ATI TEAS 7 MATH

10



FULL-LENGTH PRACTICE TESTS

380 ORIGINAL QUESTIONS

QUICK MATH REVIEW

STEP-BY-STEP EXPLANATIONS

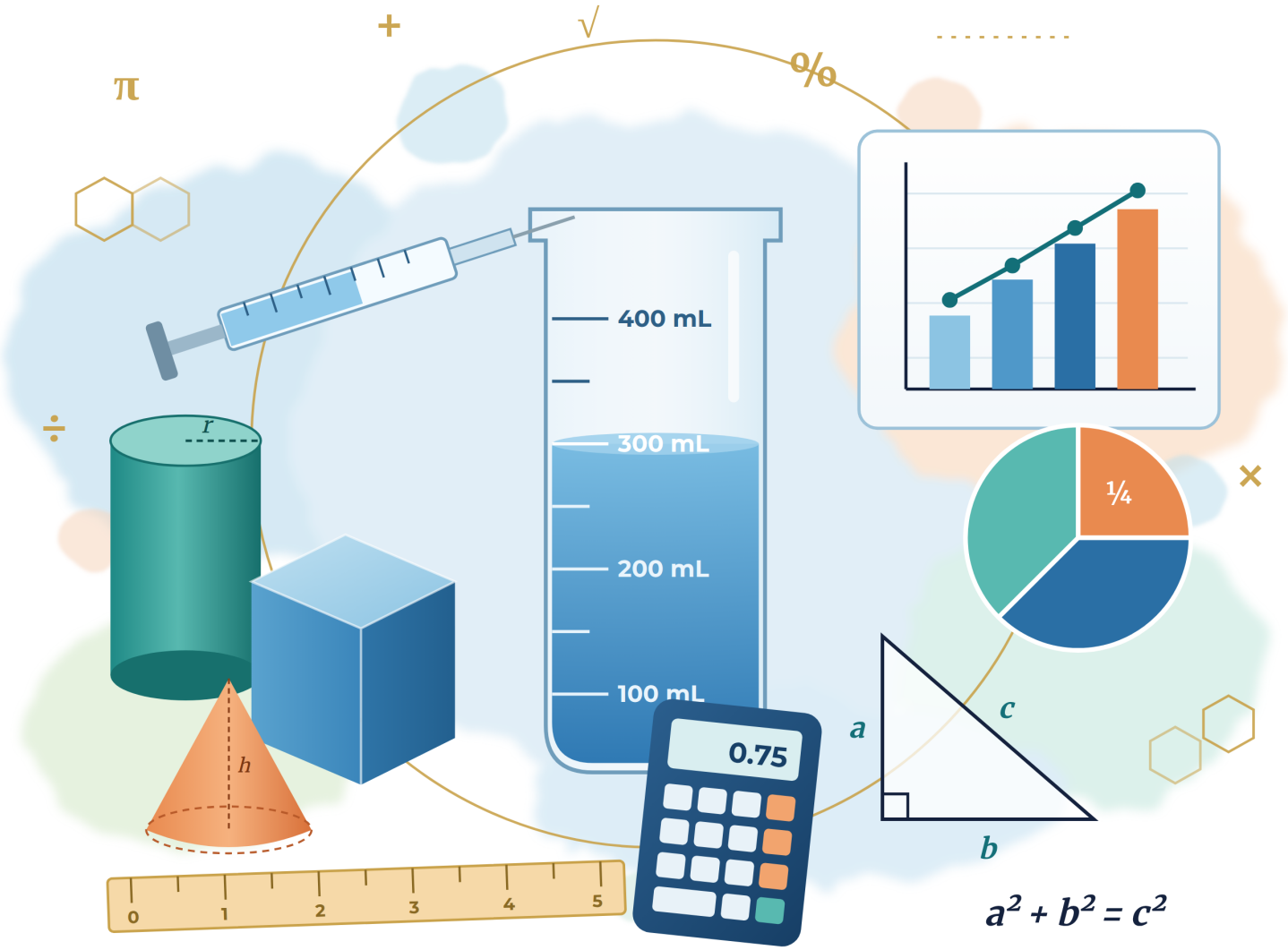
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380 Original Questions

Quick Math Review & Step-by-Step Explanations



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380 Original Questions with Step-by-Step Explanations and a Quick Math Review

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1.3 Operations with fractions

Add or subtract	common denominator first: $\frac{1}{3}+\frac{1}{4}=\frac{4}{12}+\frac{3}{12}=\frac{7}{12}$
Multiply	straight across: $\frac{2}{3}\times\frac{9}{10}=\frac{18}{30}=\frac{3}{5}$
Divide	multiply by the reciprocal: $\frac{3}{4}\div\frac{3}{8}=\frac{3}{4}\times\frac{8}{3}=2$
Mixed numbers	convert to improper fractions before multiplying or dividing

Try it: $2\frac{1}{2}\times1\frac{1}{3}$

Answer: $\frac{5}{2}\times\frac{4}{3}=\frac{20}{6}=3\frac{1}{3}$.

Watch out: never add denominators: $\frac{1}{3}+\frac{1}{4}\neq\frac{2}{7}$; and $2\frac{1}{2}\times1\frac{1}{3}$ is not $2\times1+\frac{1}{2}\times\frac{1}{3}$.

1.4 Fractions, decimals, and percents

Fraction → decimal	divide: $\frac{3}{8}=3\div8=0.375$
Decimal → percent	move the point 2 places right: $0.375=37.5\%$
Percent → decimal	move the point 2 places left: $6\%=0.06$
Decimal → fraction	read the place value: $0.45=\frac{45}{100}=\frac{9}{20}$

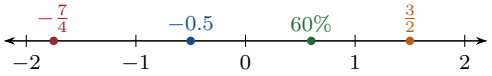
Worth memorizing:

$\frac{1}{2}=0.5=50\%$	$\frac{1}{4}=0.25=25\%$	$\frac{3}{4}=0.75=75\%$	$\frac{1}{5}=0.2=20\%$
$\frac{1}{8}=0.125$	$\frac{3}{8}=0.375$	$\frac{1}{3}\approx0.333$	$\frac{2}{3}\approx0.667$

Watch out: 0.5% is 0.005, not 0.5.

1.5 Comparing and ordering numbers

Put every value in the same form (usually decimals), then line them up.



Try it: *Order* $\frac{3}{4}$, 0.7, 72%, $\frac{5}{7}$ *from least to greatest.*

Answer: $0.75,\ 0.70,\ 0.72,\ 0.714\rightarrow0.7,\ \frac{5}{7},\ 72\%,\ \frac{3}{4}$.

Watch out: with negatives, the number farther from zero is *smaller*: $-\frac{7}{4}<-0.5$.

1.6 Decimals

- **Add or subtract:** line up the decimal points; fill empty places with zeros ($4.5-1.25=4.50-1.25=3.25$).
- **Multiply:** multiply as whole numbers, then count the decimal places in both factors: $0.3\times0.02=0.006$ (three places).
- **Divide by a decimal:** move the point in both numbers until the divisor is whole: $4.2\div0.06=420\div6=70$.
- $\times10$, $\times100$, $\times1000$: move the point 1, 2, 3 places right; divide: move it left.

Watch out: multiplying by a number less than 1 makes the result *smaller*; dividing by it makes the result larger.

1.7 Negative numbers and absolute value

Same signs, add	keep the sign: $-4+(-6)=-10$
Different signs, add	subtract, keep the sign of the greater absolute value: $-9+4=-5$
Subtract	add the opposite: $3-(-8)=3+8=11$
Multiply or divide	same signs +, different signs −

Absolute value is distance from zero: $|-7|=7$. On a temperature or elevation question, the change from $-5°$ to $12°$ is $12-(-5)=17°$.

Watch out: $-3^2=-9$, but $(-3)^2=9$; the exponent applies only to what it touches.

1.8 Order of operations

PEMDAS: Parentheses, Exponents, Multiplication and Division *left to right*, Addition and Subtraction *left to right*. A fraction bar and a square root group everything under them.

Try it: $20-2(1+3)^2\div4$

Answer: $4^2=16$; $2\times16=32$; $32\div4=8$; $20-8=12$.

Watch out: $12\div3\times2=8$, not 2: multiplication does not come before division; work left to right.

1.9 Exponents, roots, and scientific notation

- $a^m\cdot a^n=a^{m+n}$; $\frac{a^m}{a^n}=a^{m-n}$ for $a\neq0$; $(a^m)^n=a^{mn}$; $a^0=1$ for $a\neq0$.
- Perfect squares to know: $1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144$. $\sqrt{50}$ is between 7 and 8 (closer to 7).
- **Scientific notation:** $4{,}500=4.5\times10^3$; $0.0032=3.2\times10^{-3}$ (a negative exponent means a small number).

Watch out: 3^4 means $3\times3\times3\times3=81$, not 3×4.

1.10 Percent basics

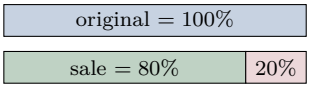
Every percent problem is **part = percent × whole**. Decide which number is the whole, then solve for the missing piece.

Find the part	15% of 80: $0.15 \times 80 = 12$
Find the percent	12 is what % of 80? $12 \div 80 = 0.15 = 15\%$
Find the whole	12 is 15% of what? $12 \div 0.15 = 80$

Quick mental math: 10% = move the point one place left; 5% = half of that; 1% = move it two places.

Watch out: "what percent of A is B" divides by A (the number after "of").

1.11 Percent change, discounts, tax, and interest



a 20% discount leaves 80% of the price

Percent change	$\dfrac{\text{new} - \text{original}}{\text{original}} \times 100\%$
Discount / markup	price $\times(1 - r)$ / price $\times(1 + r)$
Tax, tip	total = price $\times(1 + t)$
Original price	original = sale price $\div(1 - r)$
Simple interest	$I = Prt$ (r as a decimal, t in years)

Try it: *A \$56 bag is 10% off, then 8% tax is added.*

Answer: $56 \times 0.90 = 50.40$; $50.40 \times 1.08 = \$54.43$.

Watch out: a 10% discount then 8% tax is not a 2% discount; and a 50% rise followed by a 50% drop does not return to the start.

1.12 Ratios and rates

- A ratio of $2 : 7$ has $2 + 7 = 9$ parts. In a group of 63, one part is $63 \div 9 = 7$, so the groups are 14 and 49.
- **Unit rate** = amount for one unit: \$7.20 for 8 items is \$0.90 each; 150 miles in 2.5 hours is 60 mi/h.
- **Best buy:** compare unit prices, not package prices.
- distance = rate × time.

Watch out: a part-to-part ratio ($2 : 7$) is not a part-to-whole fraction; the fraction of the first group is $\frac{2}{9}$.

1.13 Proportions and scale drawings

Set up two equal ratios with the *same units in the same positions*, then cross-multiply:

$$\frac{3 \text{ nurses}}{20 \text{ patients}} = \frac{x \text{ nurses}}{140 \text{ patients}} \quad \Rightarrow \quad 20x = 420,\ x = 21.$$

Try it: *A scale of $\frac{1}{4}$ in = 2 ft. A wall is $3\frac{1}{2}$ in on the plan.*

Answer: $3.5 \div 0.25 = 14$ quarter-inches; $14 \times 2 = 28$ ft.

Watch out: flipping one ratio but not the other; check that the answer is sensible (more patients need *more* nurses).

1.14 Dosage and clinical calculations

Formula method: $\dfrac{\text{ordered dose}}{\text{dose on hand}} \times$ quantity on hand.

Try it: *Order: 150 mg. On hand: 25 mg per 5 mL.*

Answer: $\frac{150}{25} \times 5 = 30$ mL.

- **Weight-based:** convert pounds to kilograms first (1 kg ≈ 2.2 lb), then multiply by the mg/kg order. A 33-lb child is 15 kg; at 20 mg/kg that is 300 mg.
- **Divided doses:** a daily total "divided into 3 doses" means divide by 3.
- **IV rate:** mL/h = total mL ÷ hours (1,800 mL over 12 h = 150 mL/h).

Watch out: mixing units: convert so the order and the supply use the same unit (0.3 g = 300 mg) before dividing.

1.15 Expressions

- **Evaluate:** substitute, then follow the order of operations. If $x = -2$, $3x^2 - x = 3(4) + 2 = 14$.
- **Like terms** have the same variable and exponent: $4x + 7 - x + 2 = 3x + 9$.
- **Distribute** to every term inside: $-2(3x - 5) = -6x + 10$.

Watch out: substituting a negative without parentheses: $3(-2)^2 = 12$, but $3 \cdot -2^2$ is read as -12.

1.16 Solving equations

Undo operations in reverse order, doing the same thing to both sides. Distribute first, then collect the variable on one side.

Try it: $4(x + 2) = x + 17$

Answer: $4x + 8 = x + 17$; $3x = 9$; $x = 3$.

Fractions in an equation: multiply every term by the common denominator: $\frac{x}{3} + 2 = \frac{5}{6}x$ becomes $2x + 12 = 5x$, so $x = 4$.

Check: put the answer back into the original equation.

Watch out: distribute to *every* term: $4(x + 2) = 4x + 8$, not $4x + 2$.

1.17 Inequalities

Solve like an equation, but *flip the sign* when you multiply or divide both sides by a negative number: $-3x > 12 \Rightarrow x < -4$.



open circle: $<$ or $>$ closed circle: $\leq$ or $\geq$

Words: "at least" $\geq$; "at most," "no more than" $\leq$; "more than" $>$; "fewer than" $<$.

Watch out: "at least 18" includes 18 (closed circle, $\geq$).

1.18 Translating words into math

sum, more than, increased by, total	$+$
difference, less than, decreased by	$-$ ("5 less than n" is $n-5$)
product, of, times, twice	$\times$
quotient, per, ratio, divided by	$\div$
is, equals, results in	$=$

Try it: *A phone plan costs \$30 a month plus \$0.05 per minute. Write the cost for m minutes.*

Answer: $C = 30 + 0.05m$.

Watch out: order matters for subtraction and division: "n less than 12" is $12 - n$, and "the quotient of n and 3" is $\frac{n}{3}$.

1.19 Estimation and rounding

To round, look only at the digit just right of the target place: 5 or more rounds up. $3.846 \approx 3.85$ (hundredths) ≈ 3.8 (tenths).

Estimate first with friendly numbers to catch keying errors: $612.4 \div 29.8 \approx 600 \div 30 = 20$.

Watch out: whole items such as boxes or buses round *up* when you need enough, and *down* when you must stay within a budget. Medication amounts follow the stated dose, available strength, and rounding instructions.

1.20 Multi-step word problems

- Underline the question and its unit; list what is given.
- Write each step with its unit: *total cost* → *minus coupon* → *plus tax*.
- Compare your answer with the question: did it ask for the total, the difference, or the amount *per person*?

Try it: *Three friends split a \$84 bill after a 15% tip is added.*

Answer: $84 \times 1.15 = 96.60$; $96.60 \div 3 = \$32.20$ each.

Watch out: stopping one step early—many wrong choices are the correct result of a middle step.

2 Measurement and Data

16 of 34 scored questions

2.1 Tables and two-way tables

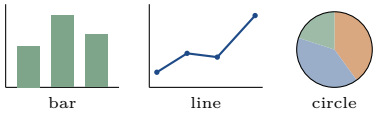
Read the title, the row and column labels, and the units first. Totals sit in the last row and column.

	Passed	Did not	**Total**
Attended	36	9	45
Skipped	21	14	35
Total	57	23	80

"Of those who attended, what percent passed?" $36 \div 45 = 80\%$. "Of those who passed, what percent attended?" $36 \div 57 \approx 63\%$.

Watch out: using the wrong total: the group named after "of" is the denominator.

2.2 Graphs and charts



- **Bar graphs** compare amounts; **line graphs** show change over time; **circle graphs** show parts of a whole.
- Check the **scale**: one gridline may stand for 2, 5, or 1,000 units.
- **Circle graph:** part = percent × total; the angle of a sector = percent $\times 360^\circ$ ($25\% \to 90^\circ$).
- **Histogram:** bars show how many values fall in each interval; the bars touch.
- **Pictograph:** read the key (one symbol = 10 patients).

Watch out: a bar graph whose axis starts above zero exaggerates differences; read the values, not the bar lengths.

2.3 Mean, median, mode, and range

Mean	sum ÷ number of values
Median	middle value *after sorting*; for an even count, average the two middle values
Mode	most frequent value (there can be none, or more than one)
Range	greatest − least

Missing value: needed sum = mean × count; subtract the known values.

Try it: *Scores 76, 83, 90, 71. What fifth score makes the mean 81?*

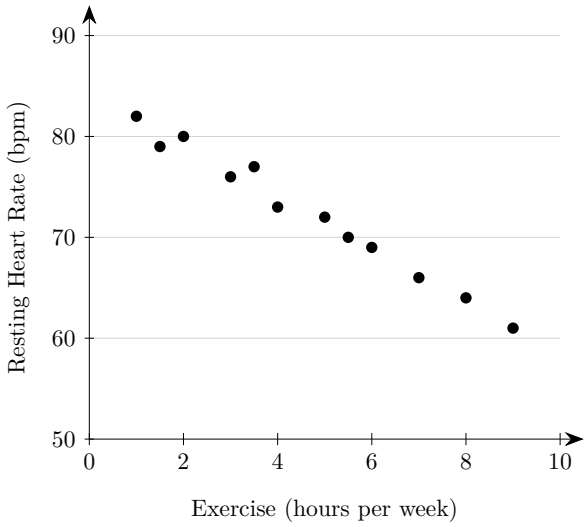
Answer: $81 \times 5 = 405$; $405 - 320 = 85$.

Watch out: finding the median without sorting the data first.

20) On a floor plan, 1.5 inches represents 20 feet. A hallway measures 7.5 inches on the plan. What is the actual length of the hallway?

(A) 225 feet
(B) 150 feet
(C) 100 feet
(D) 4 feet

21) The scatterplot shows the number of hours of exercise per week and the resting heart rate, in beats per minute, for 12 adults. Which statement best describes the relationship shown?

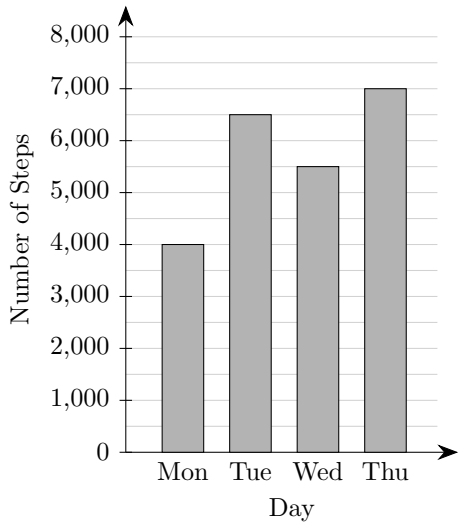


(A) As weekly exercise increases, resting heart rate tends to increase.
(B) As weekly exercise decreases, resting heart rate tends to decrease.
(C) There is no relationship between weekly exercise and resting heart rate.
(D) As weekly exercise increases, resting heart rate tends to decrease.

22) A bookstore orders 38 notebooks at $4.89 each. The buyer estimates the cost by rounding the number of notebooks to the nearest ten and the price to the nearest dollar. What is the estimated cost?

(A) $200
(B) $190
(C) $186
(D) $160

23) The bar graph shows the number of steps a patient walked on four days. How many more steps did the patient walk on Thursday than on Monday?



(A) 500
(B) 1,500
(C) 2,500
(D) 3,000

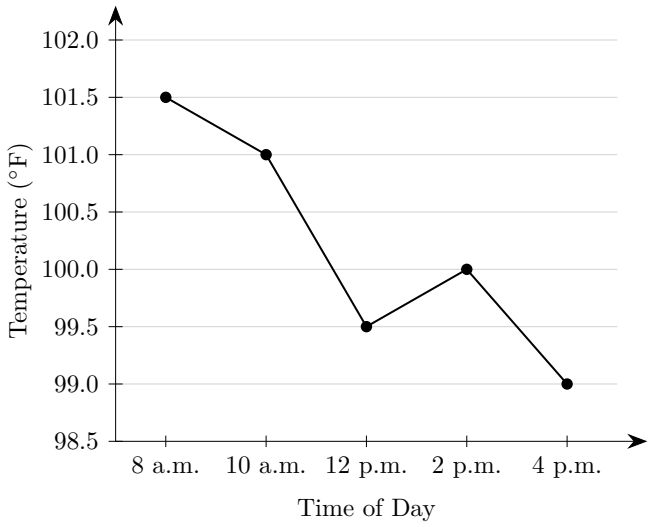
24) Which expression represents the phrase "12 less than the quotient of n and 5"?

(A) $12 - \frac{n}{5}$
(B) $\frac{n}{5} - 12$
(C) $\frac{5}{n} - 12$
(D) $\frac{n-12}{5}$

25) A rectangular classroom is 14 feet long and 9 feet wide. What is the perimeter of the room?

(A) 23 feet
(B) 37 feet
(C) 46 feet
(D) 126 feet

26) The line graph shows a patient's temperature, in degrees Fahrenheit, recorded every 2 hours. During which 2-hour period did the patient's temperature drop the most?



(A) 8 a.m. to 10 a.m.
(B) 10 a.m. to 12 p.m.
(C) 12 p.m. to 2 p.m.
(D) 2 p.m. to 4 p.m.

27) A patient is 5 feet 8 inches tall. What is the patient's height in centimeters, rounded to the nearest centimeter? (Use 1 inch = 2.54 centimeters.)

(A) 27 cm
(B) 147 cm
(C) 152 cm
(D) 173 cm

28) What is the value of $18 - 3(4 + 2)^2 \div 9$?

(A) -18
(B) 6
(C) 12
(D) 60

29) A storage box is 12 inches long, 8 inches wide, and 5 inches tall. What is the volume of the box?

(A) 25 cubic inches
(B) 96 cubic inches
(C) 240 cubic inches
(D) 480 cubic inches

30) Which of the following measurements are equal to 1.5 kilograms? Select all that apply. (Use 1 kg = 2.2 lb.)

☐ A. 1,500 grams
☐ B. 150 grams
☐ C. 1,500,000 milligrams
☐ D. 15,000 milligrams
☐ E. 3.3 pounds