



*Pacific Gas and
Electric Company®*

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.

$$\frac{12y}{5y^3} \div \frac{6}{15y^5} \Rightarrow$$

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.

$$10' \div 6 =$$

Each piece would measure 1'-8"

4. Subtract and simplify.

$$15\frac{2}{3} - 3\frac{1}{2}$$

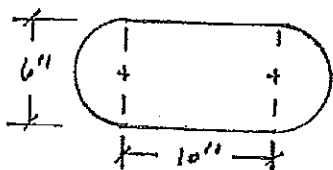
5. Simplify

$$\frac{x^3y}{xy^5} \Rightarrow$$

6. Simplify.

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

7. Find the parameter of the shape below:



Parameter =

$$\text{Parameter} = \left(+ \quad \text{---} \quad + \right)$$

(Two semicircle +
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:

$$3y - 8 = 16$$

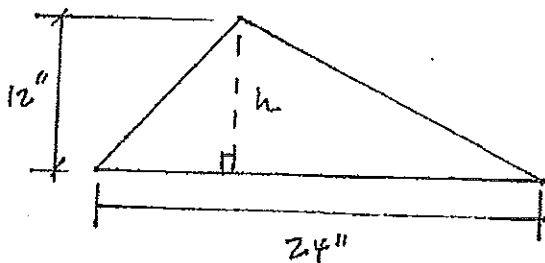
11. Multiply:

$$4(3x^2 - 2x + 1) \Rightarrow$$

12. Multiply:

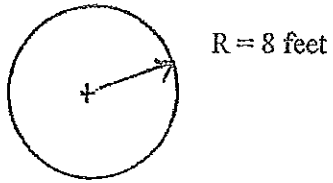
$$(2x - 1)(3x + 2) =$$

13. Find the area of the triangle.

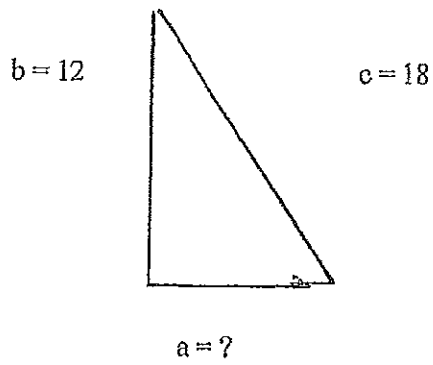


Area =
Area =
Area =

14. Find the area for the circle:



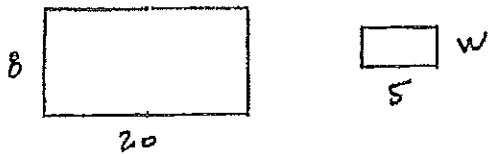
15. Using Pythagorean Theorem ($c^2 = a^2 + b^2$) find the length of a.



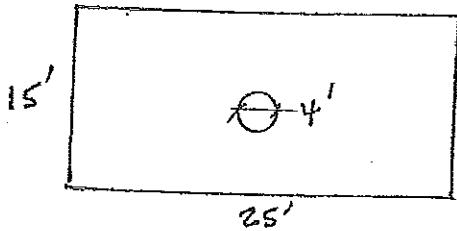
16. If a bike wheel is 26" in diameter, how far will it travel in 10 revolutions?

17. Find the volume of 1" pipe that is 10' long? I.D. of pipe is $\frac{3}{4}$ 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.

$$\frac{3x^4}{4} \cdot \frac{-8x}{9x^3} \Rightarrow \frac{3 \cdot x \cdot x \cdot x \cdot x}{2 \cdot 2} \cdot \frac{-2 \cdot 2 \cdot 2 \cdot x}{3 \cdot 3 \cdot x \cdot x \cdot x}$$
$$= \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{2} \cdot \cancel{2} \cdot 3 \cdot 3 \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} \Rightarrow \frac{-2 \cdot x \cdot x}{3} \Rightarrow \frac{-2x^2}{3}$$

2. Divide and simplify.

$$\frac{12y}{5y^3} \div \frac{6}{15y^5} \Rightarrow \frac{2 \cdot 2 \cdot 3 \cdot y}{5 \cdot y \cdot y \cdot y} \cdot \frac{3 \cdot 5 \cdot y \cdot y \cdot y \cdot y \cdot y}{2 \cdot 3} \Rightarrow$$
$$\frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{5} \cdot y \cdot y \cdot y \cdot y \cdot y}{\cancel{2} \cdot \cancel{2} \cdot \cancel{5} \cdot \cancel{3} \cdot y \cdot y \cdot y} \Rightarrow \frac{2 \cdot 3 \cdot y \cdot y \cdot y}{1} \Rightarrow 6y^3$$

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

$$10' \div 6 \Rightarrow \frac{10}{6} = \frac{\cancel{2} \cdot 5}{\cancel{2} \cdot 3} = \frac{5}{3} \text{ of a foot or } 1\text{-}2/3'$$

$$2/3 \text{ of } 12'' \Rightarrow \frac{24}{3} \Rightarrow \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{3}}{\cancel{3}} = 8 \text{ inches}$$

Each piece would measure 1'-8"

4. Subtract and simplify.

$$15\text{-}2/3 - 3\text{-}1/2$$

$$15\text{ } 2/3 - 3\text{ } 1/2 \Rightarrow - \frac{47}{3} - \frac{2}{3} \Rightarrow - \frac{94}{6}$$
$$\frac{47}{3} = \frac{47 \cdot 2}{3 \cdot 2} = \frac{94}{6}$$
$$\frac{2}{3} = \frac{2 \cdot 2}{3 \cdot 2} = \frac{4}{6}$$

$$\frac{94-21}{6} \Rightarrow \frac{73}{6} \Rightarrow 12\text{-}1/6$$

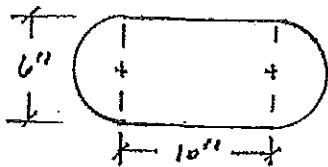
5. Simplify

$$\frac{x^3 y}{xy^5} \Rightarrow \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{y}}{\cancel{x} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y}} \Rightarrow \frac{x \cdot x}{y \cdot y \cdot y \cdot y} \Rightarrow \frac{x^2}{y^4}$$

6. Simplify.

$$\left(\frac{6y}{9y^3}\right)^2 \Rightarrow \frac{36y^2}{81y^6} \Rightarrow \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{y} \cdot \cancel{y}}{\cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y}} \\ \frac{2 \cdot 2}{3 \cdot 3 \cdot y \cdot y \cdot y \cdot y} \Rightarrow \frac{4}{9y^4}$$

7. Find the parameter of the shape below:



$$\text{Parameter} = \left(+ \quad \quad + \right)$$

(Two semicircle +
two legs for
rectangle)

$$\text{Parameter} = (2 \times \pi r) + (2 \times 10'')$$

$$= \left[\frac{2 \times \pi (6'')}{2} \right] + 20'' = (2\pi \times 3) + 20''$$

$$= 38.85''$$

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:

$$\frac{4x}{3} - \frac{x}{6} = \frac{4x}{3} \cdot \frac{2}{2} = \frac{8x}{6} - \frac{x}{6} = \frac{7x}{6}$$

$$\frac{8x}{6} - \frac{x}{6} = \frac{7x}{6}$$

10. Solve for variable and simplify:

$$3y - 8 = 16 \Rightarrow 3y - 8 + 8 = 16 + 8$$

$$3y = 24 \Rightarrow \frac{3y}{3} = \frac{24}{3} \Rightarrow \frac{3 \cdot 8}{3} \\ y = 8$$

11. Multiply:

$$4(3x^2 - 2x + 1) \Rightarrow 4 \cdot 3x^2 - 4 \cdot 2x + 4 \cdot 1$$

$$12x^2 - 8x + 4$$

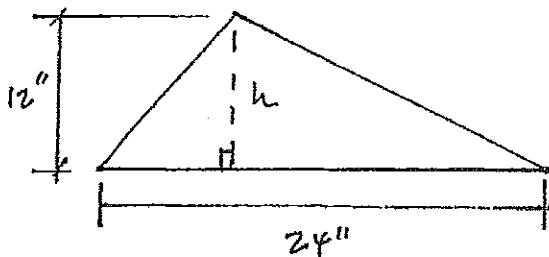
12. Multiply:

$$(2x - 1)(3x + 2) \Rightarrow 2x \cdot 3x + 2x \cdot 2 - 1 \cdot 3x - 1 \cdot 2$$

$$= 6x^2 + 4x - 3x - 2$$

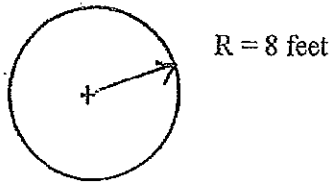
$$= 6x^2 + x - 2$$

13. Find the area of the triangle.



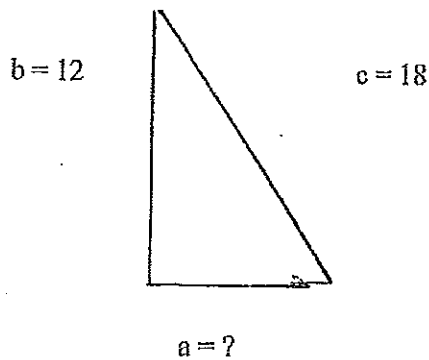
$$\begin{aligned} \text{Area} &= \frac{1}{2} b \cdot h \\ \text{Area} &= \frac{1}{2} \cdot (24'') \cdot (12'') \\ \text{Area} &= 144 \text{ in}^2 \end{aligned}$$

14. Find the area for the circle:



$$\begin{aligned} \text{Area} &= \pi r^2 \\ \text{Area} &= \pi (8')^2 \\ \text{Area} &= \pi 64 \\ \text{Area} &= 201 \text{ ft}^2 \end{aligned}$$

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



$$\begin{aligned} c^2 &= a^2 + b^2 \\ a^2 &= c^2 - b^2 \end{aligned}$$

$$a = \sqrt{c^2 - b^2}$$

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

$$a = 13.4$$

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

$$\begin{aligned} \text{One revolution} &= \text{circumference of wheel} \\ \text{Circumference} &= 2\pi r \text{ or } \pi d = (26'')\pi \\ \text{Circumference} &= 81.68 \text{ inches} \end{aligned}$$

$$\text{Total Distance} = 10 \times \text{one revolution}$$

$$\text{Total Distance} = 10 \times (81.68'')$$

$$= 816.8 \text{ inches}$$

17. Find the volume of 1" pipe that is 10' long? I.D. of pipe is $\frac{3}{4}$ inches.

Volume = Volume of a cylinder = Area circle x height

$$\text{Area of circle} = \pi r^2 \text{ or } \pi \frac{d^2}{4}$$

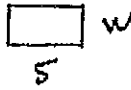
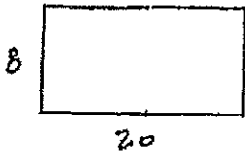
$$\text{Area of circle} = \pi \frac{(.75)^2}{4} = 0.4418 \text{ in}^2$$

Height = 10' convert to inches

$$10' \times \frac{12''}{1'} = 120''$$

$$\begin{aligned} \text{Volume} &= \text{Area O} \times \text{Height} = 0.4418 \times 120 \\ \text{Volume} &= 53.0 \text{ in}^3 \end{aligned}$$

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



$$\frac{8}{20} = \frac{W}{5}$$

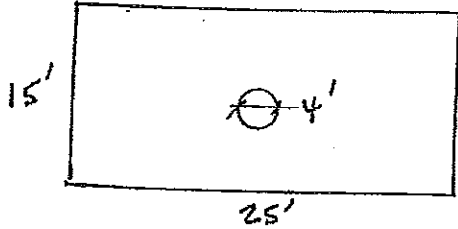
$$5 \cdot \frac{8}{20} = \frac{W}{5} \cdot \cancel{5}$$

$$W = \frac{40}{20}$$

\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?



$$\text{Area} = \square - \text{O}$$

$$\text{Area} \square = W \times L = 15' \times 25'$$

$$\text{Area} \square = 375 \text{ ft}^2$$

$$\text{Area O} = \pi r^2 = \pi \frac{(D)^2}{4} \Rightarrow \pi \frac{(4)^2}{4} = \pi 4 = 12.6 \text{ ft}^2$$

$$\text{Total Area} = \square - \text{O} = 375 \text{ ft}^2 - 12.6 \text{ ft}^2$$

$$\text{Total Area} = 362.4 \text{ ft}^2$$

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

$$\text{Volume} = 181.2 \text{ ft}^3$$

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

$$\text{Total Yards of Concrete} = \frac{\text{Volume}}{27} = \frac{181.2 \text{ ft}^3}{27}$$

$$= 6.7 \text{ yards of concrete}$$