Apprentice Gas Technician Test (AGT)

Preparation Guide
SAMPLE TEST
GAS TECHNICIAN APPRENTICE ENTRANCE EXAM

1. Multiply and simplify.
\[
\frac{3x^4}{4} \cdot \frac{-8x}{9x^3} \Rightarrow
\]

2. Divide and simplify.
\[
\frac{12y}{5y^3} \div \frac{6}{15y^3} \Rightarrow
\]

3. If Rick wants to cut a 10’ stick of conduit into 6 equal lengths, what length must be cut? Express your answer in feet and inches.

\[
10’ ÷ 6 =\]

Each piece would measure 1’-8”

4. Subtract and simplify.
\[
15-2/3 - 3-1/2
\]
5. Simplify
\[ \frac{x^3 y}{y x^2} \Rightarrow \]

\[ \left( \frac{6y}{9y^3} \right)^2 \Rightarrow \]

7. Find the parameter of the shape below:

Parameter =

(Two semicircles +
	two legs for
	rectangle)

8. What is the tax percentage if an item costs $14.50 but you are charged $15.00?

\[ \% = \frac{15.00 - 14.50}{14.50} = \]
9. Subtract:

\[
\frac{4x}{3} - \frac{x}{6} = 
\]

10. Solve for variable and simplify:

\[3y - 8 = 16\]

11. Multiply:

\[4 \left(3x^2 - 2x + 1\right) \Rightarrow \]

12. Multiply:

\[(2x - 1)(3x + 2) = \]

13. Find the area of the triangle.

Area = 
Area = 
Area =
14. Find the area for the circle:

![Diagram of a circle with radius R = 8 feet]

15. Using Pythagorean Theorem \((c^2 = a^2 + b^2)\) find the length of \(a\).

![Diagram of a right triangle with sides b = 12, c = 18, and unknown a]

\(a = ?\)

16. If a bike wheel is 26" in diameter, how far will it travel in 10 revolutions?
17. Find the volume of 1" pipe that is 10' long? I.D. of pipe is ¾ inches.

18. The two rectangles shown are similar. Find the width of the smaller rectangle.
19. Jim is going to pour a concrete patio. The patio is 15' x 25'. There is a tree in the middle that requires a 4' diameter opening. How many yards of concrete will Jim need if the patio is 6" thick?
SOLUTIONS TO
AGT PREPARATION GUIDE
Key

SAMPLE TEST
GAS TECHNICIAN APPRENTICE ENTRANCE EXAM

1. Multiply and simplify.

\[
\frac{3x^4}{4} \cdot \frac{-8x}{9x^3} = \frac{2 \cdot x \cdot x \cdot x \cdot x}{2 \cdot 2} \cdot \frac{-2 \cdot 2 \cdot 2 \cdot x}{3 \cdot 3 \cdot x \cdot x} \\
= \frac{2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot x \cdot x}{3 \cdot 3 \cdot x \cdot x} \\
\Rightarrow \frac{-2 \cdot x \cdot x}{3} \Rightarrow \frac{-2x^2}{3}
\]

2. Divide and simplify.

\[
\frac{12y^3}{5y} \div \frac{6}{15y^3} = \frac{2 \cdot 2 \cdot 3 \cdot y}{5 \cdot y \cdot y \cdot y} \cdot \frac{3 \cdot 5 \cdot y \cdot y \cdot y \cdot y \cdot y}{2 \cdot 3} \Rightarrow \\
\frac{2 \cdot 2 \cdot 3 \cdot y \cdot y \cdot y \cdot y \cdot y}{5 \cdot y \cdot y \cdot y \cdot y \cdot y} \Rightarrow \frac{2 \cdot 3 \cdot y \cdot y \cdot y}{1} \Rightarrow 6y^3
\]

3. If Rick wants to cut a 10’ stick of conduit into 6 equal lengths, what length must he cut? Express your answer in feet and inches.

\[
10' \div 6 \Rightarrow \frac{10}{6} = \frac{10}{6} = \frac{5}{3} \text{ of a foot or } 1\frac{2}{3}
\]

\[
2/3 \text{ of } 12'' \Rightarrow \frac{4}{3} \Rightarrow \frac{2 \cdot 2 \cdot 2 \cdot 2}{3} = 8 \text{ inches}
\]

Each piece would measure 1’-8”

4. Subtract and simplify.

\[
15 - 2\frac{1}{3} - 3\frac{1}{2}
\]

\[
15 - 3\frac{1}{2} \Rightarrow \frac{47}{3} - \frac{2}{3} \Rightarrow \frac{94}{6} \\
\frac{94 - 21}{6} \Rightarrow \frac{73}{6} \Rightarrow 12\frac{1}{6}
\]
5. Simplify
\[ \frac{x^2y}{xy} \Rightarrow \frac{x \times x \times y}{x \times y \times y \times y} \Rightarrow \frac{x}{y \times y} \Rightarrow \frac{x^2}{y^3} \]

6. Simplify,
\[ \left( \frac{6x}{9y^3} \right)^2 \Rightarrow \frac{36x^2}{81y^6} \Rightarrow \frac{2x^2 \times 3x \times 3y \times 3y}{3 \times 3 \times 3 \times 3y \times y \times y \times y} \]
\[ \frac{2 \times 2}{3 \times 3 \times 3 \times 3y \times y \times y} \Rightarrow \frac{4}{9y^3} \]

7. Find the perimeter of the shape below:

[Diagram of a shape with a semicircle and a rectangle]

Parameter = \((\text{Two semicircle} + \text{two legs for rectangle})\)

Parameter = \((2 \times \pi r) + (2 \times 10")\)

\[ = \left(2 \times \pi (6") \right) + 20" = (2\pi \times 3) + 20" \]

\[ = 38.85" \]

8. What is the tax percentage if an item costs $14.50 but you are charged $15.00?

\[ \% = \frac{15.00 - 14.50}{14.50} = .0345 \]

\[ .0345 \times 100 = 3.45\% \]
9. Subtract:
\[
\frac{4x}{3} - \frac{x}{6} = \frac{4x - \frac{x}{6}}{3} = \frac{4x}{3} \cdot \frac{2}{2} = \frac{8x}{6}.
\]

10. Solve for variable and simplify:
\[
3y - 8 = 16 \quad \Rightarrow \quad 3y - 8 + 8 = 16 + 8
\]
\[
3y = 24 \quad \Rightarrow \quad \frac{3y}{3} = \frac{24}{3} \quad \Rightarrow \quad \frac{y}{3} = \frac{8}{3}.
\]
\[
y = 8
\]

11. Multiply:
\[
4(3x^2 - 2x + 1) \quad \Rightarrow \quad 4 \cdot 3x^2 - 4 \cdot 2x + 4 \cdot 1
\]
\[
12x^2 - 8x + 4
\]

12. Multiply:
\[
(2x - 1)(3x + 2) \quad \Rightarrow \quad 2x \cdot 3x + 2x \cdot 2 - 1 \cdot 3x - 1 \cdot 2
\]
\[
= 6x^2 + 4x - 3x - 2
\]
\[
= 6x^2 + x - 2
\]

13. Find the area of the triangle.

Area = \(\frac{1}{2} \cdot \text{b} \cdot \text{h}\)

Area = \(\frac{1}{2} \cdot (24'' \cdot 12'')\)

Area = 144 \text{ in}^2
14. Find the area for the circle:

\[
\text{Area} = \pi r^2
\]

\[
\text{Area} = \pi (8')^2
\]

\[
\text{Area} = \pi 64
\]

\[
\text{Area} = 201 \text{ ft}^2
\]

15. Using Pythagorean Theorem \(c^2 = a^2 + b^2\) find the length of \(a\).

\[
b = 12
\]

\[
c = 18
\]

\[
c^2 = a^2 + b^2
\]

\[
a^2 = c^2 - b^2
\]

\[
a = \sqrt{c^2 - b^2}
\]

\[
a = \sqrt{(18)^2 - (12)^2}
\]

\[
a = 13.4
\]

16. If a bike wheel is 26” in diameter, how far will it travel in 10 revolutions?

- One revolution = circumference of wheel
- Circumference = \(2\pi r\) or \(\pi d = (26\text{”})\pi\)
- Circumference = 81.68 inches

Total Distance = 10 x one revolution

Total Distance = 10 x (81.68”)

= 816.8 inches
17. Find the volume of 1" pipe that is 10' long? I.D. of pipe is 3/4 inches.

\[
\text{Volume} = \text{Volume of a cylinder} = \text{Area circle} \times \text{height}
\]

\[
\text{Area of circle} = \pi r^2 \quad \text{or} \quad \pi \frac{d^2}{2}
\]

\[
\text{Area of circle} = \pi \left(\frac{3}{4}\right)^2 = \frac{0.4418}{2} \text{ in}^2
\]

\[
\text{Height} = 10' \quad \text{convert to inches}
\]

\[
10' \times 12'' = 120''
\]

\[
\text{Volume} = \text{Area O} \times \text{Height} = 0.4418 \times 120
\]

\[
\text{Volume} = 53.0 \text{ in}^3
\]

18. The two rectangles shown are similar. Find the width of the smaller rectangle.

\[
\frac{8}{20} = \frac{W}{5}
\]

\[
5 \times 8 = \frac{W}{20}
\]

\[
W = \frac{40}{20} \Rightarrow W = 2
\]
19. Jim is going to pour a concrete patio. The patio is 15' x 25'. There is a tree in the middle that requires a 4' diameter opening. How many yards of concrete will Jim need if the patio is 6" thick?

\[ \text{Volume} = \text{Area} \times \text{Thickness} = 362.4 \text{ ft}^2 \times \frac{1}{2} \text{ ft} \]

\[ \text{Volume} = 181.2 \text{ ft}^3 \]

Yards of Concrete \( \Rightarrow \) 27 \( \text{ft}^3 \) per yard

Total Yards of Concrete = \( \frac{\text{Volume}}{27} \)

\[ \frac{181.2 \text{ ft}^3}{27} \]

\[ = 6.7 \text{ yards of concrete} \]