Areas: 1, 7, 12**

To solve, use the Work Problem Formula and your knowledge of percents.

Time Needed for Entire Job is 3 hours. The part of the job that can be completed in x hours is $x/3$. Now convert the fraction to a percent by multiplying by 100.

$$\frac{x}{3} \cdot \frac{100\%}{1} = \frac{100x\%}{3}$$

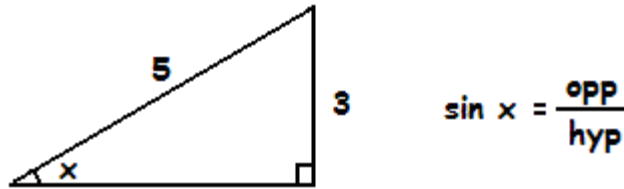
ACT MATH REVIEW DRILL

Z - Key

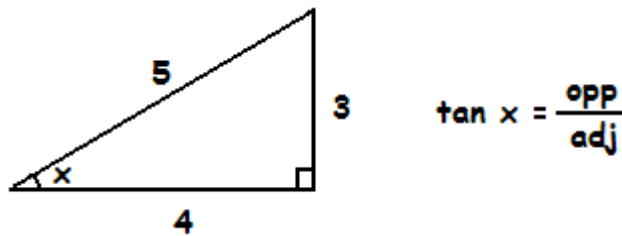
9) Answer: A

Subject Review Areas: 1, 14, 15

First, construct a right triangle so that $\sin x = 3/5$:



By the Pythagorean Theorem, the missing side is 4.



Since $\tan x = \text{opp}/\text{adj}$, $\tan x = 3/4$.

Therefore 1 divided by $\tan x = 4/3$ or $1\frac{1}{3}$

10) Answer: G

Subject Review Areas: 1, 2, 3

To simply, remove the imaginary number i (the square root of -1), from the denominator.

First multiply both numerator and denominator by the conjugate.

$$\frac{2}{5+i} \cdot \frac{(5-i)}{(5-i)} = \frac{10-2i}{25-i^2}$$

Then reduce, by dividing each term by 2.

$$\frac{10-2i}{25-(-1)} = \frac{10-2i}{26} = \frac{5-i}{13}$$