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## **IMPORTANT**

If you have a learning or medical condition, you may request special accommodations. **Please contact the CALCS (Centre for Accessible Learning and Counselling Services) at 416-289-5000, ext. 3850 or email [calcs@centennialcollege.ca](mailto:calcs@centennialcollege.ca).** Students will meet with a CALCS Counsellor to discuss their concerns and make alternative arrangements for their skills assessments if special accommodations are approved.







**Students applying to multiple programs may only require one science exam to clear admission requirements. Please note that the Engineering Math skills assessment can clear admission requirements for Business and General Arts and Science programs.**

**On the date of your exam, please arrive on time. You will be required to show Government issued photo ID.**

Examples of acceptable photo ID are:

- **One of the following:** valid passport, driver's licence, age of majority cards, Canadian citizenship card, permanent resident card, provincial photo ID card, record of landing, certificate of status Indian card, minister's permit or a Centennial College student photo ID.

**Note:** The photo must not be older than ten years from time of issue.

- If you do not have any of the above then you may provide non-government issued photo ID. These could include other school photo ID, transit photo ID, or employment ID, **and one of the following:** birth certificate, citizenship certificate, or social insurance card.

**Please note:** students arriving without acceptable ID will not be allowed to write their skills assessment. There are no exceptions to this rule.

- Students write mathematics skills assessments online using Accuplacer (with the exception of CAAT D). Exam invigilators will

provide detailed instruction on how to sign on to the Accuplacer system. Students unfamiliar with computer technology are offered online tutorials explaining how to use a computer mouse and keyboard and how to take a multiple-choice exam.

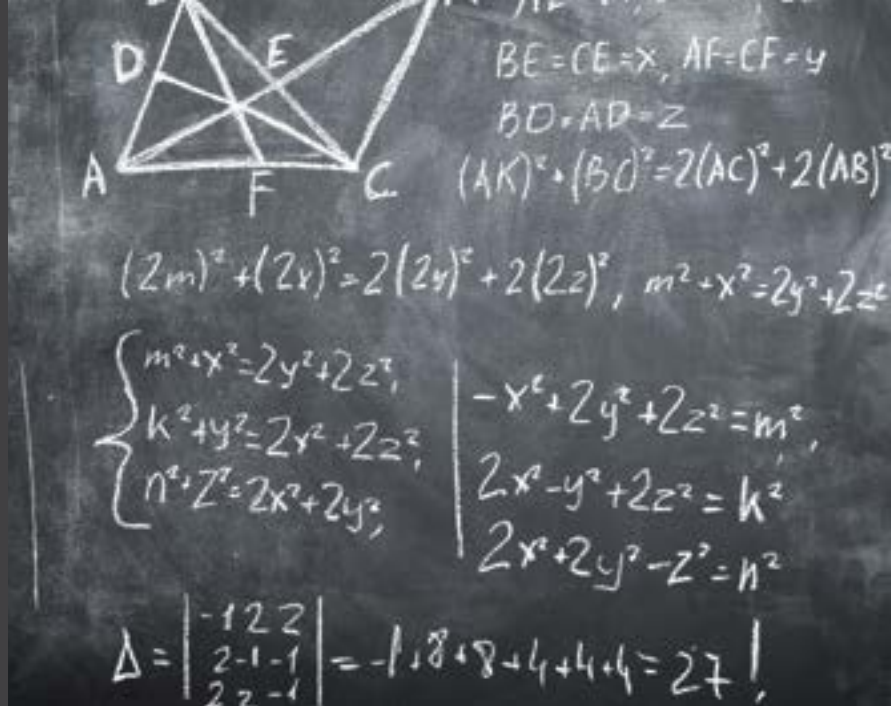
- Mathematics skills assessments allow 60 minutes for completion.
- Students are provided with a four-function onscreen calculator and scrap paper.
- Results are available upon completion of the Mathematics skills assessment, with a breakdown score of reportable subjects. Results are reported to Enrolment Services within 48 hours.

For more information regarding the Centennial College skills assessment, please visit our website:



[centennialcollege.ca/skills-assessment](https://centennialcollege.ca/skills-assessment)

# Centennial College Engineering Mathematics Practice Test



Topics tested on the Engineering math assessment include:

**Fractions**

**Decimals**

**Percentage**

**Exponents**

**Solving  
simple  
equations**

**Algebraic  
equations**

**Word  
problems**

**Analytic  
geometry**

**Mensuration**

**Trigonometry**

## Questions and Solutions

(1) Multiply 0.06 by 0.021

- a) 0.0126
- b) 0.000126
- c) 0.00126
- d) 0.126
- e) None of the above

### SOLUTION

$$0.06 \times 0.021 = 0.00126$$

The answer is c).

(2) Divide 4.2 by 0.07

- a) 1.33
- b) 60
- c) 6
- d) 600
- e) None of the above

### SOLUTION

$$4.2 \div 0.07 = 60$$

The answer is b).

(3)  $9 - 3(2 + 6) \div 6 - 2 \times 5 =$

- a) -2
- b) 35
- c) 5
- d) -5
- e) None of the above

### SOLUTION

$$\begin{aligned} 9 - 3(2 + 6) \div 6 - 2 \times 5 &= 9 - 3(8) \div 6 - 10 \\ &= 9 - 24 \div 6 - 10 \\ &= 9 - 4 - 10 \\ &= 5 - 10 \\ &= -5 \end{aligned}$$

The answer is d).

(4) The decimal equivalent of  $\frac{9}{40}$  is

- a) 4.44
- b) 2.25
- c) 0.225
- d) 0.0225
- e) None of the above

### SOLUTION

$$\frac{9}{40} = 9 \div 40 = 0.225$$

The answer is c).

(5) Express 0.275 as a common fraction in lowest terms

- a)  $\frac{11}{40}$
- b)  $\frac{11}{80}$
- c)  $\frac{22}{80}$
- d)  $\frac{11}{25}$
- e) None of the above

### SOLUTION

$$\begin{aligned} 0.275 &= \frac{0.275}{1} \times \frac{1000}{1000} \\ &= \frac{275}{1000} \\ &= \frac{11 \times \cancel{25}}{40 \times \cancel{25}} \\ &= \frac{11}{40} \end{aligned}$$

The answer is a).

(6) Express  $\frac{2}{5}$  as a percent

- a) 0.4%
- b) 20%
- c) 4%
- d) 2%
- e) None of the above

**SOLUTION**

$$\begin{aligned}\frac{2}{5} &= 0.4 \\ &= 0.4 \times 100\% \\ &= 40\%\end{aligned}$$

The answer is e).

For questions 7 to 15, see the section [Part, Whole, and Percent](#) (click on it to jump there) after the solutions for an explanation on how to solve these types of problems.

(7) Find 60% of \$10.60

- a) \$1.63
- b) \$6.36
- c) \$63.60
- d) \$16.30
- e) None of the above

**SOLUTION**

To find the part, we multiply the whole by the percent.

$$\begin{aligned}60\% \times \$10.60 &= 0.6 \times \$10.60 \\ &= \$6.36\end{aligned}$$

The answer is b).

(8) 24 is what percent of 40?

- a) 60%
- b) 3.75%
- c) 6%
- d) 37.5%
- e) None of the above

**SOLUTION**

To find the percent, we divide the part by the whole.

$$\begin{aligned}24 \div 40 &= 0.6 \\ &= 0.6 \times 100\% \\ &= 60\%\end{aligned}$$

The answer is a).

(9) 0.85 is 25% of what sum?

- a) 3.4
- b) 34
- c) 21.25
- d) 2.125
- e) None of the above

**SOLUTION**

To find the whole, we divide the part by the percent.

$$\begin{aligned}0.85 \div 25\% &= 0.85 \div 0.25 \\ &= 3.4\end{aligned}$$

The answer is a).

(10) 36 is what percent of 30?

- a) 83.3%
- b) 90%
- c) 120%
- d) 72%
- e) None of the above

**SOLUTION**

To find the percent, we divide the part by the whole.

$$\begin{aligned}36 \div 30 &= 1.2 \\ &= 1.2 \times 100\% \\ &= 120\%\end{aligned}$$

The answer is c).

(11) 6 is 15% of what number?

- a) 90
- b) 0.9
- c) 2.5
- d) 40
- e) None of the above

(12) The population of Collegeville was 4500 in 2010. In 2014, it had decreased to 3600. Find the percent decrease in population during those four years.

- a) 80%
- b) 90%
- c) 16.2%
- d) 20%
- e) None of the above

(13) You receive a grade of 75% on a test of 60 questions. How many questions did you answer correctly?

- a) 45
- b) 8
- c) 12
- d) 50
- e) None of the above

(14) Sandra's monthly salary is \$3200. If the tax deduction from her monthly paycheck is \$800, what percent of her salary goes to these deductions?

- a) 25%
- b) 25.6%
- c) 40%
- d) 4%
- e) None of the above

#### SOLUTION

To find the whole, we divide the part by the percent.

$$6 \div 15\% = 6 \div 0.15 \\ = 40$$

The answer is d).

#### SOLUTION

We first need to find the decrease in population.  
 $4500 - 3600 = 900$

So, the population decreased by 900. The question asks for this decrease as a percent, so we divide it by the whole (4500).

$$900 \div 4500 = 0.2 \\ = 0.2 \times 100\% \\ = 20\%$$

The population decreased by 20%, so the answer is d).

#### SOLUTION

We know that there are 60 questions (the whole), and we got 75 % of the correct (the percentage). To find how many we got correct (the part) we multiply the whole by the percentage.

$$60 \times 75\% = 60 \times 0.75 \\ = 45$$

We got 45 questions correct, so the answer is a).

#### SOLUTION

To find what percent of her paycheck the deductions are, we divide the deductions (the part) by her whole paycheck (the whole).

$$\$800 \div \$3200 = 0.25 \\ = 0.25 \times 100\% \\ = 25\%$$

The deductions are 25% of her salary, so the answer is a).

(15) The cost of an article including 15% tax is \$138.00. What is the cost of the article without tax?

- a) \$120.00
- b) \$117.30
- c) \$20.70
- d) \$92.00
- e) None of the above

#### SOLUTION

If \$138.00 is the price including the 15% tax, then it is  $100\% + 15\% = 115\%$  of original price. To find the original price, we divide the new price by the percentage.

$$\frac{\$138.00}{115\%} = \frac{\$138.00}{1.15} \\ = \$120$$

This means the original price was \$120.00, so the answer is a).

(16) Find the average of the following set of numbers: {43, 29, 51, 36, 33, 42, 32}

- a) 36
- b) 33
- c) 38
- d) 43
- e) None of the above

#### SOLUTION

To find the average, we add the numbers and divide the sum by the number of values.

$$\frac{43 + 29 + 51 + 36 + 33 + 42 + 32}{7} = \frac{266}{7} \\ = 38$$

The average is 38, and the answer is c).

(17) Brian had marks of 80, 94, 70, 68, and 83 on five tests. His average score is between

- a) 65 and 70
- b) 70 and 75
- c) 75 and 80
- d) 80 and 85
- e) None of the above

#### SOLUTION

To find the average, we add the numbers and divide the sum by the number of values.

$$\frac{80 + 94 + 70 + 68 + 83}{5} = \frac{395}{5} \\ = 79$$

The average is 79 which is between 75 and 80, so the answer is c).

(18)  $6.42 \times 10^4$  is equivalent to

- a) 64,200
- b) 642
- c) 0.000 642
- d) 642,000
- e) None of the above

#### SOLUTION

$$6.42 \times 10^4 = 6.42 \times 10000 \\ = 64200$$

The answer is a).

For questions 19 to 22 and 30 to 31, see the section [Working With Fractions](#) (click on it to jump there) after the solutions for an explanation on how to solve these types of problems.



(19) Solve  $\frac{1}{4} + \frac{5}{8} + \frac{7}{10}$

- a)  $\frac{14}{18}$
- b)  $\frac{13}{22}$
- c) 1.325
- d) 1.575
- e) None of the above

(20) Solve  $3\frac{1}{2} + 4\frac{3}{4} + 5\frac{3}{10}$

- a)  $12\frac{7}{16}$
- b)  $13\frac{11}{20}$
- c) 1.325
- d) 1.575
- e) None of the above

(21) Solve  $7\frac{1}{8} - 3\frac{1}{6}$

- a)  $4\frac{1}{48}$
- b)  $4\frac{1}{2}$
- c)  $3\frac{23}{24}$
- d)  $3\frac{0}{2}$
- e) None of the above

#### SOLUTION

We must first find a common denominator. The lowest common multiple of 4, 8, and 10 is 40. Now we need to convert each fraction to have a denominator of 40.

$$\begin{aligned}\frac{1}{4} + \frac{5}{8} + \frac{7}{10} &= \frac{1}{4} \times \frac{10}{10} + \frac{5}{8} \times \frac{5}{5} + \frac{7}{10} \times \frac{4}{4} \\ &= \frac{10}{40} + \frac{25}{40} + \frac{28}{40}\end{aligned}$$

Now that we've rewritten the fractions, we can add the numerators (we keep the denominator the same).

$$\begin{aligned}\frac{10}{40} + \frac{25}{40} + \frac{28}{40} &= \frac{10 + 25 + 28}{40} \\ &= \frac{63}{40} \\ &= 1.575\end{aligned}$$

The answer is d).

#### SOLUTION

We must first find a common denominator and split up the mixed fractions. The lowest common multiple of 2, 4, and 10 is 20. Now we need to convert each fraction to have a denominator of 20.

$$\begin{aligned}3\frac{1}{2} + 4\frac{3}{4} + 5\frac{3}{10} &= \frac{7}{2} + \frac{19}{4} + \frac{53}{10} \\ &= \frac{7}{2} \times \frac{10}{10} + \frac{19}{4} \times \frac{5}{5} + \frac{53}{10} \times \frac{2}{2} \\ &= \frac{70}{20} + \frac{95}{20} + \frac{106}{20}\end{aligned}$$

Now that we've rewritten the fractions, we can add the numerators.

$$\begin{aligned}\frac{70}{20} + \frac{95}{20} + \frac{106}{20} &= \frac{70 + 95 + 106}{20} \\ &= \frac{271}{20} \\ &= 13\frac{11}{20}\end{aligned}$$

The answer is b).

#### SOLUTION

We need to first write the fractions with a common denominator.

$$\begin{aligned}7\frac{1}{8} - 3\frac{1}{6} &= \frac{57}{8} - \frac{19}{6} \\ &= \frac{57}{8} \times \frac{3}{3} - \frac{19}{6} \times \frac{4}{4} \\ &= \frac{171}{24} - \frac{76}{24} \\ &= \frac{171 - 76}{24} \\ &= \frac{95}{24} = 3\frac{23}{24}\end{aligned}$$

The answer is c).

(22) Solve  $7 - 4\frac{2}{5}$

- a)  $3\frac{3}{5}$
- b)  $-2\frac{3}{5}$
- c)  $-3\frac{3}{5}$
- d)  $2\frac{3}{5}$
- e) None of the above

**SOLUTION**

If we rewrite 7 as  $6\frac{5}{5}$ , we can subtract the whole and fractional parts individually. The whole part would become  $6 - 4 = 2$ , and the fractional part would be  $\frac{5}{5} - \frac{2}{5} = \frac{3}{5}$ . This gives a result of  $2\frac{3}{5}$ , so the answer is d).

(23)  $31.7 + 6 + 2.81 + 0.254 =$

- a) 35.264
- b) 858
- c) 14.52
- d) 40.764
- e) None of the above

**SOLUTION**

$31.7 + 6 + 2.81 + 0.254 = 40.764$   
The answer is d).

(24) Subtract 5.485 from 12.

- a) -17.485
- b) 17.485
- c) -6.515
- d) 6.515
- e) None of the above

**SOLUTION**

$12 - 5.485 = 6.515$   
The answer is d).

(25) Dividing by 10,000 is the same as multiplying by

- a)  $\frac{1}{1000}$
- b)  $\frac{1}{10,000}$
- c) 0.01
- d) 0.001
- e) None of the above

**SOLUTION**

If we multiply a number by  $\frac{1}{10,000}$ , the number will then have 10,000 in the denominator. Having 10,000 in the denominator is equivalent to dividing by 10,000. Since multiplying by  $\frac{1}{10,000}$  is equivalent to dividing by 10,000, the answer is b).

(26) Ginny baked a delicious apple pie. Harpreet ate  $\frac{1}{4}$  of it. Aldo ate  $\frac{1}{2}$  of what was left. How much pie was left over after Aldo ate his piece?

- a)  $\frac{1}{4}$
- b)  $\frac{1}{8}$
- c)  $\frac{1}{2}$
- d)  $\frac{3}{8}$
- e) None of the above

**SOLUTION**

First, we find how much is left after Harpreet's slice is taken.

$$1 - \frac{1}{4} = \frac{4}{4} - \frac{1}{4} = \frac{3}{4}$$

Now, we remove Aldo's piece (half of what is left)

$$\frac{3}{4} - \frac{3}{4} \times \frac{1}{2} = \frac{6}{8} - \frac{3}{8} = \frac{3}{8}$$

There is  $\frac{3}{8}$  of the pie left, so the answer is d).

(27) Suppose a bus travelling from Toronto to Ottawa at a speed of 88km/hour takes  $3\frac{1}{4}$  hours. What is the distance between the two cities?

- a) 286,000m
- b) 28.6 m
- c) 27 km
- d) 286 cm
- e) None of the above

**SOLUTION**

To find the distance, we multiply the speed by the time.

$$88km/h \times 3\frac{1}{4}h = 88 \times 3.25km = 286km = 286,000m$$

The answer is a).

(28) Find the missing term (x):  $\frac{4}{7} = \frac{28}{x}$

- a) 49
- b) 16
- c) 56
- d) 42
- e) None of the above

**SOLUTION**

We first multiply both sides by  $7x$  to clear the denominators:

$$\frac{4}{7} \times 7x = \frac{28}{x} \times 7x$$

$$4x = 196$$

Then, we can multiply both sides by  $\frac{1}{4}$  to remove the coefficient from  $x$ .

$$\frac{1}{4} \times 4x = \frac{1}{4} \times 196$$

$$x = 49$$

So, the answer is a).

(29) If  $\frac{a}{10} = 0.57$ ,  $a = ?$

- a) 57
- b) 0.057
- c)  $5\frac{7}{10}$
- d) 0.057
- e) None of the above

**SOLUTION**

We can multiply both sides by 10 to remove the coefficient from  $x$ .

$$10 \times \frac{a}{10} = 0.57 \times 10$$

$$a = 5.7$$

$$a = 5\frac{7}{10}$$

So, the answer is c).

(30) Express the following product in lowest terms:

$$3\frac{1}{4} \times \frac{1}{7} \times 8$$

- a)  $3\frac{3}{7}$
- b)  $\frac{5}{8}$
- c)  $\frac{8}{5}$
- d)  $\frac{45}{64}$
- e) None of the above

**SOLUTION**

$$3\frac{1}{4} \times \frac{1}{7} \times 8 = \frac{13}{4} \times \frac{1}{7} \times 8$$

$$= \frac{26}{1} \times \frac{1}{7}$$

$$= \frac{26}{7}$$

Since this is not equal to any of the given answers, the answer is e).

(31) Simplify  $\frac{2-\frac{1}{4}}{3-\frac{1}{5}}$ , provide your answer in lowest terms

- a)  $\frac{7}{5}$
- b)  $\frac{5}{8}$
- c)  $\frac{8}{5}$
- d)  $\frac{45}{64}$
- e) None of the above

#### SOLUTION

We start by simplifying the numerator and denominator separately:

$$\begin{aligned}\frac{2-\frac{1}{4}}{3-\frac{1}{5}} &= \frac{\frac{8}{4}-\frac{1}{4}}{\frac{15}{5}-\frac{1}{5}} \\ &= \frac{\frac{7}{4}}{\frac{14}{5}} \\ &= \frac{7}{4} \times \frac{5}{14} = \frac{5}{8}\end{aligned}$$

So the answer is b).

(32) Simplify  $\sqrt{10^2 - 6^2}$

- a) 8
- b)  $\sqrt{136}$
- c) 64
- d) 2
- e) None of the above

#### SOLUTION

$$\sqrt{10^2 - 6^2} = \sqrt{100 - 36} = \sqrt{64} = 8$$

The answer is a).

(33) Simplify  $-3(4)^2$

- a) 48
- b) 49
- c) -48
- d) 144
- e) None of the above

#### SOLUTION

Following the order of operations, we first compute the exponent, then do the multiplication:  
 $-3(4)^2 = -3(16) = -48$   
So the answer is c).

(34)  $(4 \div 2)[6 - (-5)3] =$

- a) -14
- b) -54
- c) 126
- d) 42
- e) None of the above

#### SOLUTION

Following the order of operations, we start by simplifying each bracket separately:  
 $(4 \div 2)[6 - (-5)3] = (2)[6 - (-15)] = (2)(6 + 15) = (2)(21)$   
Then, our final answer is  $2 \times 21 = 42$ . So, the answer is d).

(35) Solve  $\frac{10^3}{10^{-2}}$

- a) 10
- b)  $10^{-4}$
- c)  $10^{-1}$
- d)  $10^{-5}$
- e) None of the above

#### SOLUTION

Using the rules for dividing exponents,  
 $\frac{10^3}{10^{-2}} = 10^{3-(-2)} = 10^{3+2} = 10^5$   
This is not equal to any of the given answers, so the answer is e).

(36) How many fifths are there in 4.8?

- a) 24
- b) 0.96
- c) 1.04
- d) 9.6
- e) None of the above

**SOLUTION**

To find the number of fifths in 4.8, we divide it by a fifth.

$$\frac{4.8}{\frac{1}{5}} = 4.8 \times \frac{5}{1} = 24$$

The answer is then a).

(37)  $22r - 15s - 3r + 3s =$

- a)  $15rs$
- b)  $22r-15s$
- c)  $7rs$
- d)  $19r-12s$
- e) None of the above

**SOLUTION**

To find the answer, we collect like terms.

$$22r - 15s - 3r + 3s = 22r - 3r - 15s + 3s =$$

$$(22 - 3)r + (-15 + 3)s = 19r - 12s$$

So the answer is d).

(38) Simplify  $\frac{a^6}{a^2}$

- a)  $a^4$
- b)  $a^3$
- c)  $a^8$
- d)  $a^{-8}$
- e) None of the above

**SOLUTION**

Using the properties of exponents,

$$\frac{a^6}{a^2} = a^{(6 - 2)} = a^4$$

The answer is a).

(39)  $(3xy^2)^3 =$

- a)  $3x^3y^6$
- b)  $xy$
- c)  $27x^3y^6$
- d)  $9x^2y^6$
- e) None of the above

**SOLUTION**

Using the properties of exponents,

$$(3xy^2)^3 = 3^3x^3y^{2 \times 3} = 27x^3y^6$$

The answer is c).

(40) Simplify  $\frac{1}{\frac{1}{a} + \frac{1}{b}}$

- a)  $\frac{a+b}{ab}$
- b)  $\frac{ab}{a+b}$
- c)  $a^2 + b^2$
- d)  $a^2 - b^2$
- e) None of the above

**SOLUTION**

We will simplify first by adding the fractions in the denominator.

$$\frac{1}{\frac{1}{a} + \frac{1}{b}} = \frac{1}{\frac{b}{ab} + \frac{a}{ab}}$$

$$= \frac{1}{\frac{a+b}{ab}}$$

$$= \frac{ab}{a+b}$$

So the answer is b).



(41) Simplify  $\frac{a}{a+a^2}$

- a)  $\frac{a}{a^3}$
- b)  $\frac{1}{a^2}$
- c)  $\frac{1}{2a}$
- d)  $\frac{1}{1+a}$
- e) None of the above

**SOLUTION**

We begin by factoring the denominator, then cancelling factors.

$$\frac{a}{a+a^2} = \frac{a}{a(1+a)} = \frac{1}{1+a}$$

So, the answer is d).

(42) Solve  $y - 6y^2$  if  $y = \frac{1}{3}$

- a)  $-\frac{2}{3}$
- b)  $-\frac{1}{3}$
- c) 1
- d)  $-4\frac{2}{3}$
- e) None of the above

**SOLUTION**

To solve, we substitute  $\frac{1}{3}$  for  $y$ .

$$\frac{1}{3} - 6\left(\frac{1}{3}\right)^2 = \frac{1}{3} - 6 \times \frac{1}{9} = \frac{1}{3} - \frac{2}{3} = -\frac{1}{3}$$

The answer is b).

(43) When  $M = -2$  and  $P = 4$ , find the value of  $\frac{3P-M}{3MP}$

- a) 0
- b)  $\frac{-7}{12}$
- c)  $\frac{-5}{12}$
- d)  $\frac{-3}{4}$
- e) None of the above

**SOLUTION**

To solve, we substitute  $-2$  for  $M$  and  $4$  for  $P$ .

$$\begin{aligned} \frac{3(P) - (M)}{3(M)(P)} &= \frac{3(4) - (-2)}{3(-2)(4)} \\ &= \frac{12 + 2}{-6(4)} \\ &= \frac{14}{-24} \\ &= \frac{-7}{12} \end{aligned}$$

The answer is b).

(44) Simplify  $y - 4[y - 3(y - 2)] - 5$

- a)  $19 + 9y$
- b)  $-7y - 29$
- c)  $-2y^2 + 14y - 29$
- d)  $9y - 29$
- e) None of the above

**SOLUTION**

Following the order of operations,

$$\begin{aligned} y - 4[y - 3(y - 2)] - 5 &= y - 4[y - 3y + 6] - 5 \\ &= y - 4[-2y + 6] - 5 \\ &= y + 8y - 24 - 5 \\ &= 9y - 29 \end{aligned}$$

So the answer is d).

(45) Expand  $(3r - 4)^2$

- a)  $9r^2 - 12r + 16$
- b)  $9r^2 - 24r - 16$
- c)  $9r^2 + 16$
- d)  $9r^2 - 16$
- e) None of the above

**SOLUTION**

$(3r - 4)^2 = (3r)^2 - 4 \times 3r - 4 \times 3r + (-4)(-4) = 9r^2 - 24r + 16$   
The answer is e).

(46) Combine fractions  $\frac{5b}{4a} + \frac{b}{3a} - \frac{3b}{a}$

- a)  $\frac{3b}{8a}$
- b)  $\frac{17b}{12a}$
- c)  $\frac{-17ab}{12a^2}$
- d)  $\frac{-17b}{12a}$
- e) None of the above

**SOLUTION**

We first write the fractions with a common denominator, then add the numerators:

$$\begin{aligned} \frac{5b}{4a} + \frac{b}{3a} - \frac{3b}{a} &= \frac{5b}{4a} \times \frac{3}{3} + \frac{b}{3a} \times \frac{4}{4} - \frac{3b}{a} \times \frac{12}{12} \\ &= \frac{15b}{12a} + \frac{4b}{12a} - \frac{36b}{12a} \\ &= \frac{15b + 4b - 36b}{12a} \\ &= -\frac{17b}{12a} \end{aligned}$$

The answer is d).

(47) Combine fractions  $\frac{2m}{t} + \frac{5}{mt}$

- a)  $\frac{2}{t}$
- b)  $\frac{2m^2+5}{mt}$
- c)  $2m^2t + 5t$
- d)  $\frac{2m-5t}{t+mt}$
- e) None of the above

**SOLUTION**

We first write the fractions with a common denominator, then add the numerators:

$$\begin{aligned} \frac{2m}{t} + \frac{5}{mt} &= \frac{2m}{t} \times \frac{m}{m} + \frac{5}{mt} \\ &= \frac{2m^2}{mt} + \frac{5}{mt} \\ &= \frac{2m^2 + 5}{mt} \end{aligned}$$

The answer is b).

(48) How many 4 cm by 4 cm tiles are needed to cover an area measuring 20 cm by 28 cm?

- a) 48
- b) 35
- c) 140
- d) 560
- e) None of the above

**SOLUTION**

We first find the area of each tile:

$$4cm \times 4cm = 16cm^2$$

Then, we find the area we need to cover:

$$20cm \times 28cm = 560cm^2$$

To find the number of tiles we need, we divide the area by the area of each tile:

$$\frac{560cm^2}{16cm^2} = 35$$

The answer is b).

(49) A wire measuring 536 cm long is cut into two parts such that the longer part is three times as long as the shorter part. What are the lengths, in cm, of the two parts?

- a) 134 cm & 402 cm
- b) 144 cm & 392 cm
- c) 134 cm & 402 mm
- d) 124 cm & 412 cm
- e) None of the above

#### SOLUTION

Suppose the length of the shorter part is  $x$ .

Then,

$$x + 3x = 536\text{cm}$$

$$4x = 536\text{cm}$$

$$x = \frac{536\text{cm}}{4}$$

$$x = 134\text{cm}$$

So the shorter side is 134 cm, and the longer side is  $134 \times 3 = 402$  cm. The answer is a).

(50) If  $T = \frac{1}{3}rm^2$ ,  $r = ?$

- a)  $\frac{m^2}{3T}$
- b)  $\frac{3\sqrt{T}}{M}$
- c)  $eT - m^2$
- d)  $\frac{T}{3m^2}$
- e) None of the above

#### SOLUTION

To solve for  $r$ , we multiply both sides by  $\frac{3}{m^2}$ :

$$T = \frac{1}{3}rm^2$$

$$T \times \frac{3}{m^2} = \frac{1}{3}rm^2 \times \frac{3}{m^2}$$

$$\frac{3T}{m^2} = r$$

So  $r = \frac{3T}{m^2}$ , meaning the answer is e).

(51) If  $3b = 5(2 - b) - 4(1 - 3b)$ ,  $b = ?$

- a)  $-\frac{3}{2}$
- b)  $\frac{6}{7}$
- c)  $\frac{3}{2}$
- d)  $\frac{3}{10}$
- e) None of the above

#### SOLUTION

We will expand the brackets, collect like terms, then solve for  $b$ .

$$3b = 5(2 - b) - 4(1 - 3b)$$

$$3b = 10 - 5b - 4 + 12b$$

$$3b = 6 + 7b$$

$$-6 = 4b$$

$$-\frac{3}{2} = b$$

So, the answer is a).

(52) If  $8x - 3 = 4x - 15$ ,  $x = ?$

- a) -3
- b) 3
- c) 1.5
- d) -1.5
- e) None of the above

#### SOLUTION

Collecting like terms and then solving,

$$8x - 3 = 4x - 15$$

$$4x = -12$$

$$\frac{1}{4} \times (4x) = \frac{1}{4} \times (-12)$$

$$x = -3$$

The answer is a).

(53) If  $bx = c - x$ ,  $x = ?$

- a)  $b - c$
- b)  $\frac{c}{b+1}$
- c)  $\frac{b+1}{c}$
- d)  $c - b$
- e) None of the above

**SOLUTION**

We must collect like terms, factor, then solve.

$$bx = c - x$$

$$bx + x = c$$

$$x(b + 1) = c$$

$$x = \frac{c}{b + 1}$$

The answer is b).

(54)  $x^2 - 2x - 3$

- a)  $(x - 3)(x + 1)$
- b)  $(x + 3)(x - 1)$
- c)  $(x - 3)(x - 1)$
- d)  $(x + 3)(x + 1)$
- e) None of the above

**SOLUTION**

We need to look for two numbers that add to -2 and multiply to -3. -3 and 1 satisfy this, so

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

The answer is a).

(55) Expand  $(3 - y)(3 + y)$

- a)  $9 - y^2$
- b)  $9 + y^2$
- c)  $9 + 6y + y^2$
- d)  $9 - 6y + y^2$
- e) None of the above

**SOLUTION**

This is a difference of squares, so expanded it is

$$(3 - y)(3 + y) = 3^2 - y^2 = 9 - y^2$$

The answer is a).

(56) Evaluate  $\frac{a^2}{16} - \frac{1}{9}$

- a)  $(\frac{a-1}{4})(\frac{a+1}{9})$
- b)  $\frac{a^2-1}{7}$
- c)  $(\frac{a}{4} - \frac{1}{3})(\frac{a}{4} + \frac{1}{3})$
- d)  $\frac{a^2-1}{7}$
- e) None of the above

**SOLUTION**

This is a difference of squares, with the squares being  $\frac{a^2}{16}$  and  $\frac{1}{9}$ . So, it can be factored as follows:

$$\frac{a^2}{16} - \frac{1}{9} = (\frac{a}{4} + \frac{1}{3})(\frac{a}{4} - \frac{1}{3})$$

The answer is c).

(57)  $|-4 - 5| =$

- a) -9
- b) 9
- c) 1
- d) -1
- e) None of the above

**SOLUTION**

$|-4 - 5| = |-9| = 9$ . The answer is b).

(58)  $|-3 - (-4)| =$

- a) -9
- b) 9
- c) 1
- d) -1
- e) None of the above

**SOLUTION**

$|-3 - (-4)| = |-3 + 4| = |1| = 1$   
The answer is c).

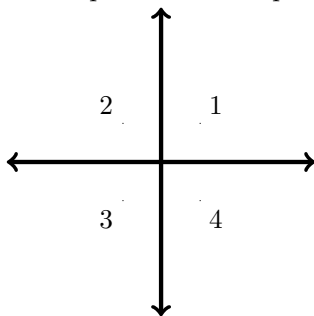
(59)  $|-3| - |-4|$

- a) -1
- b) 1
- c) -7
- d) 7
- e) None of the above

**SOLUTION**

$|-3| - |-4| = 3 - 4 = -1$   
The answer is a).

(60) Refer to the diagram below for this question. In which quadrant is the point (18, -36)?

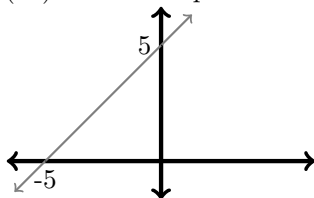


- a) 1
- b) 2
- c) 3
- d) 4
- e) None of the above

**SOLUTION**

The x coordinate is positive, so it must be in quadrants 1 or 4. The y coordinate is negative, so it must be in quadrant 4, meaning the answer is d).

(61) Find the equation of the line shown



- a)  $x - y + 5 = 0$
- b)  $x + y + 5 = 0$
- c)  $x + y - 5 = 0$
- d)  $x = y$
- e) None of the above

**SOLUTION**

From the diagram, we know that the y-intercept of the line is 5. So, the equation of the line is  $y = mx + 5$ . To find  $m$ , we substitute the other

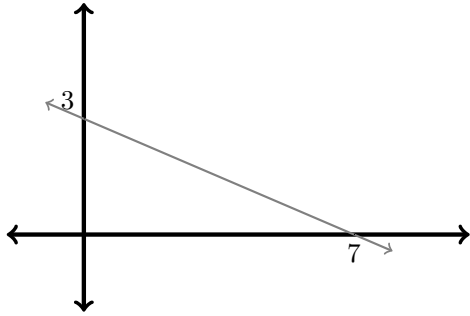
known point, (-5, 0):

$$y = mx + 5$$
$$0 = m * (-5) + 5$$
$$-5 = -5m$$
$$1 = m$$

So, the equation is  $y = x + 5$ , and this can be rearranged to  $x - y + 5 = 0$ . The answer is a).



(62) Find the slope of the line shown



- a)  $\frac{3}{7}$
- b)  $-\frac{3}{7}$
- c)  $-\frac{7}{3}$
- d)  $\frac{7}{3}$
- e) None of the above

**SOLUTION**

Using the formula for slope,

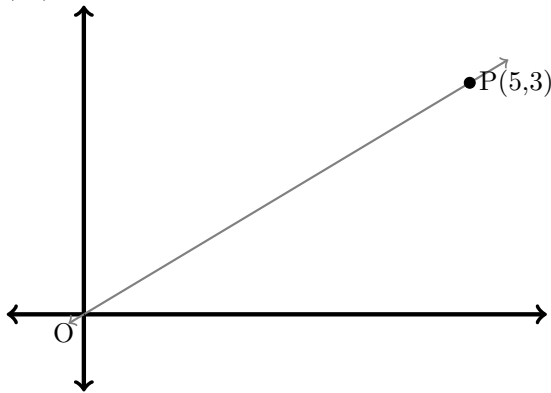
$$m = \frac{\text{rise}}{\text{run}}$$

$$= \frac{0 - 3}{7 - 0}$$

$$= -\frac{3}{7}$$

So, the answer is b).

(63) Find the equation of the line OP



- a)  $3y - 5x = 0$
- b)  $5x + 3y = 0$
- c)  $x + y = 8$
- d)  $5y - 3x = 0$
- e) None of the above

**SOLUTION**

We can see from the diagram that the y-intercept is 0. To find the slope, we use the formula

$$m = \frac{\text{rise}}{\text{run}}$$

$$= \frac{3 - 0}{5 - 0} = \frac{3}{5}$$

Now that we know the slope and the y-intercept, we can use the slope-y-intercept form and rearrange:

$$y = mx + b$$

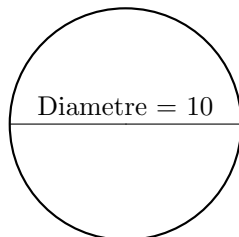
$$y = \frac{3}{5}x + 0$$

$$5y = 3x$$

$$5y - 3x = 0$$

The answer is d).

(64) Find the circumference of the circle shown

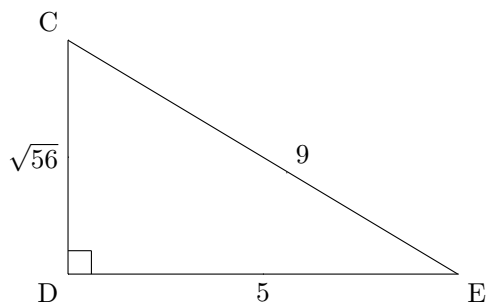


- a)  $10\pi$
- b)  $25\pi$
- c)  $100\pi$
- d)  $5\pi$
- e) None of the above

**SOLUTION**

The circumference of a circle is given by  $c = \pi d$ , where  $d$  is the diameter. Substituting the known diameter into the formula, we find  $c = 10\pi$ , so the answer is a).

(65) In the right triangle CDE shown, find the value of  $\cos(E)$



- a)  $\frac{\sqrt{56}}{9}$
- b)  $\frac{\sqrt{56}}{5}$
- c)  $\frac{5}{9}$
- d)  $\frac{9}{5}$
- e) None of the above.

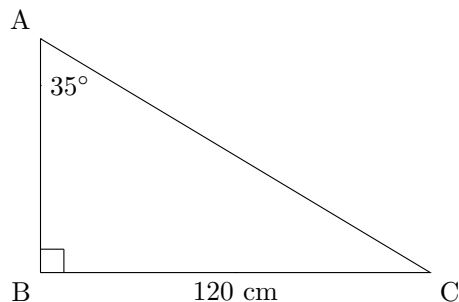
#### SOLUTION

By definition, cosine is the adjacent side divided by the hypotenuse. The adjacent side to E is 5, and the hypotenuse is 9. Therefore,

$$\cos(E) = \frac{5}{9}$$

The answer is c).

(66) In the right triangle ABC shown, find the length of AB to the nearest centimetre



$$\begin{aligned}\sin 35^\circ &= 0.573 \\ \cos 35^\circ &= 0.819 \\ \tan 35^\circ &= 0.700\end{aligned}$$

- a) 84 cm
- b) 147 cm
- c) 209 cm
- d) 171 cm
- e) None of the above

### SOLUTION

By definition, the tangent of A is the opposite (BC) over the adjacent (AB). Writing this as an equation and then rearranging,

$$\tan(A) = \frac{BC}{AB}$$

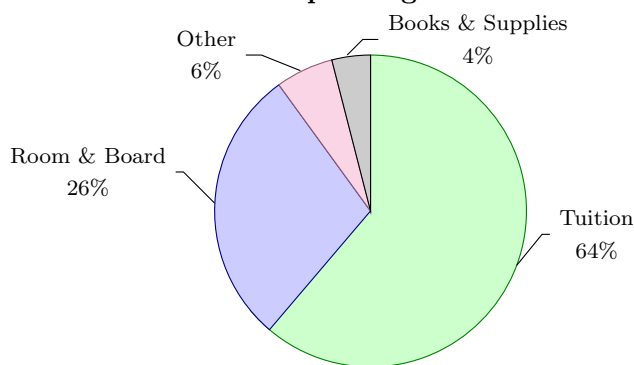
$$AB \times \tan(A) = BC$$

$$\begin{aligned}AB &= \frac{BC}{\tan(A)} \\ &= \frac{120\text{cm}}{\tan(35^\circ)} \\ &= \frac{120\text{cm}}{0.700} \\ &= 171\text{cm}\end{aligned}$$

The answer is d).

(67) The circle graph below shows the allocation of a student's total spending for the 2014 school year. If the student spend a total of \$15,000, how much more money was sent to tuition compared with room & board?

**Total School Spending in 2014**



- a) \$9600
- b) \$3900
- c) \$5700
- d) \$8100
- e) None of the above

### SOLUTION

We will start by calculating how much was spent on tuition and room & board. For tuition:

$$\begin{aligned}\$15000 \times 64\% &= \$15000 \times 0.64 \\ &= \$9600\end{aligned}$$

For room & board:

$$\begin{aligned}\$15000 \times 26\% &= \$15000 \times 0.26 \\ &= \$3900\end{aligned}$$

To find how much more was spent on tuition than room & board, we subtract the amount spent on room & board from the amount spent on tuition.

$$\$9600 - \$3900 = \$5700$$

\$5700 more was spent on tuition than room & board, so the answer is c).

## Part, Whole, and Percentage

There are three main equations that are involved in these types of questions:

$$\text{Part} = \text{Whole} \times \text{Percentage}$$

$$\text{Whole} = \frac{\text{Part}}{\text{Percentage}}$$

$$\text{Percentage} = \frac{\text{Part}}{\text{Whole}}$$

The general approach for these problems is to determine what is given, and what the question is asking for. Percentages are easy to spot, since they are usually labelled with ‘%’. If the question mentions a percent or part **of something**, that **something** is often the whole. The ‘part’ is sometimes labelled as such in the question, or can be identified through elimination.

In some types of questions, the ‘whole’ may represent an **original amount**, and the ‘part’ may represent an **increase or decrease**. In those types of problems, the ‘percent’ is often referred to as the **percent increase or decrease**.

After figuring out what is given and what is required, use the proper formula to find the unknown.

Example	
Find 60% of \$10.60 a) \$1.63 b) \$6.36 c) \$63.60 d) \$16.30 e) None of the above	We can first identify 60% as the percentage (since it has the % symbol). The question mentions 60% <b>of \$10.60</b> , so <b>\$10.60</b> must be the whole. By elimination, the question must be asking for the part. So, using the appropriate formula for the part, we multiply the percentage by the base: $60\% \times \$10.60 = 0.6 \times \$10.60$ $= \$6.36$ The answer is b).

## Working With Fractions

When adding or subtracting fractions, add or subtract the whole and fractional parts separately. Make sure when adding the fractional parts that they all have the same denominator.

### Example

Solve  $3\frac{1}{2} + 4\frac{3}{4} + 5\frac{3}{10}$

- a)  $12\frac{7}{16}$
- b)  $13\frac{11}{20}$
- c) 1.325
- d) 1.575
- e) None of the above

Adding the whole parts first,  $3 + 4 + 5 = 12$ . Then, we add the fractional parts:

$$\frac{1}{2} + \frac{3}{4} + \frac{3}{10} = \frac{10}{20} + \frac{15}{20} + \frac{6}{20} = \frac{31}{20}$$

Lastly we combine the whole and fractional parts, and then turn it into a proper mixed number.

$$12\frac{31}{20} = 13\frac{11}{20}$$

The answer is b).

When multiplying or dividing fractions and mixed numbers, begin by turning all mixed numbers into improper fractions. When dividing by a fraction, switch the numerator and denominator, then multiply instead.

### Example

Express the following product in lowest terms:

$$3\frac{1}{4} \times \frac{1}{7} \times 8$$

- a)  $3\frac{3}{7}$
- b)  $\frac{5}{8}$
- c)  $\frac{8}{5}$
- d)  $\frac{45}{64}$
- e) None of the above

First, change the mixed numbers to improper fractions:

$$\begin{aligned} 3\frac{1}{4} \times \frac{1}{7} \times 8 &= \frac{13}{4} \times \frac{1}{7} \times \frac{8}{1} \\ &= \frac{104}{28} \\ &= \frac{26}{7} \end{aligned}$$

Since this is not equal to any of the given answers, the answer is e).



# Additional study materials can be found online at...

This site provides 1400+ videos covering everything from basic arithmetic and algebra to differential equations.

 [www.khanacademy.org](http://www.khanacademy.org)

This site focuses on basic math skills, interactive practice, and explanation of concepts, challenge games and random mathematics problems.

 [www.AAAmath.com](http://www.AAAmath.com)

This comprehensive site reviews principles from basic mathematics to calculus.

 [www.math.com](http://www.math.com)

## Answers

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. C  | 15. A | 29. C | 43. B | 57. B |
| 2. B  | 16. C | 30. E | 44. D | 58. C |
| 3. D  | 17. C | 31. B | 45. E | 59. A |
| 4. C  | 18. A | 32. A | 46. D | 60. D |
| 5. A  | 19. D | 33. C | 47. B | 61. A |
| 6. E  | 20. B | 34. D | 48. B | 62. B |
| 7. B  | 21. C | 35. E | 49. A | 63. D |
| 8. A  | 22. D | 36. A | 50. E | 64. A |
| 9. A  | 23. D | 37. D | 51. A | 65. C |
| 10. C | 24. D | 38. A | 52. A | 66. D |
| 11. D | 25. B | 39. C | 53. B | 67. C |
| 12. D | 26. D | 40. B | 54. A |       |
| 13. A | 27. A | 41. D | 55. A |       |
| 14. A | 28. A | 42. B | 56. C |       |

# General Test Taking Tips and Strategies for Alleviating Exam Anxiety



**Get enough sleep** the night before the skills assessment.



**Utilize materials** given during the test such as scratch paper.



**Allow yourself time** to find the Assessment Centre by arriving early.



**Deal with test anxiety** by preparing in advance, taking your time, and pacing yourself throughout the skills assessment.



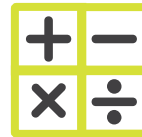
**Know what items** you can and cannot bring with you.



**During the skills assessment,** read the entire question and all choices before attempting to answer.



**To avoid** experiencing test anxiety, approach the test with a positive attitude. Negative self-talk can ruin your ability to do well on a skills assessment.



**The math skills assessment** is a multiple-choice test. For multiple choice questions, eliminate the choices that you know are incorrect first. Then attempt to find and choose the answer.



**Listen carefully** to all pre-test instructions prior to starting your skills assessment.



**If you are unsure** of the answer, make an educated guess.



**Carefully read** all skills assessment questions and instructions presented.



**Usually your first choice** of the answer is the right one. Do not second guess yourself.



**Ask questions** if you do not understand what is required.

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**See where experience takes you.**