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' ÷ 6 =

Each piece would measure 1'-8"

4. Subtract and simplify.

15-2/3 – 3-1/2

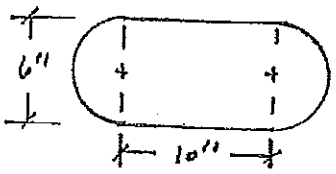
5. Simplify

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

6. Simplify.

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

7. Find the perameter of the shape below:



Parameter =

Parameter = (+ ___ +)

(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:

$3y - 8 = 16$

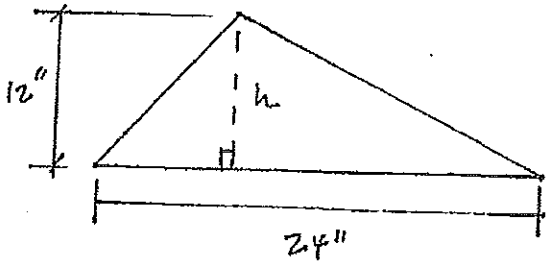
11. Multiply:

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

12. Multiply:

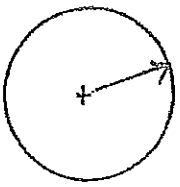
$(2x - 1)(3x + 2) =$

13. Find the area of the triangle.



Area =
Area =
Area =

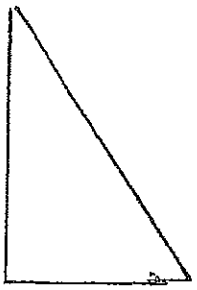
14. Find the area for the circle:



R = 8 feet

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

b = 12



c = 18

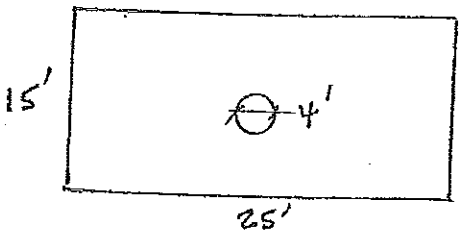
a = ?

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.

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

$$-\frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x}{\cancel{2} \cdot \cancel{2} \cdot 3 \cdot \cancel{3} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} \Rightarrow -\frac{2 \cdot x \cdot x}{3} \Rightarrow -\frac{2x^2}{3}$$

2. Divide and simplify.

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

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

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.

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

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

Each piece would measure 1'-8"

4. Subtract and simplify.

15-2/3 – 3-1/2

$$\begin{array}{l} 15\ 2/3 \\ -\ 3\ 1/2 \end{array} \Rightarrow -\frac{\frac{47}{3}}{\frac{7}{2}} - \frac{\frac{2}{2}}{\frac{3}{3}} \Rightarrow -\frac{\frac{94}{6}}{\frac{21}{6}}$$

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

5. Simplify

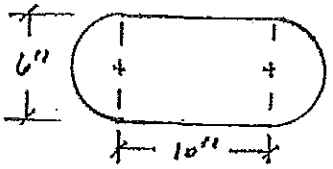
$$\frac{x^3y}{xy^3} \Rightarrow \frac{x \cdot x \cdot x \cdot y}{x \cdot y \cdot y \cdot y \cdot y \cdot y} \Rightarrow \frac{x \cdot x}{y \cdot y \cdot y \cdot y} \Rightarrow \frac{x^2}{y^4}$$

6. Simplify.

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

$$\frac{2 \cdot 2}{3 \cdot 3 \cdot y \cdot y \cdot y \cdot y} \Rightarrow \frac{4}{9y^4}$$

7. Find the perameter of the shape below:



Parameter = (+ ___ +)

(Two semicircle + two legs for rectangle)

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:

$$\frac{4x}{3} - \frac{x}{6} - \frac{4x}{3} \Rightarrow \frac{4x \cdot 2}{3 \quad 2} \Rightarrow \frac{8x}{6}$$

$$\frac{x}{6} \qquad \frac{x}{6} \qquad \frac{x}{6}$$

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

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:

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

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

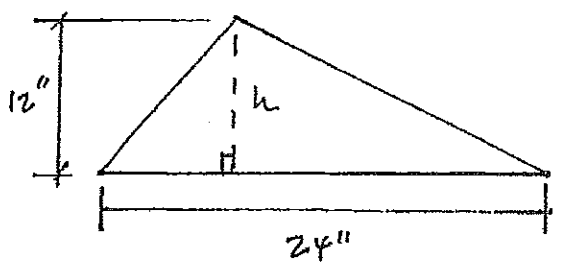
12. Multiply:

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

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

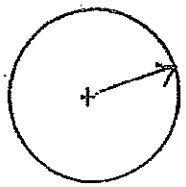
$$= 6x^2 + x - 2$$

13. Find the area of the triangle.



Area = ½ b · h
Area = ½ · (24") (12")
Area = 144 in^2

14. Find the area for the circle:

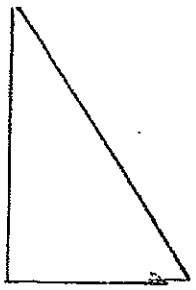


R = 8 feet

Area = πr^2
Area = $\pi (8')^2$
Area = $\pi 64$
Area = 201 ft^2

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

b = 12



c = 18

a = ?

$c^2 = a^2 + b^2$
$a^2 = c^2 - b^2$

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

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

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 $\pi d = (26")$
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 ¾ inches.

Volume = Volume of a cylinder = Area circle x height

Area of circle = πr^2 or $\pi \frac{d^2}{2}$

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

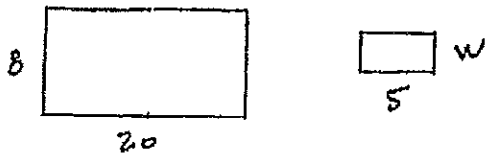
Height = 10' convert to inches

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

Volume = Area O x Height = 0.4418 x 120

Volume = 53.0 in^3

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

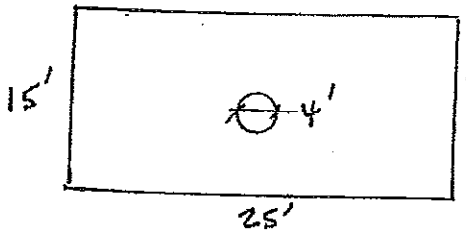


$\frac{8}{20} = \frac{W}{5}$

$5 \cdot \frac{8}{20} = \frac{W}{1} \cdot 5$

$W = \frac{40}{20} \Rightarrow W = 2$

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?



Area = □ - O

Area □ = W x L = 15' x 25'

Area □ = 375 ft²

Area O = πr^2 = $\pi \frac{(D)^2}{2}$ ⇒ $\pi \frac{(4)^2}{2}$ = $\pi 4$ = 12.6ft²

Total Area = □ - O = 375 ft² - 12.6 ft²

Total Area = 362.4 ft²

Volume = Area x Thickness = 362.4 ft² x ½ ft

Volume = 181.2 ft³

Yards of Concrete ⇒ 27 ft³ per yard

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

= 6.7 yards of concrete