Practice Aptitude Assessment for Building and Construction Industry

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Group Training Australia (SA) Inc.
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I am sure that over the years many thousands of students will benefit from Jerry’s dedication to the project.

Another special mention must go to Jane Harvey. Jane was the person who initially planted the seed in respect of developing an aid to assist students prepare themselves for interviews and assessments in the trade areas. Jane has been there during the planning and programming stages, to assisting with the coordination of the many other people who have assisted in some form in the development of this resource, to grouping the maths examples under appropriate headings and preparing the answers.
Jane has fought with me every inch of the way, through thick and thin at times, to produce a quality product which we hope will fill a vast void that has been identified in this sector of the VET/Career education pathway of students.

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Guidance

This assessment has been developed with the assistance of Industry and Registered Training Organisations, based on the needs and requirements of the Industry sector.

Please note that rates quoted in this assessment for various items, including pay rates, are not meant to reflect today’s values, but are used purely for mathematical purposes.

This assessment is intended to prepare people who may be required to sit an aptitude test as part of an interview and assessment process for a job vacancy, such as an apprenticeship.

The assessment can be used by a number of different organisations or people such as Group Training Organisations, Career Education Teachers, Mathematics Teachers within schools or New Apprenticeship Centres.

The assessment can be:

- provided to individual people to enable them to practice and hone their skills before sitting an actual aptitude test.
- used by Career Education Teachers for individuals or in a class setting to provide general guidance to students on what they may expect during the interview process if they intend commencing a career as an apprentice.
- used by Mathematics Teachers as a guide to Industry mathematics requirements at the entry point of a particular apprenticeship career path.

This practice aptitude assessment has two components; Literacy and Mathematics.

You may find that this assessment differs from similar tests administered by Industry as their tests may have other elements included, that this one does not, such as:

- Mechanical Reasoning;
- Building and Construction Theory;
- Building and Construction Knowledge and reasoning;

The mathematics questions contained within this document are equivalent to Applied Mathematics at the Year 10 level in South Australia.

The test should be able to be completed in approximately 1 hour 20 minutes.

Calculators may not be used to complete this practice assessment, however Industry in some cases does allow calculators to be used in their aptitude tests.
ENGLISH

Spelling

1. The following text has 12 spelling errors in it. Correct those errors and list them in the order you find them in the text.

   Today the “Building and Construction Industry” is worth over $50 billion and employs over three quarters of a million people. The industry is divided into three sectors, domestic, commercial and civil. The majority of workers are either apprentice/trainee, construction worker or tradsperson. There are over 20 trades ranging from concrete and steel workers to telecommunications technicians. There are many career pathways and opportunities available to prospective employees willing to apply themselves.

2. Write the correct form of the following words

   a) Elimination  f) Bricklaying
   b) Prefabricated  g) Vocational
   c) Demolition  h) Permission
   d) Certificate  i) Committees
   e) Sprinkler  j) Participate

Comprehension

Read the following passage and answer the questions in the spaces provided.

The construction industry, put simply, is an industry of which the purpose is to erect structures, from simple house structures to major multi-storey civil and commercial structures. A construction project begins with an idea and ends with the completion of the final structure. From beginning to end there are several stages and each stage has its own series of steps. In order for each stage of the project to be completed successfully effective communication is vital. Communication can only be considered successful when the receiver of the information understands exactly what the sender of the information intended. Feedback from the receiver of the information to the sender of the information can determine if the communication was successful. Workplace communication is how we convey or share information in the workplace. People use a wide variety of ways to communicate with each other. Sometimes these are used alone or combined together to make a message or information clearer. Methods of communication include verbal, written, electronic and non-verbal. When communicating you must be accurate, clear, concise, comprehensive and logical.
3. What is the main purpose of the construction industry?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

4. What is the most important tool that is used in the building and construction industry to ensure a project is completed successfully?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

5. Explain how you would know if someone had understood an instruction you gave them.
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

6. List three different examples used to exchange information.
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

7. Do you think effective communication is important in the building and construction industry? Why?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
MATHEMATICS
Numbers (Measurement, Scales, Decimals, Rounding, Estimates, Scientific Notation)

1. What unit from the list below would you use to measure
   (a) length
   (b) time
   (c) temperature
   (d) weight
   (e) area
   (f) speed
   (g) volume
   (h) cost
   
<table>
<thead>
<tr>
<th>kg</th>
<th>ml</th>
<th>km/hr</th>
<th>m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>m</td>
<td>min</td>
<td>C</td>
</tr>
</tbody>
</table>

2. From the list of numbers below, select the one which is a
   (a) percentage
   (b) decimal number
   (c) fraction
   (d) mixed number
   (e) ratio
   (f) angle

<table>
<thead>
<tr>
<th>3/8</th>
<th>35</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:4</td>
<td>16·37</td>
<td>2⅓</td>
</tr>
</tbody>
</table>

3. Write as a number:
   (a) two thousand six hundred and thirty four
   (b) fifty six thousand and eighty seven.

4. Round
   (a) 35·6754 to two decimal places
   (b) 425·8 to the nearest tens
   (c) 248 to the nearest hundreds

5. Estimate the
   (a) height of a standard door
   (b) length and width of A4 sized paper
   (c) average weight of a medium sized egg
   (d) amount a coffee cup will hold
   (e) distance an adult will walk in a hour
   (f) area of an adult’s shoe
   (g) boiling point of tap water
   (h) angle between the floor and wall
   (i) weight of a normal motor vehicle
6. Write the following decimals in descending (largest to smallest) order.

<table>
<thead>
<tr>
<th>7.19</th>
<th>71.9</th>
<th>0.719</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Simplify:

(a) \(2 + 3 \times 4\)

(b) \(4 - 10 \div 2\)

(c) \(50 \div 50\)

(d) \((16 - 5) \times 3\)

(e) \((75 \div 5) \div (12 \div 4)\)

(f) \(8^2\)

(g) \(\sqrt{25}\)

Operations (Addition, Subtraction, Division, Multiplication)

8. Subtract

a. 1784 from 5218

b. 2961 from 4318

9. Find the total of:

a. $2, $21.45 and $8.23

b. 18.32, 471.019 and 315

c. 2.63m and 50cm

10. Multiply

a. 6.87 by 10

b. 13.8 by 3

c. 46.2 by 8.5

11. Divide

a. 3.45 by 10

b. 3024 by 14

c. 56.2 by 0.2

12. Select the best estimate for each of the following:

(a) \(4249 \times 71\)

<table>
<thead>
<tr>
<th>280000</th>
<th>150000</th>
<th>28000</th>
</tr>
</thead>
</table>

(b) \(80000 \div 38\)

| 200 | 2000 | 20000 | 4000 |
13. Add the following
   (a) $\frac{1}{4}$ and $\frac{1}{2}$
   (b) $\frac{2}{9}$ and $\frac{5}{6}$
   (c) $3\frac{1}{4}$ and $\frac{1}{8}$

14. Subtract the following:
   (a) $\frac{5}{6}$ and $\frac{1}{4}$
   (b) $2\frac{1}{14}$ and $\frac{4}{7}$

15. Express as a fraction in lowest terms:
   (a) 0·75
   (b) 2·6
   (c) 30%

16. Which fraction is mid-way between $\frac{1}{4}$ and $\frac{3}{4}$?

17. A carpenter was making a bookcase. He hit a nail 6½ cm long through a piece of wood 2¼ cm thick and into a large piece of wood. How far did the nail go into the large piece of wood?

18. Evaluate the following:
   (a) 10% of $44$
   (b) 25% of 12·84.

19. Michelle earns $500 a week. She gets a pay rise of 5%. What is her new wage?

20. An article bought for $250 is sold for $375. Find:
   (a) the profit
   (b) the profit as a percentage of the cost price.

21. Jonathan the painter buys the following from a paint store: paint $215; rollers and brushes $95; cleaning fluids $12; and plastic covers $8. Jonathan gets 10% trade discount. How much will Jonathan pay
   (a) without discount
   (b) with discount?
   (c) How much has he saved?

22. Barry scored 80% in a TAFE exam. There were 25 questions.
   (a) How many questions did Barry get right?
   (b) How many questions did Barry get wrong?
Decimals

23. Find the decimal number halfway between:
   (a) 0.6 and 0.8
   (b) 2.8 and 2.9

24. A plastic pipe costs $8.00 a metre. How many complete metres of pipe could I buy for $60.00?

25. A dinner bill was divided equally among 6 people. The total of the bill was $48.60.
   (a) How much did each pay?
   (b) If Tuesday is half price day, how much will each pay?

26. Phil is a plasterer and earns $12.00 an hour for a normal 40 hour week. For any overtime, he receives time-and-a-half thereafter. How much does he receive for working 42 hours?

Geometry

27. Estimate the size of the following angles by selecting the appropriate answers from the list below.

   (a) 30
   (b) 110
   (c) 170
   (d) 30
   (e) 110
   (f) 170

28. Find the value of x° in the following:

   (a)  
   (b)  

Shapes

29. Which shapes below best represents a

   (a) circle
   (b) triangle
   (c) rectangle
   (d) square
   (e) semicircle
   (f) parallel lines
   (g) cross
   (h) star
   (i) cube
   (j) cylinder
   (k) diagonal
   (l) right angle
   (m) revolution
   (n) right angled triangle
   (o) straight angle
   (p) circle and diameter
   (q) circle and radius
30. Find the perimeter of these shapes.

31. If each square represents 1 square centimeter, what is the area of the shape shown?

32. A bricklayer estimates there are 55 bricks to the square metre. How many bricks are needed for a 6 square metres wall?

33. A circular flowerbed with a radius of 3 metres is to be surrounded by a concrete path 1 metre wide. Calculate the area of the path?

34. In the question above, a quote to supply and lay the concrete is $10 per square metre, what is the cost of the path?

35. An oil can in the shape of a cylinder has a radius of 6 cm and a height of 20 cm. What is the volume of the can?

36. David is going to paint his ceiling in the lounge room which measures 6 metres by 3 metres. One litre of ceiling paint covers 12 square metres.

(a) What is the area of the ceiling?
(b) How many litres of paint will he use?

37. What is the area of these shapes?

38. Calculate the area of this circle? Use \( A = \pi r^2 \) and \( \pi = 3.14 \).
39. If each cube represents 1 cubic centimetre, what is the total volume of the shape shown? 

40. Calculate the volume of the cylinder using the formula \( V = \pi r^2h \) and \( \pi = 3.14 \). 

41. If the volume of this box is 24 cubic metres, how high are the sides? 

42. Calculate the pitch line length of the gable roof? 

43. A wooden gate 80 cm wide and 120 cm high needs a diagonal brace for support. How long will the brace be?
44. A ready-mix company uses metal, sand and cement in the ratio of 7 : 5 : 3. What amount of cement is needed for a 15 m³ job? 

45. The scale on a drawing is 1 : 100. What length will be represented by a measurement of 8 cm on the drawing?

46. What is the ratio of the number of circles to squares?

47. Adam always mixes 8 shovels of sand with 10 shovels of metal when he makes concrete. How many shovels of sand will Adam mix with 50 shovels of metal?

**Problem Solving**

48. Calculate the cost of 40 hinges at $3.00 a pair?

49. Five litres of glue costs $65.00. How much will 1 litre cost?

50. Jeff’s yearly salary is $31,200. Calculate his:
   (a) monthly salary
   (b) fortnightly salary.

51. Peter the carpenter is paid $10.00 per hour plus time and a half for any hours over 35 hours. If he worked 42 hours, what was his pay for
   (a) the first 35 hours work
   (b) the overtime work only
   (c) total pay?

52. My car uses 10 litres of petrol every 300 kilometres. What is the rate of petrol consumption in km per litre?

53. A 3600 litre water tank is a ¼ full.
   (a) How much water is in the tank?
   (b) How much is empty space?

54. Simon is a bricklayer. He uses 50 bricks to build a 1 square metre wall. How many bricks are needed to build a wall that measures 6 metres by 3 metres?
ENGLISH

1. billion, commercial, majority, either, apprentice, tradesperson, concrete, steel, telecommunication, career, opportunities, employees

2. Elimination, Prefabricated, Demolition, Certificate, Sprinkler, Bricklaying, Vocational, Permission, Committees, Participate

3. The main purpose of the industry is to build structures. These structures could range from family homes to large business structures.

4. Communication is the most important tool or skill to use to ensure a project is completed successfully. There are so many stages between the start and completion of a structure that require people to communicate with each other.

5. You can tell if someone has understood the instruction you gave them from the feedback the receiver gives you. The feedback might be given to you verbally, ie: ‘Yes I understand’, could be given to you in written form, electronic or non-verbal ie: a nod of a head.

6. Verbal: speaking to each other, Written: sending a request, Electronic: sending an email

7. Yes, it’s very important. There are so many stages between the commencement of a structure to the completion. Several tradespeople are involved and are often relying on work to be completed before they can start theirs. If there is a break down in communication, stages can become delayed, structures aren’t built properly, the building of the structures might have to start again and generally time and resources are wasted. Break down of communication can become very costly as well!!

MATHMATICS

1. m, min, °C, kg, m², km/hr, ml, $  
2. 25%, 16·37, 3/8, 2⅓, 5:4, 35°
3. a) 2,634, b) 56,087  
4. a) 35·68, b) 430, c) 200
5. a) 2m, b) 30cm, 20cm c) 50g, d) 250-350ml, e) 3km, f) 240cm², g) 100°C, h) 90°, i) approx 1,400kg
6. 71·9, 7·19, 0·719  
7. a) 24, b) -1, c) 2, d) 33, e) 5, f) 64, g) 5
8. a) 3,434, b) 13·719  
9. a) $31.68, b) 804·339, c) 2680cm or 2·68m
10. a) 68·7, b) 41·4, c) 392.7 11. a) 0·345, b) 216, c) 281
12. a) 28,000, b) 2,000 13. a) ⅓, b) 57/54 or 11/18, c) 27/8 or 33/8
14. a) 7/12, b) 21/14 or 1½ 15. a) ⅔, b) 13/5, c) 3/10
16. ½ 17. 4½cm
18. a) $4.40, b) 3·21 19. $525
20. a) $125, b) 50% 21. a) $330, b) $297, c) $33
22. a) 20, b) 5 23. a) 0·7, b) 2·85
24. 7 25. a) $8.10, b) $4.05
26. $516 27. a) 30°, e) 110°
28. a) 44°, b) 150°
30. a) 36m, b) 32 units 31. 14cm²
32. 330 Bricks 33. 21·98m²
34. $219.80 35. 2,260·8cm³
36. a) 18m², b) 1·5litres 37. a) 8m², b) 40m²
38. 314m² 39. 6cm³ 40. 628m³
41. 3m 42. 5m 43. √20,800cm
44. 3m³ 45. 800cm 46. 3·2
47. 40 48. $120 49. $13.00
50. a) $2,600, b) $1,200 51. a) $350, b) $105, c) $455
52. 30km/l 53. a) 900 litres, b) 2,700 litres
54. 900 Bricks