Measure Booklet

This booklet has been made so that a calculator will not be required unless otherwise stated.

Contents

Chapter 1: Basic Tolerance

1. Write the following in tolerance form (Don't forget units)

   a) Min = 30cm, Max = 40
   b) Min = 130g, Max = 200g
   c) Min = 9mm, Max = 10mm
   d) Min = 13kg, Max = 16kg
   e) Min = 11m, Max = 20m
   f) Min = 6.4cm, Max = 6.8cm
   g) Min = 1.3mm, Max = 1.6mm
   h) Min = 1.1m, Max = 2.2m
   i) Min = 0.05L, Max = 0.1L
   j) Min = 0.001m, Max = 0.01m

2. For a machine to accept bottles of juice they must be between 498.8ml and 501.4ml. Write this in tolerance form.

3. The number of pieces in a box of k'nex is at most 230 and at least 185. Write this in tolerance form.

4. A plane going between Birmingham and Belfast will carry at most 120 passengers. If there is less than 34 passengers, the flight will not go. Write this in tolerance form.

5. The thickness of playing cards allowed in Poker nights in a casino is at least 0.17mm and at most 0.24mm. Write this in tolerance form.

6. The minimum amount of salt in an exotic fish tank is 30g for every litre
   The maximum amount of 15% more.
   Write the tolerance for the amount of salt allowed in an exotic fish tank.

7. The volume of liquid in a bottle of juice is 1.2L. The minimum is 10% less than this. Write the tolerance for the amount of liquid in a bottle of juice.

8. The number of screws in a box is at least 300. The maximum is 12% more. Write the tolerance for the number of screws in a box.

9. Write the maximum and minimum for each of the following

   a) 24cm $\pm$ 5
   b) 5000m $\pm$ 250
   c) 180km $\pm$ 40
   d) 9kg $\pm$ 3.5m
   e) 1g $\pm$ 0.25

f)   40g ± 7.5

g)   66ml ± 9.5

h)   91g ± 6.75

i)   0.3mm ± 0.24

j)   0.5cm ± 0.03

10.   Write the maximum and minimum of each of the following.

a)   50mm ± 5%

b)   120m ± 20%

c)   £3000 ± 2%

d)   4500 ± 15%

e)   2200m ± 25%

f)   17 000 ± 35%

g)   40km ± 2.5%

h)   55mg ± 10%

i)   80° ± 17.5%

j)   90km ± 34%

11.   The amount of ham in a packet has a tolerance of 180g±15
      State <u>YES</u> or <u>NO</u> if the following are within the tolerance.
      a) 188g
      b) 183g
      c) 163g
      d) 191g
      e) 198g
      f) 0.17kg

12.   Andy records all of his times running. His times are within the tolerance of
      140seconds ± 22.
      Which of the following must not be one of Andy's times. (State YES or NO)
   a) 117 s
      b) 156 s
      c) 164 s
      d) 2mins 4 seconds
      e) 2 mins 38 seconds
      f) 1 minute 54 seconds

13.   Lenny buys shares in different companies. The algorithm he uses means he
      only buys shares in the tolerance of £2.40 ± 25%. Which of the following are
      tolerances that Lenny could potentially buy (State YES or NO)
      a) £1.95
      b) £3.12

c) £2.99
d) £1.78
e) £2.55

14. A bus company plan that the 5b route should take 90minutes ± 5%
Which of the following would be acceptable journey times for the route
(State YES or NO)
a) 93minutes 41 seconds
b) 89minutes 11 seconds
c) 95minutes 48 seconds
d) 87minutess 5 seconds
e) 83minutes 31 seconds
f) 5820 seconds

15. Grace measures the dimensions of her rectangular garden as being 19m by
12.5m. The instrument she uses has a degree of error of ±1m.
What is the maximum area that her garden could be?

16. (Calculator) The dimensions of Henry's rectangular patio are 800cm by
375cm. The instrument he uses to measure has a ± 20% degree of accuracy.
What is the minimum area of Henry's patio.

17. (Calculator) Zoe uses an app on her phone to measure the dimensions of her
living room. They are measured as below.
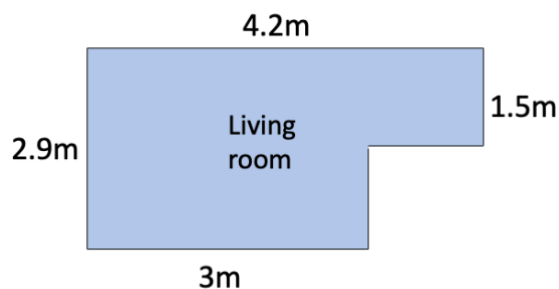
In the terms and conditions of the app it states that there is a ±5% error.
With this in mind calculate the maximum area of Zoe's living room.

18. (Calculator) The maximum size of a large bottle is 29.68cm. The minimum
size is 26.32cm. Write the size allowed for the bottle in tolerance form with
percentages (...cm ± ... %)

19. The maximum amount of people on a rollercoaster ride is 48, the minimum
before it is allowed to start is 32. Write the tolerance for the number of
people on a rollercoaster as a percentage (... ± ... %)

20. (Calculator) The maximum temperature for a freezer in a restaurant is -16.5°C and at a minimum -19.5°C. Write the tolerance for the temperature in the freezers as a percentage. (…°C $\pm$ … %)

21. (Calculator) The weight of a bread roll from a bakery to be suitable for selling must be at most 58g and at least 45g. Write the tolerance of the weight of a bread roll as a percentage (…g $\pm$ …%)

Chapter 2: Tolerance Exam Style Questions

1.   A lorry is bring filled with boxes. Beforehand the boxes have been measured and all fall within the tolerance of 62kg $\pm$ 4. If there are 80 boxes in the lorry then what is the maximum possible weight of all the boxes.

2.   Amount of liquid in bottles of cleaning product are 300ml $\pm$ 5%. What is the maximum possible amount of liquid in 200 bottles.

3.   The amount of cardboard needed to make packaging for toys is 400cm^2 $\pm$ 20. Calculate the maximum amount of cardboard needed for 45 toys.

4.   The amount of flour that Miss Robinson uses to make a cake is 300g $\pm$ 2.5%.

   a)   What is the minimum amount of flour that Miss Robinson will use.

   Given that 500g bags of flour cost £0.58.

   b)   What is the minimum amount that Miss Robinson will spend if she wants to make 6 cakes.

5.   An average person weight is 62kg$\pm$10%. A lift states that it can hold 15 people. What is the maximum weight the lift can hold?

6.   The temperature in the cupboards of a restaurant is supposed to be within the tolerance of 18.5^{o}C $\pm$ 1.7. The following temperatures were recorded (in degrees Celsius). What fraction are **within** the tolerance?

   20.9   19.1   19.3   17.1   16.5   18.6   16.9   17.4   18.3   15.8   17.0

7.   The mass of metal brackets is recorded in grams below. The metal brackets should be within 20g $\pm$ 1.5. The following are all in grams.

   18.9   19.5   20.6   18.2   21.1   19.7

   22.0   21.3   19.8   17.9   20.1   18.1

   What fraction of them are **within** the tolerance?

8. The price of different crisps in a shop is normally within the tolerance of £0.55 ± 0.07, the prices below are all in pounds.

    0.44 0.60 0.56 0.58 0.61
    0.58 0.65 0.53 0.49 0.51
    0.56 0.63 0.58 0.51 0.46
    0.55 0.57 0.49 0.67 0.54

    What fraction is **outside** the tolerance?

9. The amount of wool used to make jumpers is normally 800 yards ± 15%. The amount of wool used to make different jumpers is written below.

    855   940   901   799   690
    840   825   650   780   850
    915   875   700   620   840

    Calculate what fraction is **within** the tolerance?

10. Ink cartridges from a brand of printer can print 240±10%. The amount of pages printed from different ink cartridges is written below.

    236   208   255   261   254   260
    218   228   254   209   288   211
    299   233   289   248   237   271

    What fraction is **outside** the tolerance?

11. The minutes on different albums is recorded below. The length of a standard album is 51 ± 3 minutes. The following shows the length of albums in minutes.

    53   56   49   48   50   55   50   52   54   46

    Calculate what percentage of the albums are **within** tolerance of a standard album.

12. The length of screws as supposed to be within the tolerance of 22.3mm±0.8. The length of 20 different screws is written below.

22.5 22.0 21.9 21.5 23.5
21.8 23.8 22.5 21.8 21.9
22.0 21.1 21.8 22.1 22.4
20.8 22.3 22.4 24.1 22.9

Calculate what percentage is **within** the tolerance.

13. The amount of liquid in eye drops should be within the tolerance of 40ml±0.5. The amount of 24 different eye drops in ml is recorded below.

40.8 40.4 39.8 39.9 39.7 39.6
40.0 40.1 39.4 40.3 40.4 39.7
41.1 39.7 39.8 40.9 40.3 40.1
39.9 40.3 40.6 39.2 39.5 41.2

Calculate what percentage **fell outside** the tolerance.

14. William records his times to complete his race. Most of his races fall within 102seconds±9. William records 12 race time below.

108   113   99   98   106   104
91   104   102   90   105   112

Calculate what percentage are **within** the tolerance.

15. (Calculator) The amount of liquid in detergent should fall in the tolerance of 1200ml ± 2.5%.

1213 1190 1184 1245 1211 1181 1175 1225
1201 1165 1213 1198 1221 1248 1240 1159

Calculate what percentage **fell outside** the tolerance.

16. (Calculator) The weight of scones at a bakery need to be within the tolerance 52g ± 2.25

53.40 51.80 49.65 53.14
52.75 50.50 53.76 52.27
48.78 53.60 56.08 50.65

Calculate what percentage is **within** the tolerance.

17.   The price of milk in different shops per 500ml is normally within the tolerance £0.42 ± 0.08. Milk prices across different shops is written below.

0.45   0.36   0.31   0.41   0.40   0.39   0.49   0.53   0.38   0.30
0.48   0.35   0.31   0.40   0.36   0.45   0.44   0.32   0.48   0.56

Calculate the percentage that are **within** the tolerance.

18.   Lengths of wire are sold in bundles. The bundles are supposed to be within the tolerance of 2000cm±8%.

1750   2090   2110   2020   1890
1990   2140   2100   2060   2030
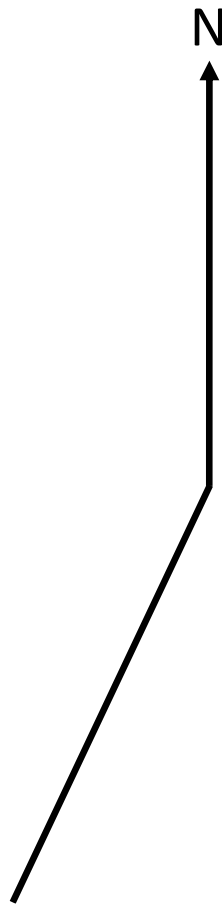1950   1990   1860   1780   2140
2160   2020   1760   1980   2230

Calculate what percentage **fell outside** the tolerance.

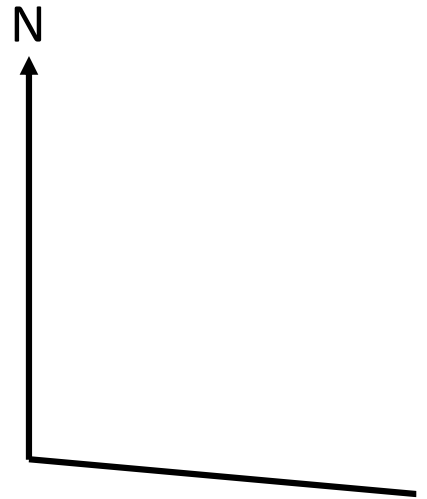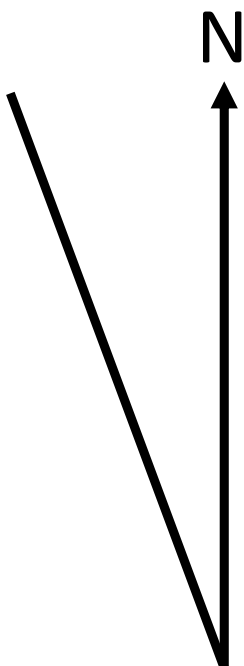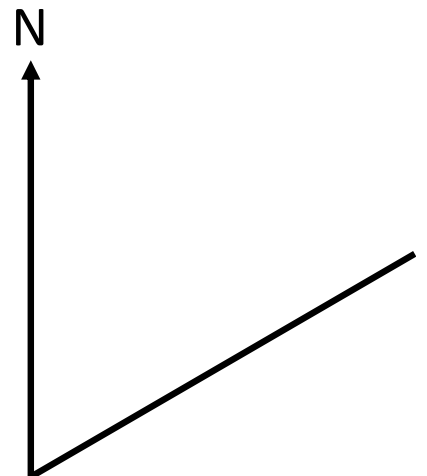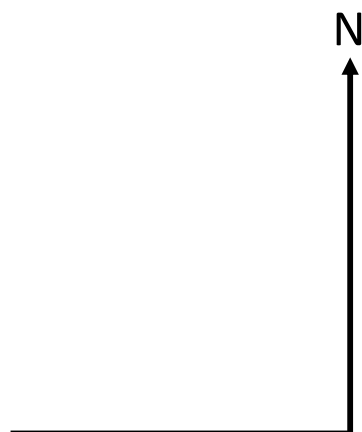# Chapter 3: Directions and Bearings

1

N

2

N

3

N

4

N

5

N

6

N

7

8

9

N

N

N

10

11

12

N

N

N
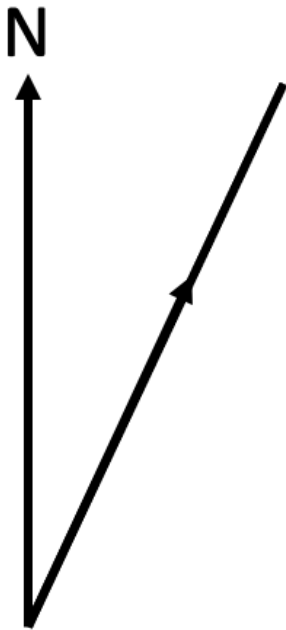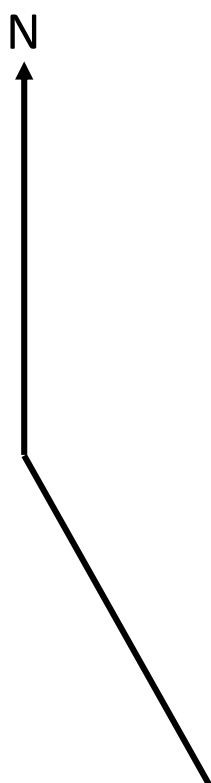
13. Draw the following bearings.

      a)   065
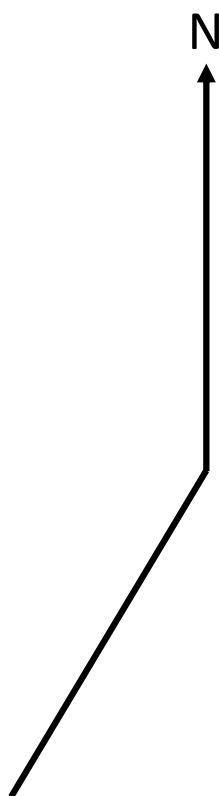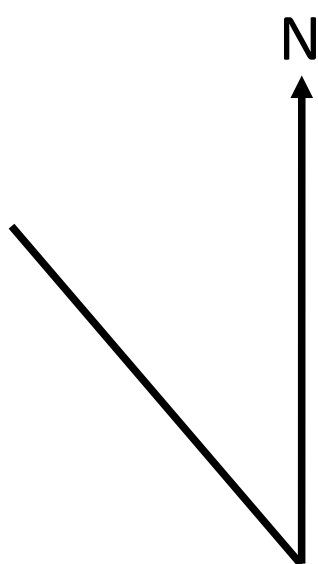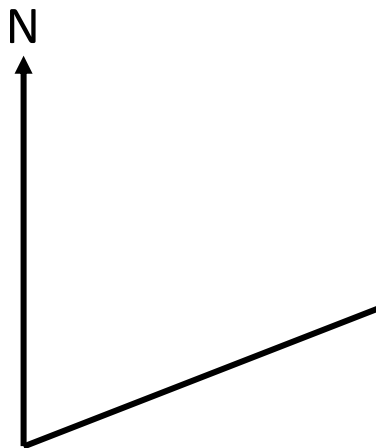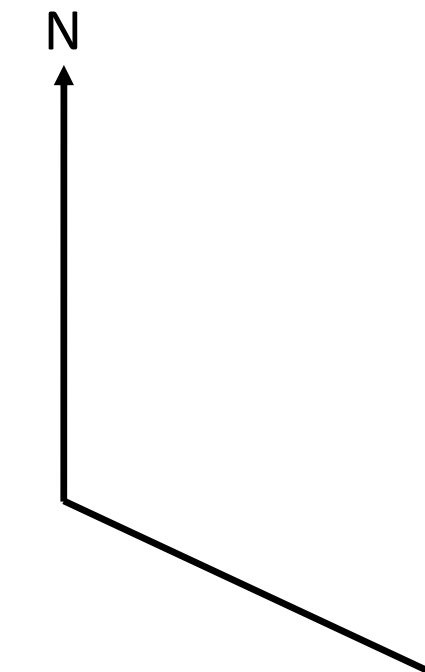   b)   130
      c)   220
      d)   085
      e)   165
      f)   260
      g)   315
      h)   190
      i)   060
      j)   272

14. State the bearing of each of the following directions

      a)   East
      b)   South
      c)   South West
      d)   North East
      e)   West
      f)   South East
      g)   North West

15. Draw each of the following bearings along with the current length of line.

      a)   4cm line on a bearing of 050
      b)   6cm line on a bearing of 120
      c)   9cm line on a bearing of 250
      d)   7cm line on a bearing of 175
      e)   5cm line on a bearing of 100
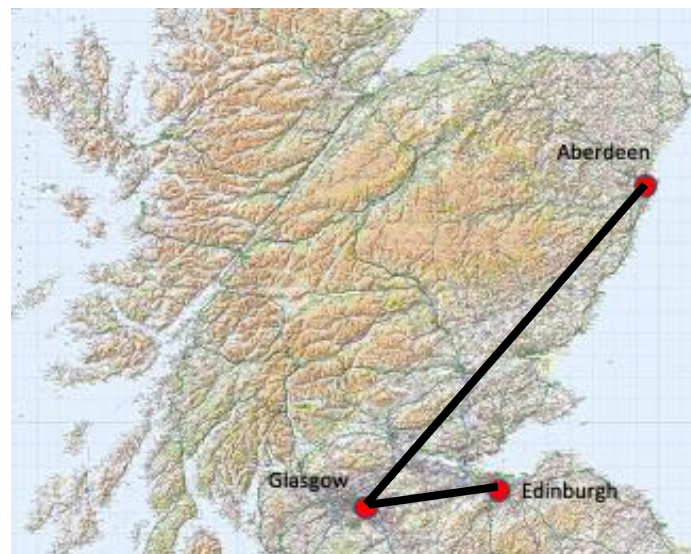
Chapter 4: Scale Drawings

1. Use the following map below and the scale that 1cm = 32 miles. Calculate the real distance between Bordeaux and Toulouse.

2. Use the following map and the scale of 1cm = 220 miles to calculate the real distance between Shanghai and Tokyo.

3.   (Calculator) The map is of Scotland and shows Aberdeen, Glasgow and Edinburgh with the scale 1cm =28miles .

a)   Use the map and scale drawing to estimate the distance between Glasgow and Aberdeen.

A train travelling between Glasgow and Aberdeen cannot travel directly there for obvious reasons and covers an extra 62 miles. Using this and that the journey takes 4 hours.

b)   Calculate the average speed of the train

If the train travels the same speed between Glasgow and Edinburgh.

c) Calculate how long it takes to for the train to make that journey in minutes to the nearest whole minute.

4. (Calculator) The map is of the South of England and highlights London, Southampton and Brighton and Hove with a scale of 1cm = 10 miles.

a) Use the map to estimate the distance between London and Southampton.

A train travelling between London and Southampton cannot directly travel there and must travel an extra 23 miles. Given the train journey takes an 1 hour and 30 minutes.

b) Calculate the average speed of the train from London to Southampton.

A train travels the same speed between London and Brighton and Hove. The train must travel the distance between them with an extra 17 miles.

c) Calculate how long this journey will take in hours and minutes (to the nearest whole minute).

5.   (Calculator) The following map is of the East Coast of North America and shows Quebec, Nashville and Boston with a scale of 1cm = 185 miles.

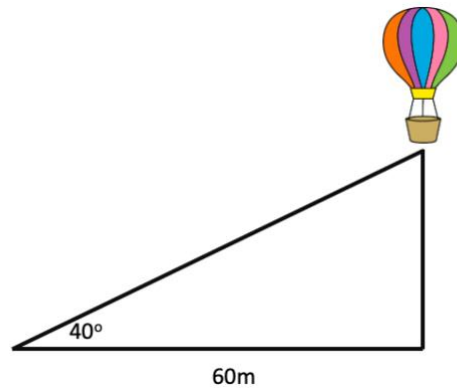a)   Calculate the real distance between Boston and Nashville.

A plane makes this journey in 3 hours.

b) Calculate the average speed of the plane when it makes this journey.

If a plane travels the same average speed from Nashville to Quebec.

c) Calculate how long this journey will take.

6.   A hot air balloon is 60m away from where it started and the angle is 40°.

   a)   Using the scale of 1cm = 10m. Make a scale drawing.
   b)   Measure how far off the ground the balloon is in the diagram.
   c)   How far is the balloon off the ground in reality.

7.   A tower is 120m away and at an angle of 35°.
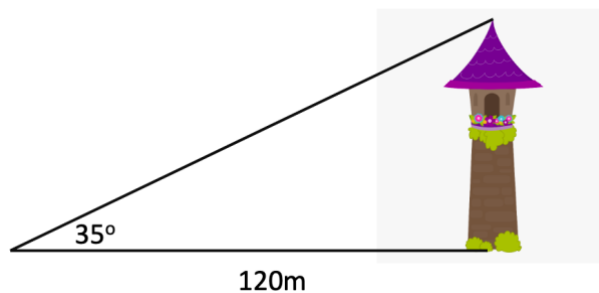
   a)   Using a scale of 1cm = 8m. Make a scale drawing.
   b)   Calculate the real height of the tower.

8.   A bank is 40m away and at an angle of 55 degrees.
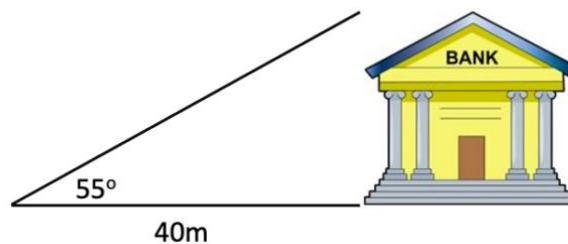
   a)   Using the scale of 1cm = 5cm. Make a scale drawing.
   b)   Calculate the real height of the bank.

9.   A stadium is 500m away and an angle of 8 degrees.
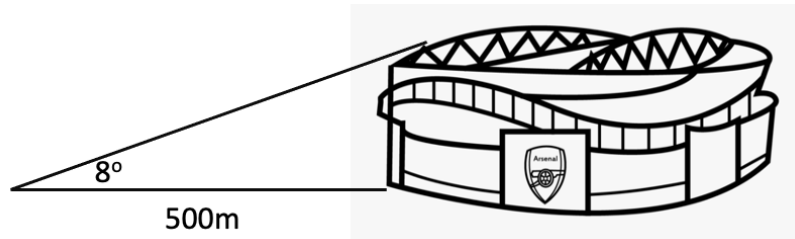
a)   Make a scale drawing with the scale of 1cm = 50m.
b)   Calculate the real height of the stadium.

10.   An excessively tall statue is shown below.

75°

18m
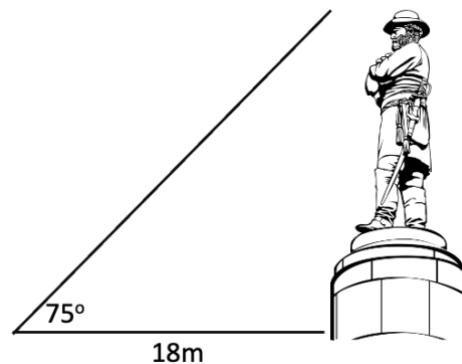
a)   Using the scale of 1cm=3m. Make a scale drawing.
b)   Calculate the real life height of the statue.

11.   A building is shown below

36°

90m
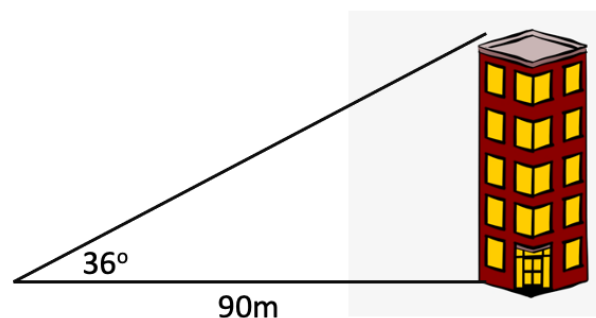
a)   Using a scale of 1cm = 9m. Make a scale drawing.
b)   Calculate the real height of the building.

12. A drawing of a helicopter is below.

h

55°   40°

20m
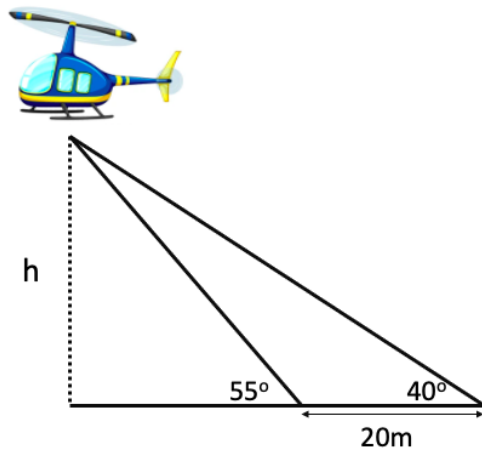
a)   Using a scale of 1cm = 10m. Make a scale drawing.
b)   Calculate the real height of the helicopter above the ground.

13. A diagram of a trial rocket is shown below.

h

35°   65°

180m
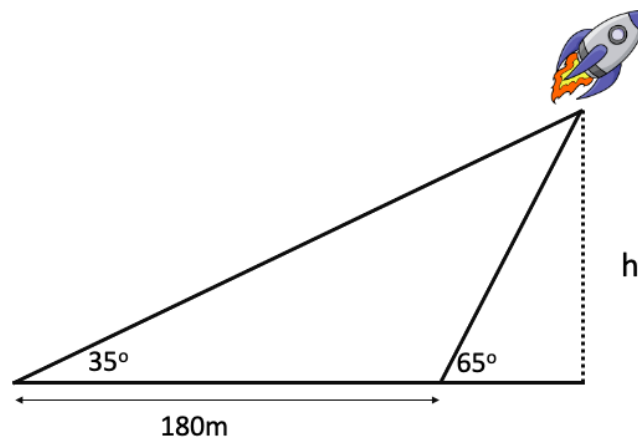
a)   Using the scale of 1cm = 60m. Make a scale drawing.
b)   Calculate the real height of the rocket.

14. A diagram of a tower is below.

h

30°   45°

50m
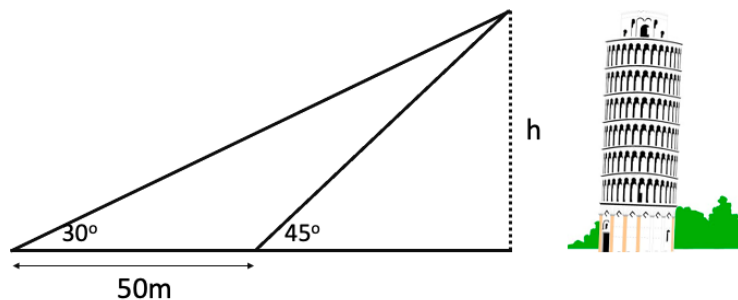
a)   Using of scale of 1cm = 10m. Make a scale drawing.
b)   Calculate the real height of the tower.

15.   Two satellites are 12,000 miles above the ground.
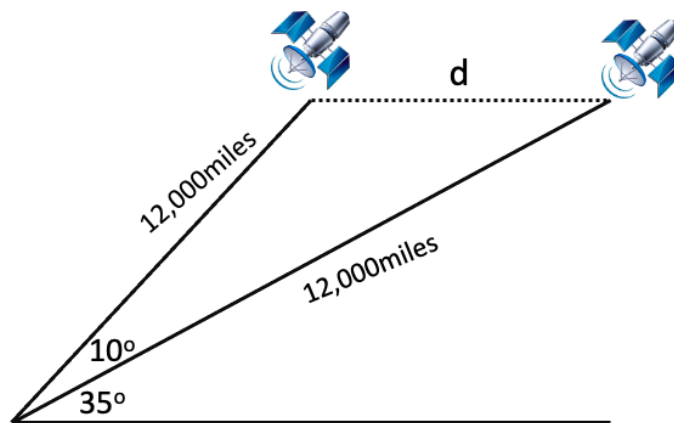
a)   Using the scale of 1cm = 2000miles, make a scale drawing.
b)   Use this to calculate the distance between the two satellites

16.
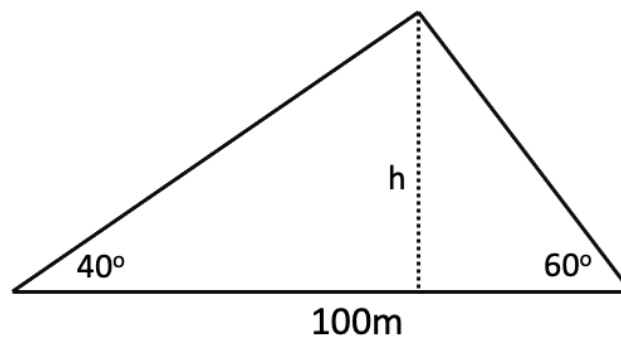
a)   Use a scale of 1cm = 10m, make a scale drawing.
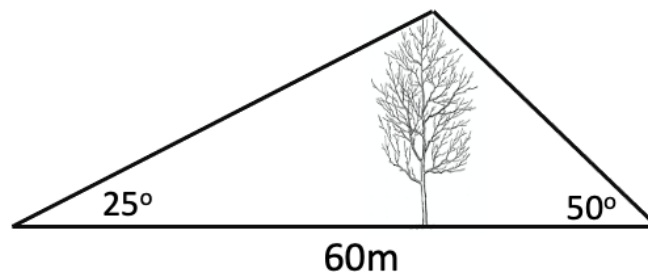b)   Calculate the real height h.

17.   A drawing of a tree is below.

a)   Use a scale of 1cm = 6m. Make a scale drawing.
b)   Calculate the real height of the tree.

Chapter 5: Scale Drawings with Two Journeys

1. The bearings and distances of two ships A and B from a port P are
    A [036°,144km] and B[114°,97km].
    a) Make a scale drawing of this. Use scale of 1cm = 20km.
    b) How far away are the ships from each other.

2. An airplane is 200km from an airport on a bearing of 208°, while a
    second airplane is 170km from the same airport on a bearing of 094°.
    a) Make a scale drawing of these journeys. Use Scale 1cm = 40km.
    b) How far away are two planes from each other.

3. An airplane leaves Heathrow and flies 400km on a bearing of 100°.
    It then turns and flies 280km on a bearing of 160°.
    a) Make a scale drawing of the journey the planes takes.
    Use Scale of 1cm = 40km
    b) How far away is the plane from Heathrow.

4. The bearings and distances of two ships Alpha and Beta from a port P are
    Alpha [058°,76km] and Beta [108°,87km].
    How far apart are the ships?
    a) Make a scale drawing of the journeys. Use 1cm = 10km.
    b) How far apart are the ships from each other.

5. A ship leaves port P and sails 91km east. It then turns and sails 99km on a
    bearing 136°.
    a) Make a scale drawing of this journey.
    b) How far away is the ship from the port.

6. Two radar stations R1 and R2 pick up signals from an incoming aircraft. R1 is
    80km north of R2. Station R1 picks up the signals on a bearing of 102° and
    station R2 on a bearing 067°. How far is the aircraft from R1?

7. Plane BA37 is 760km from an airport on a bearing 200°, while plane Vir22 is
    570km from the same airport on a bearing 166°. How far apart are the
    planes?

8. A plane leaves an airport A and travels on a bearing of 065 for 320 miles to
    point B.
    The plane turns and travels on a bearing of 150 for 180 miles to point C.

a) Make a scale drawing on this journey.

b) Calculate the real distance the plane is now from the airport.

c) Calculate the bearing of the airport from point C

9. A boat B_1 leaves a harbour H. It travels East for 90km. A second boat B_2 travels on a bearing of 230 from the harbour for 60km.

a) Make a scale drawing of this.

b) Calculate the real distance between the two boats.

c) Calculate the bearing of B_1 from B_2.

10. A golfer is standing at the tee and hits a golf ball 224 yards on a bearing of 110°. From there the golfer hits his second shot on a bearing of 124 and it travels 172 yards onto the green.

a) Calculate how far away the tee is from where the second shot landed.

b) Calculate the bearing from the second shot back to the tee.

11. Two planes leave an airport A at the same time.
    - P_1 flies for 90 minutes at a speed of 280mph on a bearing of 025.
    - P_2 flies for 2 hours at a speed of 250mph on a bearing of 100.

a) Make a scale drawing to show these journeys.

b) Calculate how far away plane 1 is away from plane 2.

c)What is the bearing from P_2 to P_1.

12. The bearings and distances of three oil rigs from a port are Oilrig1 [027°,90km], Oilrig2 [100°,150km] and Oilrig3 [235°,130km].
A supply ship leaves port and visits the three oilrigs one after the other and then returns to port.
Find the total distance travelled by the supply ship

Chapter 6: Distance, Speed and Time (Basic)

1.   Calculate the speed, distance or time of the following.
   a)   Find the distance a car will go if it travels 45mph for 3 hours.
   b)   How long will it take for a bike to travel 60 miles if it travels 15mph
   c)   Find the distance a jet will travel in 2 and a half hours if it goes at 180mph.
   d)   What is the average speed of a bus going if it travels 41miles in 2 hours?
   e)   What is the average speed of a helicopter that goes 198 miles in 3 hours?
   f)   What distance will a tractor go if it travels 12mph for 30 minutes?
   g)   How long will it take a car travelling 30mph to go 90 miles?
   h)   What distance will a man walking 8kmph for 1 hour and 45 minutes
   i)   How long will it take a plane to travel 1250 miles if it travels 250mph?
   j)   What distance will a boat travel if its average speed is 48mph for 1 hour and 30 minutes?
   k)   What is the average speed of a car in mph that goes 25miles in 30 minutes?
   l)   What distance will a hiker cover, if they travel 9kmph for 1 hour and 20 minutes?
   m)   How long will it take for a car to travel 60 miles if it travels 40mph?
   n)   What is the average speed in kmph of a bike that goes 18km in 45 minutes?

A calculator is allowed in the rest of the questions.

2.   Convert the following into decimal hours.
   a)   6 minutes
   b)   30 minutes
   c)   40 minutes
   d)   1 hour 20 minutes
   e)   3 hours 15 minutes
   f)   2 hours 12 minutes
   g)   4 hours 35 minutes
   h)   2 hours 42 minutes
   i)   1 hours 45 minutes
   j)   2 hours 20 minutes
   k)   3 hours 15 minutes
   l)   2 hours 18 minutes
   m)   5 hours 2 minutes
   n)   2 hours 51 minutes

3.   Convert the following into hours and minutes.
   a)   0.5hours
   b)   0.2 hours

c)   0.3333333 hours
d)   1.5 hours
e)   2.25 hours
f)   3.6666666 hours
g)   4.7 hours
h)   1.85 hours
i)   0.93333333 hours
j)   2.46666666 hours
k)   1.76666666 hours
l)   3.01666666 hours

4.   How far will a car go if it travels 38mph for 1 hours and 12 minutes?

5.   If a bike travels 36km in 2 hours and 20 minutes. What was its average speed?

6.   If a boat travels 50 miles at a speed of 36mph. How long will it take to make this journey in hours and minutes?

7.   A plane flies at an average speed of 320mph for 2 hours and 42 minutes. How far has the plane travelled in this time?

8.   A bus travels 220 miles at an average speed of 48mph. If the bus left at 1205. What time would it arrive at?

9.   A long distance runner travels 26 miles in 2 hours and 2 minutes. What was their average speed?

10.   A plane departs at 1040. It travels 882 miles. If it arrives at 1312 what was the planes average speed?

11.   A bus leaves Glasgow at 2134. It travels at an average speed of 38mph. If it arrives at 0105 how far has it travelled?

12.   Mary leaves the house at 0450. If she travels 80miles at an average speed of 36mph, what time will she arrive at?

13.   A helicopter travels 40kmph. If it left at 0931 and arrives at 1102, how far has it travelled?

14.   A ferry leaves at 0623. It travels 214km and arrives at 1156. What is the average speed of the ferry?

15.   A submarine travels 89km at an average speed of 44mph. How long will this take in hours and minutes?

16.   A runner completes a 100m race in 18.4 seconds. Calculate his average speed.

Chapter 7: Speed, Distance and Time Exam Style

1.   (Calculator) Alan spent 41 minutes on gym bike. The information from the bike tell him that his average speed is 14.5km/h. Calculate the distance on the bike Alan has travelled.

2.   Jill runs for 24 minutes on a treadmill. She runs at an average speed of 8km/h. How far has Jill ran on the treadmill?

3.   Tim is out riding his bike. He cycles for 42 minutes at an average speed of 18km/h. How far will he travel in this time?

4.   Bella is out of a run. She leaves the house at 0555. She runs 6km at an average speed of 8km/h. What time will she get back to the house at?

5.   (Calculator) Henry runs from 1304 until 1331. In this time he runs 3.8km. Calculate Henry's average speed in kmph?

6.   (Calculator) Naomi runs for 32 minutes on a treadmill. Her average speed is 5.9km/h. Calculate the distance she has run.

7.   (Calculator) James runs on a treadmill. He runs 5.9km at an average speed of 8km/h. How many minutes was James on the treadmill for?

8.   (Calculator) A cyclist completes a 4km cycle in 11 minutes. Calculate his speed in kilometres per hour.

9.   (Calculator) A rally car completes a 4.6km lap in 6 minutes. Calculate his speed in km/hour

10.   (Calculator) A motorbike rider completes a 2.9km in 135 seconds. Calculate his speed in km/h

11.   (Calculator) A race car completes a lap of 4.3 miles in 171 seconds. Calculate the race cars average speed in miles per hour.

12.   (Calculator) An F1 car completes a lap of 5.1 miles in 184 seconds. Calculate the average speed of the F1 car in miles per hour.

13.   Jonah leaves the house at 3.30pm. He returns homes at 4.10pm. His phone tells him that he has walked at an average speed of 0.4m/s. How far has Jonah walked?

14.   Anne leaves the house to walk the dog at 7.15pm. She walks for an average speed of 1.4m/s. She returns home at 7.40pm. Calculate how far Anne walked.

15.   Billy goes out for a bike ride. He leaves at 8.20am and returns at 8.55am. Billy cycled at an average speed of 4.1m/s. Calculate how far Billy cycled.

16. (Calculator) Graham leaves the house at 7.25am. He returns at 7.45am. In this time he travelled 960m. Calculate Graham's speed in metres per second.

17. (Calculator) Ellie gets in the car at 8.10am. She reaches her destination at 9.20am. During that time an app on her phone tells her that she has travelled at 5.1m/s. Calculate how far she has travelled in this time.

18. (Calculator) David gets in his car at 4.00pm. He travels 8500m at an average speed of 6.8m/s. Calculate what time David will arrive at his destination.

19. (Calculator) Helen travels 12.5km by bus. Her phone tells her she has travelled at an average speed of 8.9m/s. How long has it taken for Helen to make this trip.

20. Karen has booked a doctor's appointment that she is travelling to by car.
    - Karen's appointment is as 10.45am
    - The doctor is 12 miles away.
    - Karen's average speed throughout the journey is 20mph.
    What is the latest time that Karen can leave the house?

21. Fraser is going to the cinema. Fraser is going to cycle there.
    - The film Fraser wants to see is at 7.50pm.
    - The cinema is 9 miles away.
    - Fraser's average speed to cycle there will be 15mph.
    - Fraser needs to arrive 10 minutes early to purchase snacks.
    What time should Fraser leave at?

22. Abbie is going to the theatre. Which starts at 8.00pm
    - Abbie lives 68 miles away.
    - She estimates she will be able to drive at 40mph
    - She needs to allow 10 minutes for parking.
    - Abbie would also like to allow 5 minutes to purchase a drink on the way in.
    What time should Abbie leave at?

23. Eric is taking a ferry from Scotland to Belfast.
    - The ferry leaves at 7.35am
    - The ferry is 165 miles away
    - Eric stopped for 30 minutes for breakfast
    If Eric left the house at 4.20am. What was Eric's average speed while he was driving?

24. Isla is travelling back home from university for Christmas.
    - Isla leaves at 2.08.pm
    - Isla stops for 25 minutes for a break
    - Isla arrives home at 7.26.pm
    - Her average speed was 48mph

Calculate how far Isla travelled.

25.   Paul has a meeting in Cardiff.
- His meeting is at 10.10am
- He travels 155 miles at an average speed of 45mph.
- He stops for 20 minutes to get breakfast

Calculate what time Paul should leave the house at.

26.   Gillian is getting a ferry at 8.10am
- The ferry is 105 miles away and she drives at an average speed of 50mph
- Gillian needs to arrive 35 minutes early

If Gillian leaves the house at 5.40am has she left the house in enough time to get to the ferry?

27.   Steven has booked a doctor's appointment at 4.40pm.
- The doctor is 16 miles away.
- Steven will travel an average speed of 24mph.
- Steven needs to allow 5 minutes to get parked

If Steven leaves at 3.52pm has he left enough time?

28.   Katie is going to the cinema for a movie.
- The cinema is 4.8 miles away.
- Katie walks at an average speed of 3mph
- Katie wants to get there 10 minutes early to get snacks.
- She leaves the house at 5.10pm

If the film starts at 6.35pm has Katie given herself enough time to get there?

Chapter 8: Converting Between Different Units

1. Given that
   1 inch = 2.5cm
   Convert the following
   a) 5 inches into centimetres
   b) 12 inches into centimetres
   c) 8 inches into millimetres

2. Given that
   1 gallon = 4.545 litres
   a) How many litres is 10 gallons?
   b) How many litres is 30 gallons?
   c) How many litres is 60 gallons?

3. Given that
   1kg = 2.2lb
   a) How many pounds is 5kg?
   b) How many pounds is 30kg
   c) How many pounds is 4000g?
   d) How many pounds is 60,000g?

4. (Calculator)
   Given that
   1 gallon = 4.545 litres
   a) How many gallons is 30 litres?
   b) How many gallons is 13 litres?

5. Given that
   1 yard = 3 feet
   1 foot = 12 inches.
   Convert the following

   a) 5 yards into inches
   b) 30 yards into inches
   c) 1800 inches into yards

6. (Calculator) Given that
   1 kilometre per hour = 0.54 knots
   a) A boat travels 80km in 4 hours. Calculate it's speed in knots
   b) A boat travels 23km in 1 hour and 12 minutes. Calculate its speed in knots.
   c) A boat sails 250 miles in 6 hours and 15 minutes. Calculate its speed in knots.

7. (Calculator) Given that

1 gallon = 8 pints
1 pints = 473.1ml
a)   How many millilitres is there in 8 gallons?
b)   How many millilitres is there in 0.2 gallons?
c)   How many full gallons are there in 142,000ml
d)   How many full gallons are there in 9000ml

8.   (Calculator) Given that
        1 Furlong = 220 yards
        1 yard = 0.9 metres
        a)   How many metres is 6 Furlongs?
        b)   How many metres is 50 Furlongs?
        c)   How many metres is 200 Furlongs?
        d)   How many metres is 75 Furlongs?

9.   (Calculator)
        Given that
        1 Pint = 4 Gill
        1 Gill = 142ml
        a)   How many ml are there in 4 pints?
        b)   How many ml are there in 30 pints?
        c)   How many ml are there in 15 pints?
        d)   How many full pints are there in 4000ml?
        e)   How many full pints are there in 10,000ml?
        f)   How many full pints are there in 9000ml?

10.   (Calculator)
        Given that
        1 mile = 1609m
        a)   If a car travels 8.5m/s, what is this in mph?
        b)   If a car travels 7.6m/s, what is this in mph?
        c)   If a car travels 4.2m/s, what is this in mph?
        d)   If a car travels 5.6m/s, what is this in mph?
        e)   A car travels along a road at 12.3m/s, if the speed limit of the road is
                30mph, is the car above or below the speed limit?
        f)   If a car travels along the motorway at 32.18m/s. Cars on the
                motorway are not allowed to exceed 70mph. Is the car exceeding the
                speed limit?

11.   (Calculator)
        Given that
        1 miles = 1.61km
        1km = 3280 feet
        a)   How many feet are there in 1 mile?
        b)   How many feet are there in 9 miles?
        c)   How many feet are there in 40 miles?
        d)   How many full miles are there is 80,000 ft

12. (Calculator)
    Given that
    $1km^2$ = 247 acres
    a)   How many acres is a square field that has sides 5km.
    b)   How many acres is a rectangular field 2km wide and 6km wide.
    c)   How many acres is a rectangular field 4.5km by 10km.

13. (Calculator)
    Given that
    1 gallon = 4.545 litres
    a)   If a car can drive 70miles per gallon. How many miles can it go with 8
          litres of fuel?
    b)   If a car can drive 57 miles per gallon. How many miles can it go with
          6 litres of fuel?
    c)   If a car can drive 68 miles per gallon. How many miles can it for with
          10 litres of fuel?

14. (Calculator)
    Given that
    1 gallon = 4.545 litres
    Amy needs to drive 41 miles.
       • Her car can do 59 miles to the gallon
       • She has 3 litres of fuel left.
    Has she got enough fuel left?

15. (Calculator)
    Given that
    1 gallon = 4.545 litres
    Bill needs to drive 82 miles
       • His car can do 70 miles to the gallon
       • If he has 7 litres of fuel left.
    Has he got enough fuel to make the journey?

16. (Calculator)
    Given that
    1 mile = 1.609km
    1 gallon = 4.545 litres
    Matt is driving to his golf club.
       • The golf club is 31 miles away.
       • His car can drive 80 km to the gallon
       • The car has 4 litres of fuel.
    Has he got enough fuel left in the tank?

17. (Calculator)
    Given that
    1 mile = 1.609km
    1 gallon = 4.545 litres

Sarah is driving to her mother's house.
- Her mother lives 40 miles away.
- Her car can drive 74 km to the gallon.
- The car has 3 litres of fuel

Has she got enough fuel in the tank?

18. (Calculator)
Given that
1 mile = 1.609km
1 gallon = 4.545 litres
Linda is driving to the zoo
- The zoo is 21 miles away
- Her car can travel 67 km to the gallon
- Her can has 3.4 litres of fuel

Has she got enough fuel in the tank?

19. (Calculator)
Given that
1 mile = 1.609km
1 gallon = 4.545 litres
Carl is driving to visit relatives
- The relatives are 82 miles away
- Her car can travel 70 km to the gallon
- Her can has 12 litres of fuel

Has she got enough fuel in the tank?

20. (Calculator)
Given that
1 mile = 1.609km
1 gallon = 4.545 litres
John is driving to an amusement park
- The amusement park is 65 miles away
- Her car can travel 54 km to the gallon
- Her can has 7.7 litres of fuel

Has she got enough fuel in the tank?

Chapter 9: Time Management

1. The following shows the time current time in two different cities.

   Glasgow, Scotland   Moscow, Russia
        1300   1600

   a) What is the time difference between Glasgow and Moscow
   b) If the time was 10.12pm in Glasgow what would the time be in Moscow?
   c) If it is 0940am in Moscow, what time is it in Glasgow?

2. The following shows the time in three different cities on the same day.

   London, England   New York, USA   Los Angeles, USA
   3pm   11am   8am

   a) What is the time difference between London and New York?
   b) What is the time difference between New York and Los Angeles?
   c) If it is 5.15am in London England, what time is it in Los Angeles?
   d) A plane leaves New York at 9.20pm. What time is this in Los Angeles?
   e) If it is 11.52am in Los Angeles, what time is it in New York?

3. The times of two cities are shown below on the same day.

   Budapest, Hungary   Tokyo, Japan
   0500   1200

   a) If a plane leaves Budapest to go to Tokyo at 2.50pm local time, what time did the plane leave in Tokyo time?
   b) The plane journey took 3 hours and 4 minutes. What time did the plane land in Tokyo local time?

4. The times of two cities are shown below.

   Sydney, Australia   Rome, Italy
   4am   8pm
   12th August   11th August

   a) What is the time difference between Sydney and Rome
   b) If a plane leave Sydney at 10.25pm. What time is this in Rome
   c) The plane journey takes 7 hours and 14 minutes, what time will the plane land in Rome local time?

5. The times in two cities is shown below on the same day.

   Buenos Aries, Argentina   New York, USA
   13.30   12.30

   Alan is on a flight to Buenos Aries from New York.
   The flight leaves New York at 5.35am local time.
   The flight takes 2 hours and 42 minutes.
   It will take 30 minutes to get through security after the plane has arrived.

What will the local time be when Alan get through the security in Buenos Aries

6. The time in two cities is shown below on the same day.
    Hong Kong, China   Belfast, Northern Ireland
    1300   0400
    Matthew is flying from Belfast to Hong Kong
    Matthew's flight leaves at 3pm local time.
    The flight takes 8 hours and 11 minutes
    It will takes 25 minutes to get through security in Hong Kong.
    What will the local time be in Hong Kong when Matthew gets through security?

7. The time in two cities is shown below
    Berlin, Germany   Sao Paolo, Brazil
    1800   1100
    Maddie is flying from Berlin to Sao Paolo
    The flight leaves at 1840 local time from Berlin.
    The plane flies for 4 hours and 39 minutes.
    It will take 18 minutes to get through security.
    What will the local time when Maddie gets through security?

8. Alan is flying back to London from Beijing.
    Alan's flight leaves Beijing at 0800 local time.
    The flight lands in London at 0924 local time.
    Beijing is 7 hours ahead of London.
    How long was Alan's flight from Beijing to London?

9. Judie is flying from Dallas Texas to Johannesburg.
    Judie's flight leave Dallas at 16.19 local time.
    The flight lands in Johannesburg at 05.06 local time.
    Dallas is 7 hours behind Johannesburg.
    How long was Judie's flight between Dallas and Johannesburg.

10. Nigel is flying from Abu Dhabi, UAE to Melbourne Australia.
    Nigel's flight leave Abu Dhabi at 23.54 local time.
    His flight lands in Melbourne at 13.28 local time.
    Melbourne is 6 hours ahead of Abu Dhabi.
    How long was Nigel's flight?

11. Violet is flying from Sydney to London. The flight includes a stopover in Warsaw.
    • Violet's flight leaves Sydney at 2.45pm local time

- The total flying time is 9 hours and 34 minutes.
- London is 9 hours behind Sydney.

Given the flight lands in London at 4.28pm local time, how long was the stopover in Warsaw?

12. Ben is flying from Los Angeles, California to Lisbon, Portugal. The flight includes a stopover in New York.
- Ben's flight leaves Los Angeles at 10.32am local time.
- The total flying time is 10 hours and 17 minutes.
- The stopover in New York is 45 minutes.
- Lisbon is 8 hours ahead of Los Angeles

What is the time in Lisbon that Ben's flight will land?

13. Hannah is flying from Reykjavik, Iceland to Cape Town, South Africa. The flight includes a stopover in Cairo, Egypt.
- Hannah's flight leave Reykjavik at 7.49am local time.
- The total flying time is 7 hours and 38 minutes.
- Cape Town is 2 hours ahead of Reykjavik

Given Hannah's flight lands at 7.50pm in Cape Town local time. How long was the stopover in Cairo?

14. Jordan is flying from Glasgow to Tokyo. The flight includes a stopover in Amsterdam.
- Jordan's flight leaves Glasgow at 6.08pm local time.
- The total flying time is 9 hours and 31 minutes.
- Tokyo is 8 hours ahead of Glasgow

Given Jordan's flight lands at 1.53pm local time, calculate Jordan's stopover time in Amsterdam?

15. Molly is flying from London to Las Vegas. The flight includes a stopover in New York.
- The flight leaves London at 6.55am
- The total flying time is 13 hours and 48 minutes.
- Las Vegas is 8 hours behind London.
- The stopover in New York is 1 hours and 35 minutes.

What is the local time in Las Vegas when Molly's flight lands?

Chapter 10: Container Packing

1. Boxes are packed into a large container. The dimensions of the box and container are shown below.

    32cm 34cm 120cm
    2.4m 1.85m 7.2m
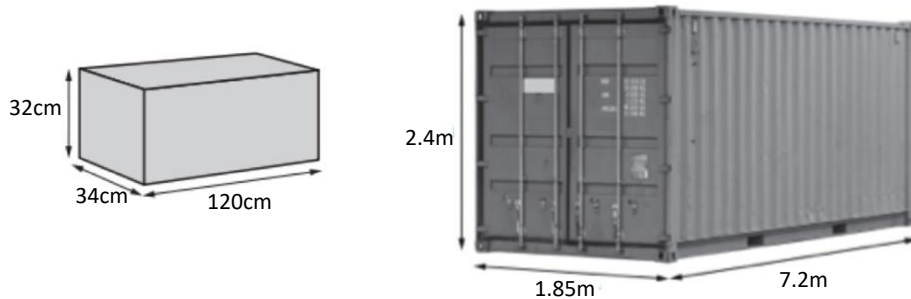
    Given that all the boxes must be stacked the same way. What is the maximum number of boxes that you can fit into the container?

2. Boxes are packed into a large container. The dimensions of the box and container are shown below.
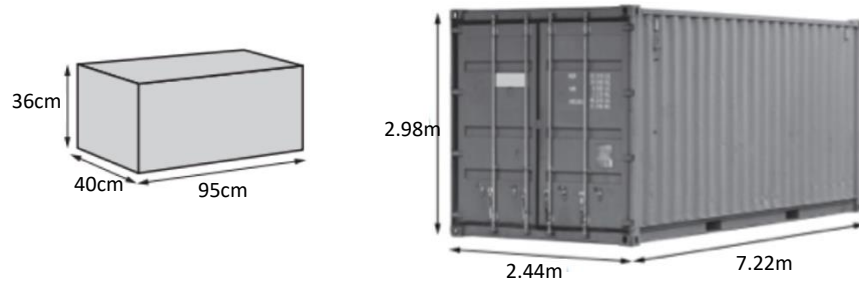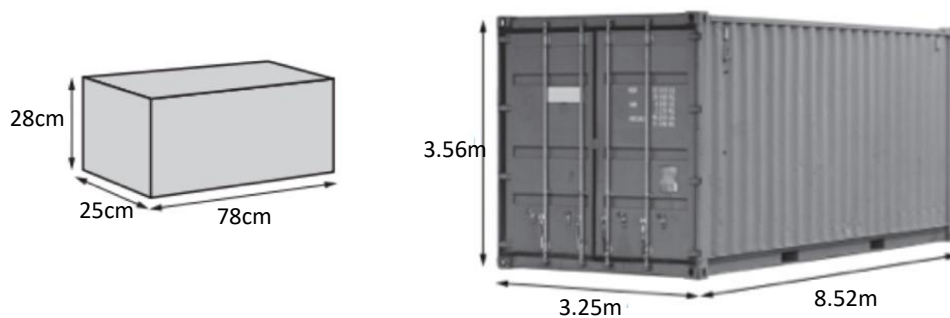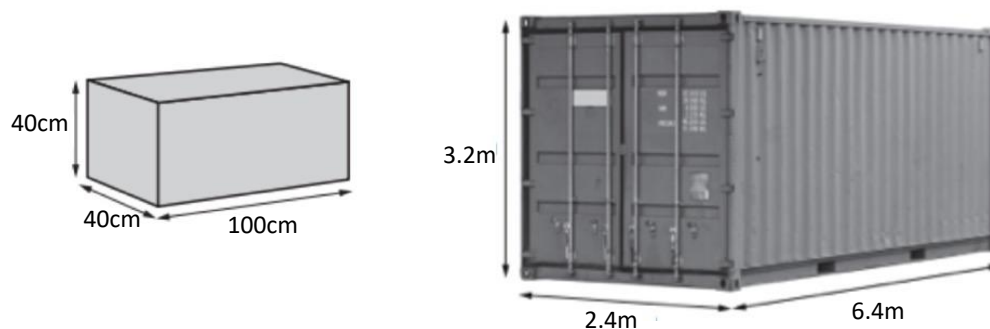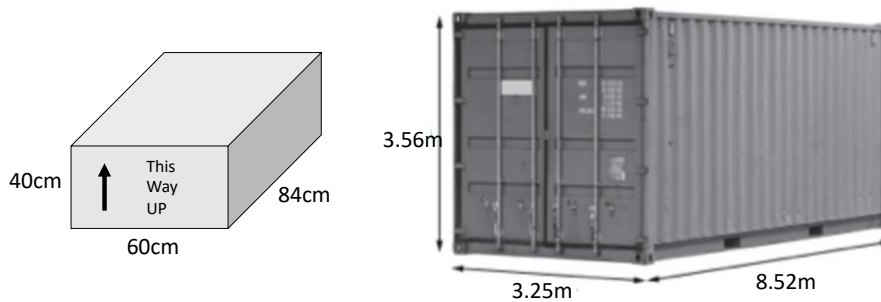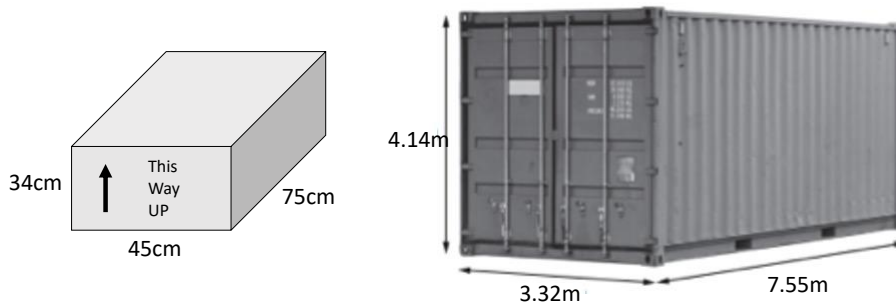

    28cm 33cm 140cm
    2.9m 2m 6.45m
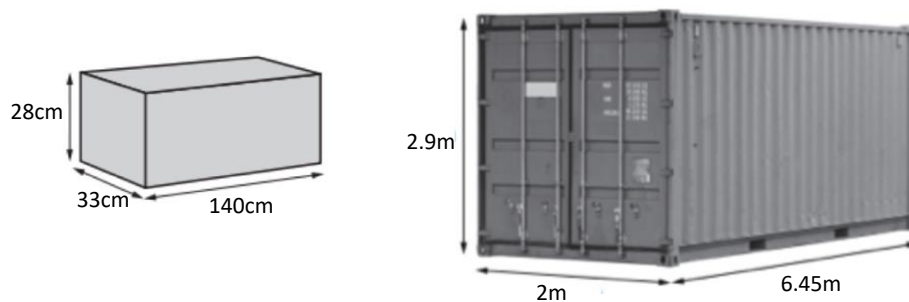
    Given that all the boxes must be stacked the same way. What is the maximum number of boxes that you can fit into the container?

3. Boxes are packed into a large container. The dimensions of the box and container are shown below.
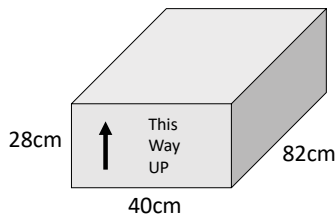

    45cm 42cm 110cm
    3.23m 2.85m 7.25m
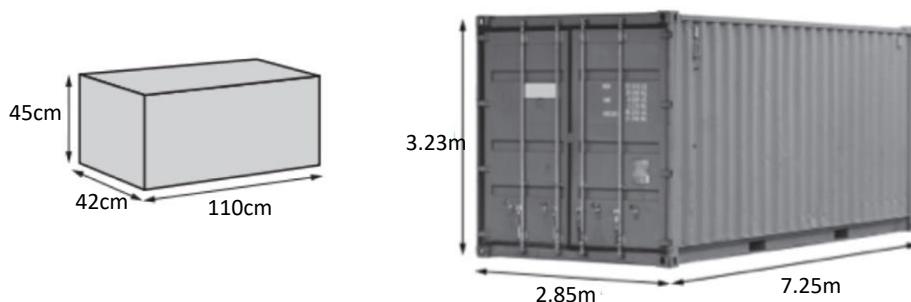
    Given that all the boxes must be stacked the same way. What is the maximum number of boxes that you can fit into the container?

4. Boxes are packed into a large container. The dimensions of the box and container are shown below.

36cm
40cm
95cm

2.98m
2.44m
7.22m

Given that all the boxes must be stacked the same way. What is the maximum number of boxes that you can fit into the container?

5. Boxes are packed into a large container. The dimensions of the box and container are shown below.

28cm
25cm
78cm

3.56m
3.25m
8.52m

Given that all the boxes must be stacked the same way. What is the maximum number of boxes that you can fit into the container?

6. Boxes are packed into a large container. The dimensions of the box and container are shown below.

40cm
40cm
100cm

3.2m
2.4m
6.4m

Given that all the boxes must be stacked the same way.
a) What is the maximum number of boxes that you can fit into the container?

It costs £2.40 to pack each box. It also costs £350 to rent the container.
b) Calculate the cost of shipping all the boxes.

7.   Boxes are packed into a large container. The dimensions of the box and
   container are shown below.

Given that all the boxes must be stacked the same way.
a) What is the maximum number of boxes that you can fit into the
container?

It costs £1.60 to pack each box. It also costs £275 to rent the container.
b) Calculate the cost of shipping all the boxes.

8.   Boxes are packed into a large container. The dimensions of the box and
      container are shown below.

Given that all the boxes must be stacked the same way.
a) What is the maximum number of boxes that you can fit into the
container?

It costs £2.85 to pack each box. It also costs £420 to rent the container.
b) Calculate the cost of shipping all the boxes.

9.   Boxes are packed into a large container. The dimensions of the box and
      container are shown below.

28cm   This Way UP   82cm
40cm

2.65m

2.4m   6.05m

Given that all the boxes must be stacked the same way.
a) What is the maximum number of boxes that you can fit into the container?

It costs £1.90 to pack each box. It also costs £380 to rent the container.
b) Calculate the cost of shipping all the boxes.

10.   Books are packed into boxes.
The dimensions are shown below for the book and boxes.
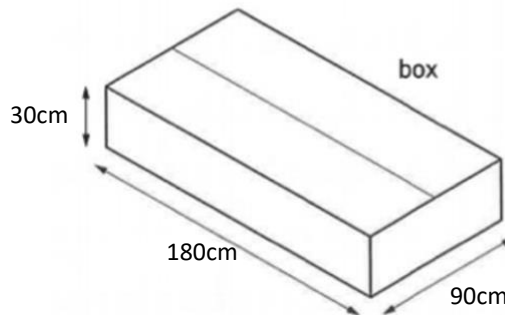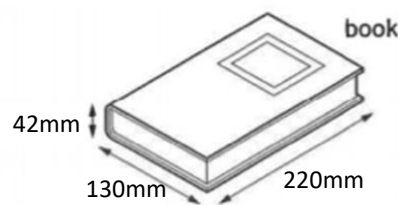
book
42mm
130mm   220mm

box
30cm
180cm
90cm

The books must be stacked with the front facing upwards in the boxes and must all be stacked in the same way.

Calculate the maximum number of books you can put into the boxes this way.

11.   Books are packed into boxes.
The dimensions are shown below for the book and boxes.
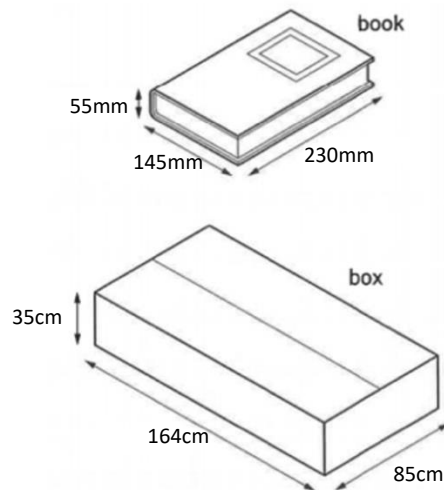
book

55mm
145mm
230mm

box

35cm
164cm
85cm

The books must be stacked with the front facing upwards in the boxes and must all be stacked in the same way.

a)   Calculate the maximum number of books you can put into the boxes this way.

The bookshop ordering these books pays £3.50 for each one, and £14 to have the books shipped to the store.

If the bookshop makes a total profit of £300,

b)   How much did they sell each book for? (Give your answer to the nearest pound)

12.   Books are packed into boxes.
       The dimensions are shown below for the book and boxes.
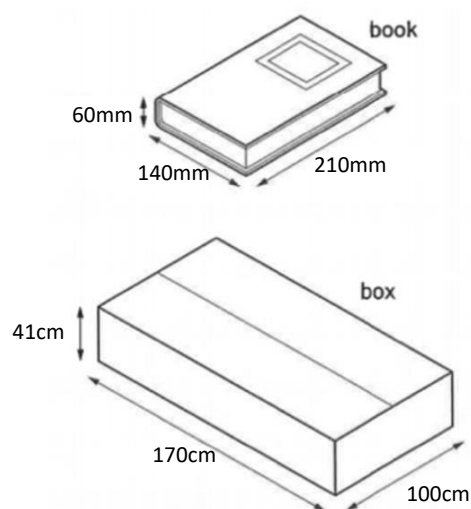
book

60mm
140mm
210mm

box

41cm
170cm
100cm

The books must be stacked with the front facing upwards in the boxes and must all be stacked in the same way.

a)   Calculate the maximum number of books you can put into the boxes this way.

The bookshop ordering these books pays £4 for each one, and £10 to have the books shipped to the store.

If the bookshop makes a total profit of £800,

b)   How much did they sell each book for?

Chapter 11: Precedence Tables 1

1.   The Williams family are having a BBQ
      The table below shows the list of tasks and the order they must be
      completed in.

Task	Summary	Preceded Task
A	Season Burgers	none
B	Turn off gas	F
C	Get BBQ out of garage	none
D	Attach gas to BBQ	C
E	Place Burgers on the grill	G,A
F	Take burgers off which when cooked	E
G	Light BBQ	D

Complete the diagram below writing the tasks in the boxes.
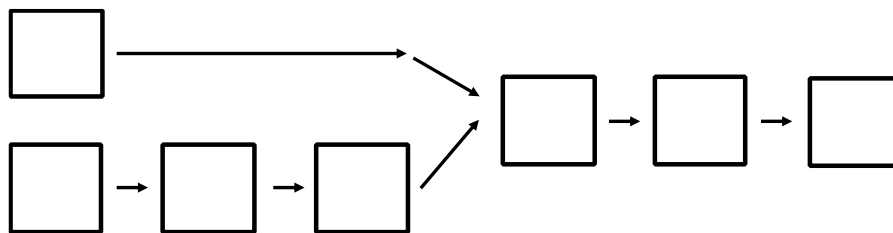
2.   Mr and Mrs Gallagher are building a bookcase.
      The table below shows the list of tasks and the order they must be
      completed in.

Task	Summary	Preceded Task
A	Open up the box and remove packaging.	None
B	Assemble top shelf	C
C	Begin assembling the frame of the bookcase	D
D	Check that everything is accounted for.	A
E	Assemble the middle shelves	C
F	Attach all three shelves to the frame	B,E,I
G	Attach back panel	F
H	Assemble bottom shelf	C

Complete the diagram below writing the tasks in the boxes.
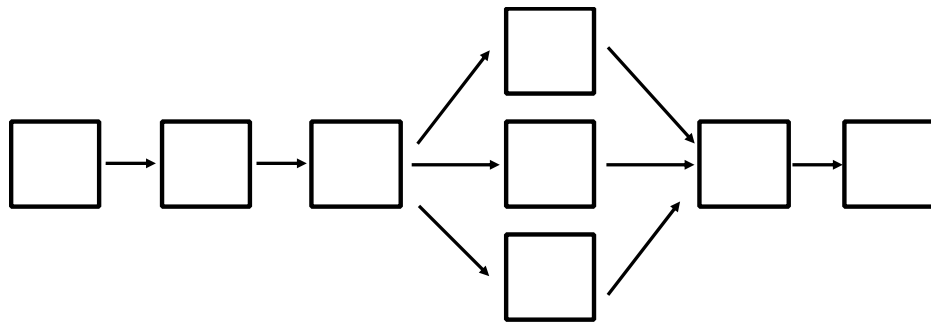
3. Heather has decided to wash her car.
The table below shows the list of tasks and the order they must be completed in.

Task	Summary	Preceded Task
A	Park car in shaded area	none
B	Wax car and finish	G, H
C	Gather cleaning supplies	A
D	Rinse body with a hose	E
E	Wash the body of the car	I
F	Clean wheels of the car	I
G	Dry the top to the bottom of the car	D
H	Rinse the wheels then dry	G
I	Fill two buckets with water	C

Complete the diagram below writing the tasks in the boxes.
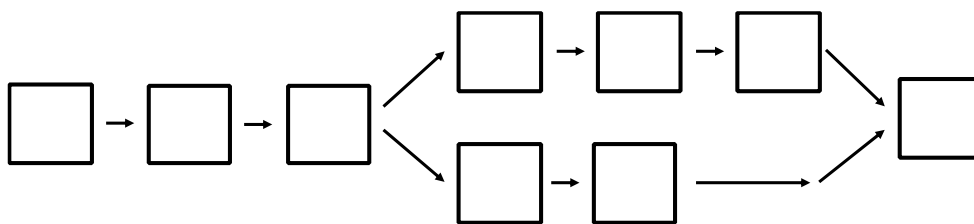
4. James is making Spaghetti
The table below shows the list of tasks and the order they must be completed in.

Task	Summary	Preceded Task	Time (seconds)
A	Boil the kettle	none	120
B	Turn on the hob and cook for several minutes	C	300
C	Add boiling water to the pot	A, F	30
D	Place pasta in a pot	none	10
E	Dain water	B	40
F	Add salt to the pot	D	10

a)   Complete the diagram below writing the tasks in the boxes.
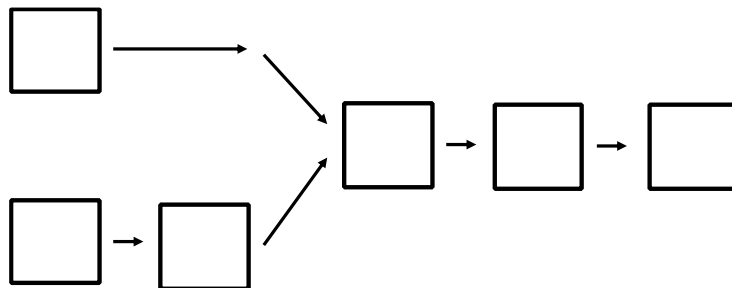
b)   State how long it will take for Jamie to make the Spaghetti

5.   Karen is making a cup of tea
     The table below shows the list of tasks and the order they must be
     completed in.

Task	Summary	Preceded Task	Time (seconds)
A	Add boiling water to mug	F,G	20
B	Add milk and sugar	H	20
C	Let tea sit for 2 minutes to brew	A	120
D	Get mug out of the cupboard	none	10
E	Stir and Serve	B	15
F	Put teabag into mug	D	5
G	Boil the kettle	none	120
H	Remove teabag	C	5

a)   Complete the diagram below writing the tasks in the boxes.
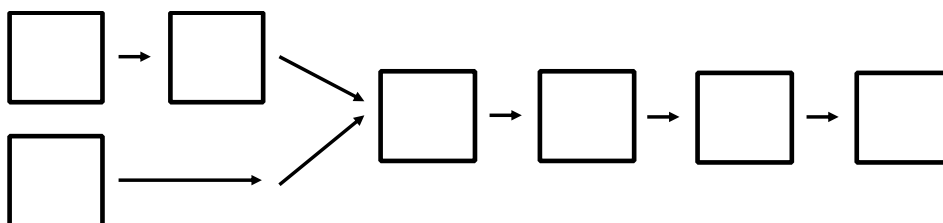
b)   State the amount of time it will take Karen to make a cup of tea.

6.   Mr and Mrs Roberts are redecorating their living room.
       The table below shows the list of tasks and the order they must be
       completed in.

Task	Summary	Preceded Task	Time (minutes)
A	Place furniture in room	B,D	10
B	Lay the carpet	C	15
C	Hang the wallpaper	F	10
D	Assemble new furniture	none	30
E	Remove the old furniture and carpet	none	5
F	Paint the woodwork	E	10

a)   Complete the diagram below writing the tasks in the boxes.
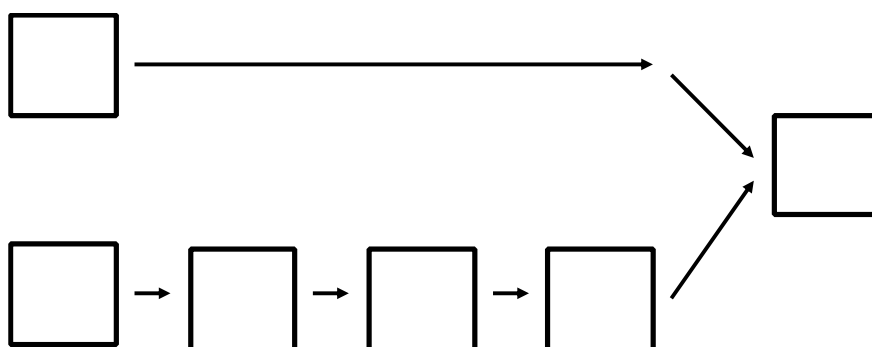
b)   State the time it will take for Mr and Mrs Roberts to redecorate their
       living room.

7.   The table below shows the order that tasks must be completed in.

| Task	Summary	Preceded Task	Time (seconds)
A	Whisk butter, eggs and sugar together	none	120
B	Add icing to the cupcakes	E,F	30
C	Pour mixture into cupcake tray	D	60
D	Add Vanilla extract	A	10
E	Mix icing sugar and water	none	60
F	Bake for 15 minutes then allow to cool	C, G	1200
G	Preheat the oven	none	600

Complete the diagram below writing the tasks in the boxes.
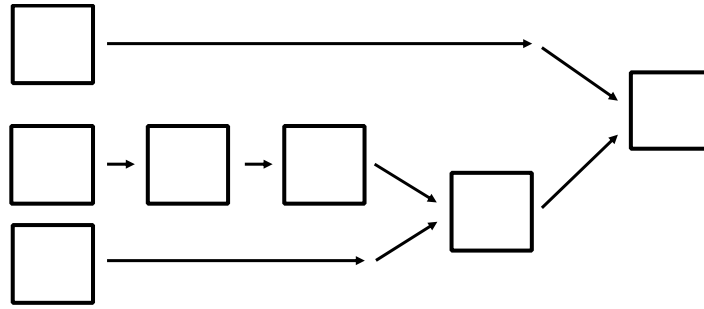
8. Ian is making Pizza
The table below shows the list of tasks and the order they must be completed in.

Task	Summary	Preceded Task	Time (seconds)
A	Bake pizza for 10 minutes	B,F	600
B	Preheat the oven	none	300
C	Make and knead pizza dough	none	150
D	Prepare toppings	none	200
E	Brush dough with olive oil	C	30
F	Cover top of the dough in tomato sauce, cheese and toppings	D,E,G	60
G	Flatten and stretch pizza dough until round	C	180

a) Complete the diagram below writing the tasks in the boxes.
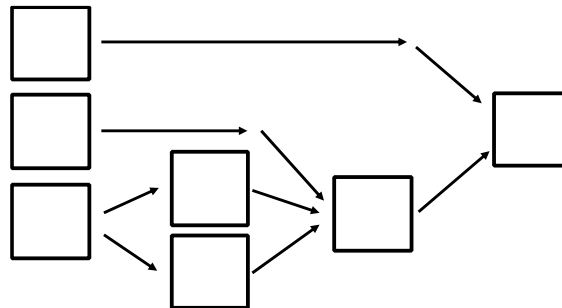
b) State the time it will take Ian to make a Pizza

9. Louise is making a sandwich.
The table below shows the list of tasks and the order they must be completed in.

Task	Summary	Preceded Task
A	Get bread to make sandwich	C
B	Wrap sandwich	E
C	Get lunch box out of the cupboard	None
D	Fill a bottle with water	C
E	Place filling in sandwich	G
F	Place water bottle in lunch box	D
H	Close lunch box	B, F, I, J
G	butter bread	A
I	Put Apple in lunch box	C
J	Put a packet of crisps in lunch box	C

Complete the diagram below writing the tasks in the boxes.
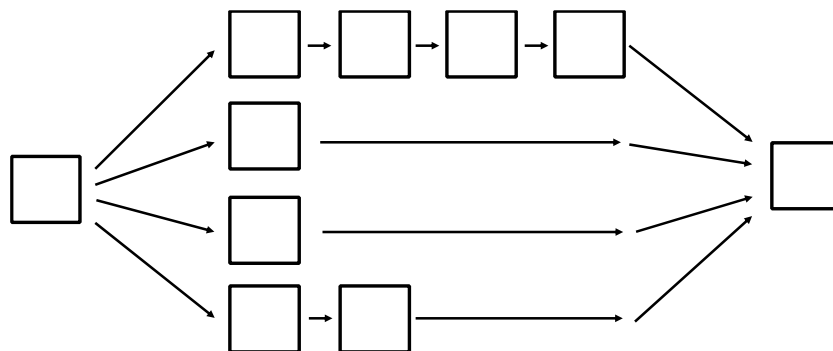
10. Tom and Christina are making burgers
The table below shows the list of tasks and the order they must be completed in.

Task	Summary	Preceded Task	Time (seconds)
A	Make meat into burger patties	B	100
B	Season meat	none	20
C	Make burger sauce	none	100
D	Toast buns	none	120
E	Butter buns	D	30
F	Place cooked patties on tasted buns	I,E	10
G	Put burger sauce, cheese and lettuce on burger	C,F	10
H	Put patties on grill and cook	A	300

a) Complete the diagram below writing the tasks in the boxes.
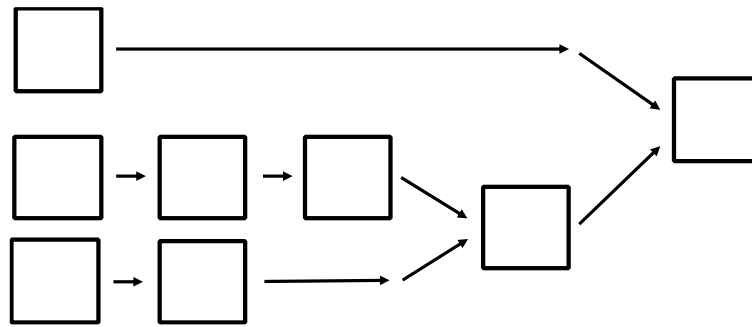
b)   State how long it will take Tom and Christina to make the burgers.

Chapter 12: Precedence Tables 2

The following questions have no context and are only for practicing the skills for filling in the table and calculating the total time.

1.   Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (hours)
A	None	3
B	C	2
C	A, D	2
D	None	4
E	G, F	1
F	C	2
G	G	3
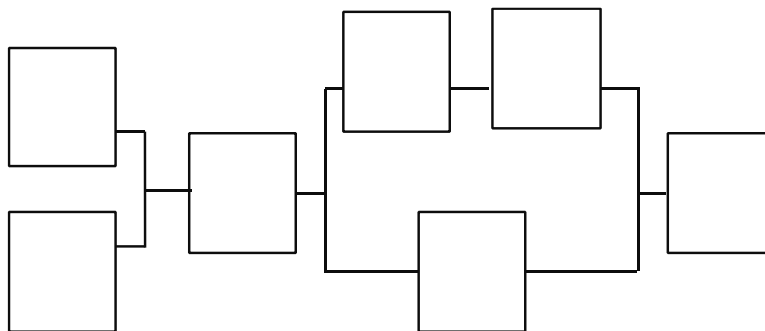
2.   Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Minutes)
A	G	3
B	D	2
C	B,E	2
D	A	4
E	A	1
F	E	7
G	None	5
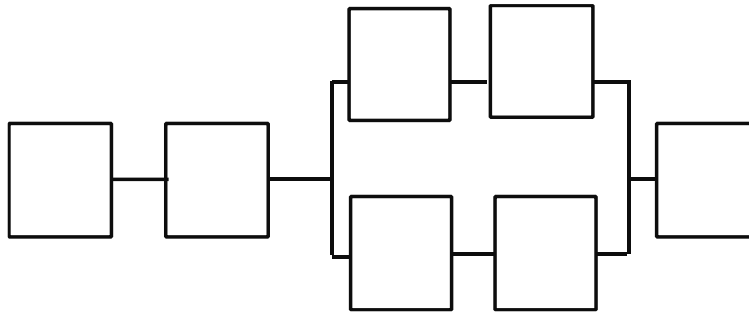
3.   Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Minutes)
A	None	4
B	D	8
C	D	3
D	A, G	5
E	B, F	4
F	C	4
G	None	2
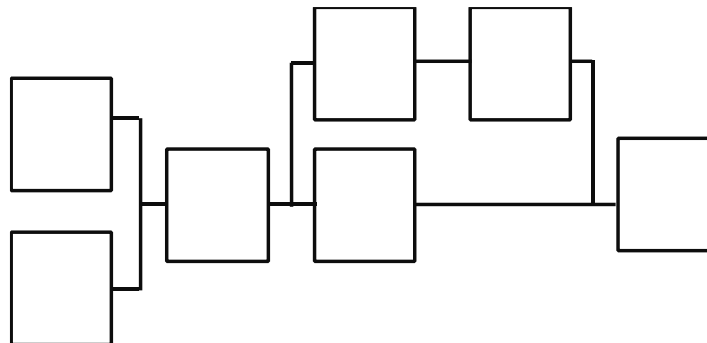
4.   Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Hours)
A	D	3
B	D	5
C	B,E,G	5
D	None	3
E	H	2
F	C	1
G	D	4
H	A	1
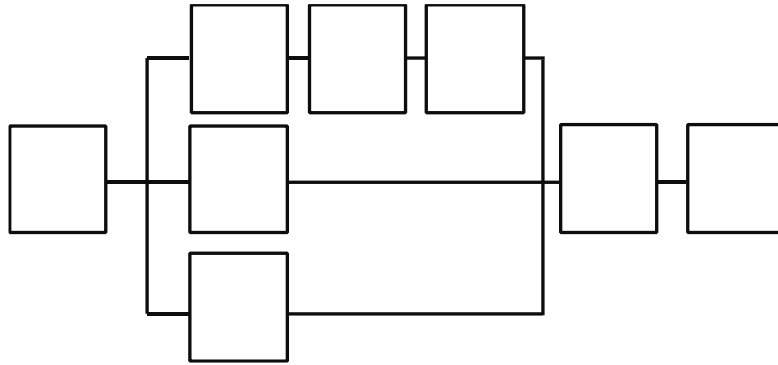
5. Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Hours)
A	C	2
B	F	4
C	None	2
D	A, E	4
E	None	3
F	H	5
G	H	4
H	D	2
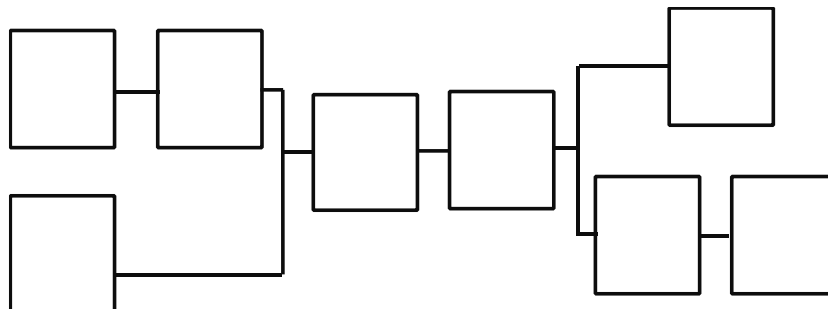
6. Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Minutes)
A	I	14
B	None	11
C	B,F	8
D	H	11
E	I	17
F	None	8
G	A	12
H	E	5
I	C	10
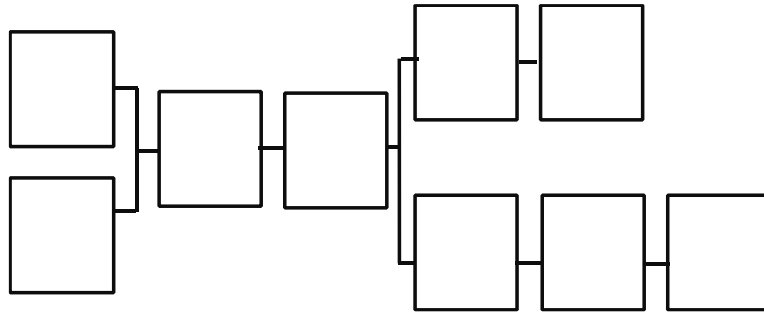
7. Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Minutes)
A	None	8
B	H	3
C	I	2
D	E	2
E	A	5
F	H	2
G	E	3
H	D,G	4
I	H	4
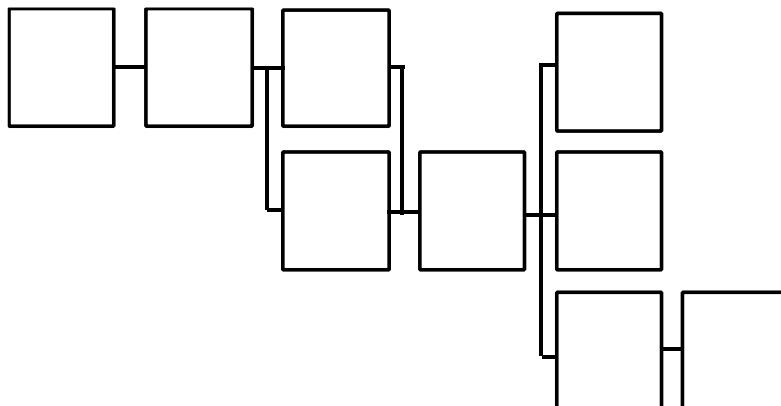
8. Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Hours)
A	J	5
B	G	4
C	None	2
D	J	2
E	J	2
F	None	3

G	D	1
H	E	2
I	A,B,H	7
J	C , F	2
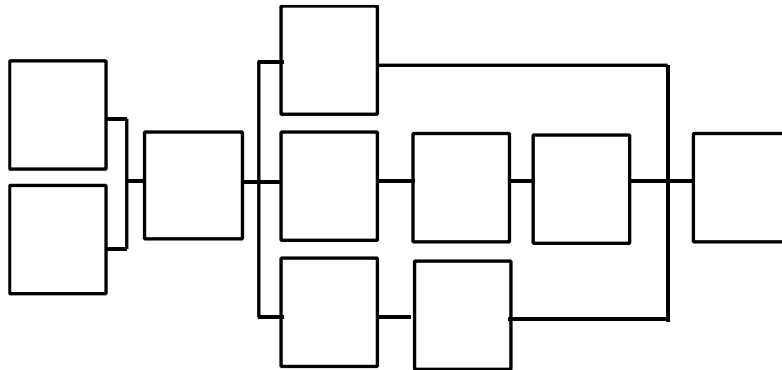
9.   Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Hours)
A	G	3
B	D	1
C	A	4
D	A	1
E	A	7
F	H, I, J	6
G	None	5
H	E	1
I	B	4
J	C	5
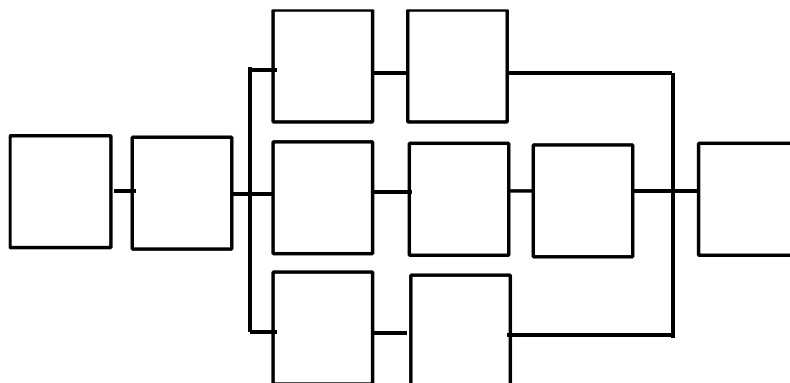
10. Complete precedence table and calculate the time for critical path.

Letter	Prerequisite Tasks	Time (Minutes)
A	None	10
B	D,I	10
C	A, H	5
D	F	15
E	K	10
F	K	20
G	B	15
H	None	15
I	J	15
J	E	5
K	C	10
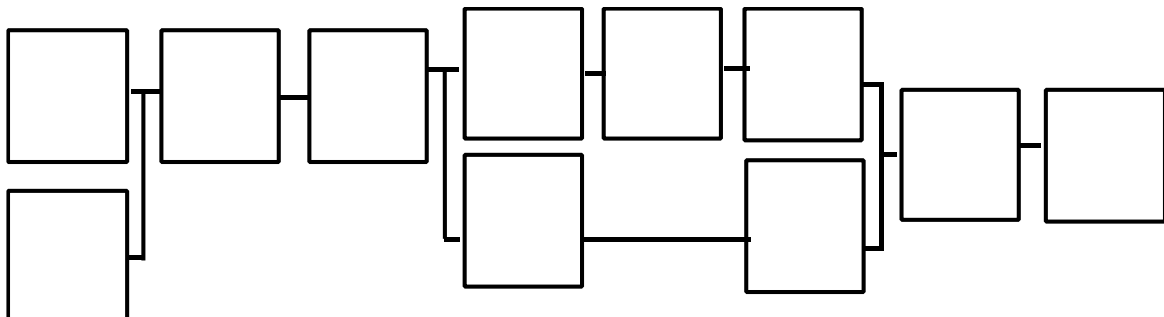
Answers

Chapter 1: Basic Tolerance

1a. 35±5cm

b. 165±35g

c. 9.5±0.5mm

d. 14.5±1.5kg

e. 15.5m±4.5

f. 6.6±0.2cm

g. 1.45mm ±0.15

h. 1.6±0.5m

i. 0.075 ± 0.025L

j. 0.0055 ± 0.0045

2. 500.1±1.3ml

3. 207.5 ± 22.5

4. 77±43

5. 0.205 ± 0.035mm

6. 32.25± 2.25g

7. 1.14 ± 0.06L

8. 318 ± 18

9a. min = 19cm, max = 29cm

b. min = 4750m, max = 5250m

c. min = 140km, max = 220km

d. min = 5.5m, max = 12.5m

e. min =0.75g , max = 1.25g

f. min = 32.5g, max = 47.5g

g. min = 56.5ml, max = 65.5ml

h. min = 84.25g, max = 97.75g

i. min = 0.06mm, max = 0.54mm

j. min = 0.47cm, max = 0.53cm

10a. min = 47,5mm, max = 52,5mm

b. min = 96m, max = 144m

c. min = £2940, max = £3069

d. min = 3825, max = 5175

e. min = 1650mm, max = 2750mm

f. min = 11050, max = 22950

g. min = 39km, max = 41km

h. min = 49.5mg, max = 60.5mg

i. min = 66°, max = 94°

j. min = 59.4km, max = 120.6km

11. min = 165 , max = 195

a. YES

b. YES

c. NO

d. YES

e. NO

f. YES

12. min = 118 , max = 162

a. NO

b. YES

c. NO

d. YES

e. YES

f. NO

13. min = 1.80, max = 3.00

a. YES

b. NO

c. YES

d. NO

e. YES

14. min = 94m 30s, max = 85m 30s

a. YES

b. YES

c. NO

d. YES

e. NO

f. NO

15. 270m^2

16. 192000cm^2

17. 11.6m^2

18. 28cm±6%

19. 40±20%

20. -18°C ± 8.3%

21. 51.5± 12.6%

Chapter 2: Tolerance Exam Questions

1. 5280kg

2. 63000ml

3. 18900cm^2

4a. 292.5g

b. £2.32

5. 1023kg

6. $\frac{8}{11}$

7. $\frac{2}{3}$

8. $\frac{1}{4}$

9. $\frac{4}{5}$

10. $\frac{7}{18}$

11. 70%

12. 75%

13. 35%

14. 66.7%

15. 31.25%

16. 75%

17. 70%

18. 15%

Chapter 3: Directions and Bearings

1. 025
2. 205
3. 105
4. 340
5. 240
6. 060
7. 270
8. 151
9. 210
10. 320
11. 068
12. 114

14a. 090
b. 180
c. 225
d. 045
e. 270
f. 135
g. 315

Chapter 4: Scale Drawings

(These answers were recorded when printed on A4 sized paper, allow for typical error in degrees of measurement)

1. 134.4 miles
2. 968 miles
3a. 156 miles
b. 54.5 miles
c. 52 minutes
4a. 80 miles
b. 68.7mph
c. 1 hours 2 mins
5a. 980.5 miles
b. 327 mph
c. 3 hours 37 mins
6b. 5cm
c. 50m
7b. 84m
8b. 57m
9b. 70m
10b. 67m
11b. 65m
12b. 50m
13b. 210m
14b. 11.8m
15b. 2200 miles
16b. 55m
17b. 19.2m

Chapter 5: Scale Drawing with Two Journeys

1b. 156km
2b. 308km
3b. 600km
4b. 72km
5b. 174km
6b. 132km
7b. 440km
8b. 388 miles
c.273
9b.140km
c. 074

10a. 396 yards
b. 298
11a. 570 miles
b. 322
12. 474km

Chapter 6: Distance Speed Time
Basic

1a. 135mph
b. 4 hours
c. 450 miles
d. 20.5mph
e. 66mph
f. 6 miles
g. 3 hours
h. 14 k,
i. 5 hours
j. 2 miles
k. 50mph
l. 12km
m. 1 hours 30 mins
n. 24kmph

2a. 0.1
b. 0.5
c. 0.67
d. 1.33
e. 3.25
f. 2.2
g. 4.58
h. 2.7
i. 1.45
j. 2.33
k. 3.25
l. 2.3
m. 5.03
n. 2.85

3a. 30 mins
b. 12 mins
c. 20 mins
d. 1 hr 30 mins

e. 2 hrs 15 min
f. 3 hrs 40 min
g. 4 hrs 42 min
h. 1 hr 51 min
i. 56 mins
j. 2 hrs 28 mins
k. 1 hr 46 mins
l. 3 hrs 1 min

4. 45.6 miles
5. 15.4kmph
6. 1 hr 23 mins
7. 864 miles
8. 4.40pm
9. 12.79mph
10. 348mph
11. 132 miles
12. 0703
13. 60.7km
14. 11.56
15. 2 hrs 1 min
16. 5.4m/s

Chapter 7: Speed Distance Time
Exam Questions

1. 9.9km
2. 3.2km
3. 12.6km
4. 0640
5. 8.4kmph
6. 3.15km
7. 44.25km
8. 21.8kmph
9. 46kmph
10. 55.3 kmph
11. 90.5mph
12. 99.8mph
13. 960m
14. 2100m
15. 8610m
16. 0.8 m/s
17. 21.42km

18. 4.21pm
19. 23 mins
20. 10.09am
21. 7.04pm
22. 6.03pm
23. 60mph
24. 234.4 miles
25. 6.23am
26. no, will be 9 minutes late
27. yes
28. no, will be 21 minutes late

Chapter 8: Converting between Two different units.

1a. 12.5cm
b. 30cm
c. 200mm

2a. 44.54L
b. 133.62L
c. 267.24L

3a. 11 lb
b. 66 lb
c. 8.8 lb
d. 132 lb

4a. 6.6 gallons
b. 2.8 gallons

5a. 180 inches
b. 1080 inches
c. 50 yards

6a. 10.8 knots
b. 10.35 knots
c. 21.6 knots

7a. 30278.4ml
b. 756.96ml
c. 37 gallons
d. 2 gallons

8a. 1188m
b. 9900m
c. 39600m
d. 14850

9a. 2272ml
b. 17040ml
c. 8520ml
d. 7 pints
e. 17 pints
f. 15 pints

10a. 19mph
b. 17mph
c. 9.4mph
d. 12.53mph
e. 27.5mph, the car is below speed limit.
f. 72mph, the car is exceeding the speed limit.

11a. 5280.8 ft
b. 47527.2 ft
c. 211232 ft
d. 15 miles

12a. 6175 acres
b. 2964 acres
c. 11115 acres

13a. 123 miles
b. 75 miles
c. 149.6 miles

14. Can go 40 miles. No, she is 1 mile short

15. Yes, he can travel 108 miles

(For the following answers can be given in miles or km as long as working is correct)

16. Can drive 70km and only needs to go 49.9km.

17. No, needs to travel 64.4km but only has enough fuel for 48km

18. Yes, needs to travel 33.8km and has enough fuel for 50km.

19. Yes, needs to travel 132 km and has enough fuel for 184km

20. No, needs to travel 104km but only has enough fuel for 91km.

Chapter 9: Time Management

1a. 3 hours
b. 1.12am, Moscow
c. 6.40am Glasgow

2a. London is 4 hours ahead of New York
b. New York is 3 hours ahead of LA
c. 10.15pm in LA
d. 6.20pm in LA
e. 2.52pm in NY

3a. 9.50pm
b. 12.04am or 0004

4a. Sydney is 8 hours ahead of Budapest
b. 2.52pm
c. 9.39pm

5. 9.42am

6. 2.36pm

7. 16.37pm

8. 8 hours 24 mins

9. 5 hours 47 mins

10. 7 hours 34 mins

11. 1 hours 9 mins

12. 5.34am

13. 2 hours 23 mins

14. 2 hours 14 mins

15. 2.18pm

Chapter 10: Container Packing

1. 220 is the maximum.

2. 276 is the maximum.

3. 252 is the maximum.

4. 360 is the maximum.

5. 1680 is the maximum.

6a. 288 is the maximum.
b. £1041.20

7a. 400 is the maximum.
b. £915
8a. 840 is the maximum.
b. £2814

9a. 378 is the maximum.
b. £1098.20

10. 364 is the maximum.

11a. 210 is the maximum.
b. They sell them for £5 each.

12a. 360 is the maximum.
b. They sell them for £6.25 each.

Chapter 11 Precedence Tables
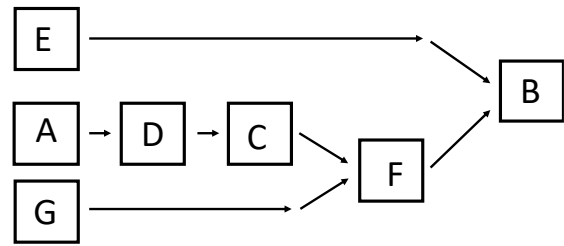
1.
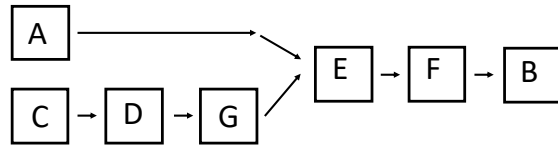
2.
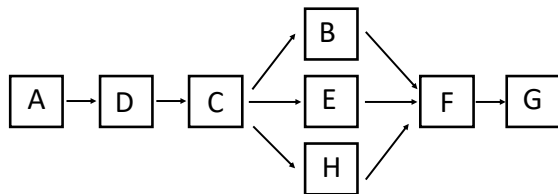
3.
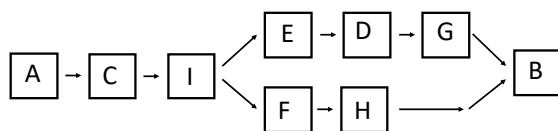
4a.
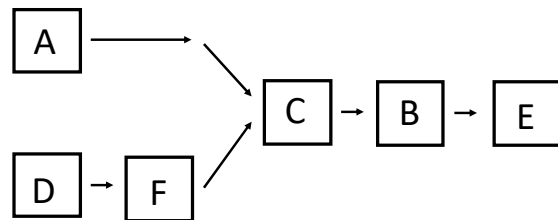
b. 490 seconds

5a.
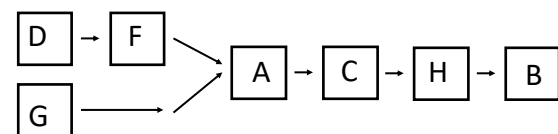
b. 285 seconds
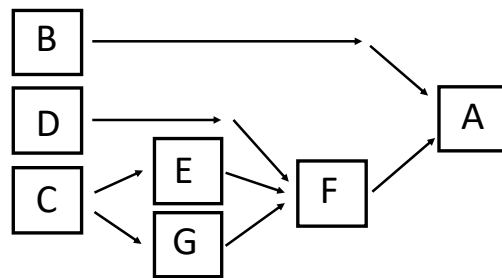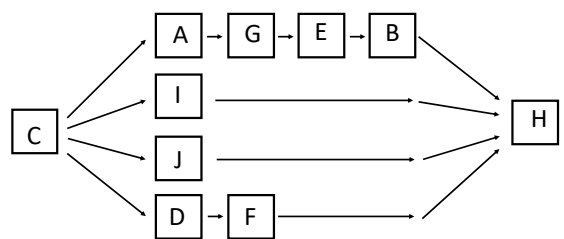
6a.
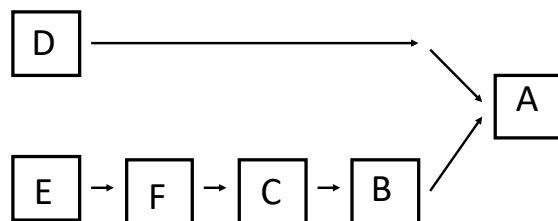
b. 55 minutes

7a.

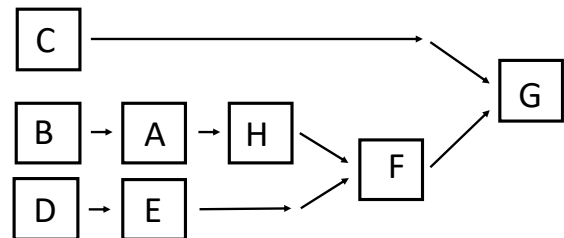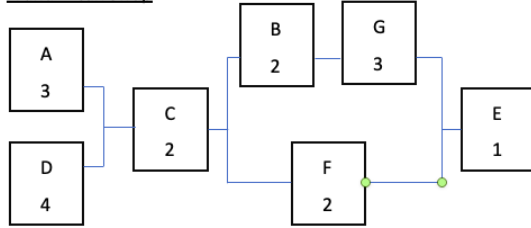b. 1830 seconds

8a.

b. 990 seconds

9.

10a.

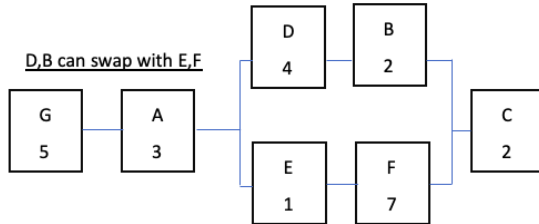b. 440 seconds

Chapter 12: Precedence Tables 2

1.

A and D can swap

| A 3 | D 4 | C 2 | B 2 | G 3 | F 2 | E 1 |

Critical Path = 12 hours

2.

D,B can swap with E,F

| G 5 | A 3 | D 4 | B 2 | E 1 | F 7 | C 2 |

Critical Path = 16 minutes

3.

A and G can swap

| G 2 | A 4 | D 3 | C 3 | F 4 | B 8 | E 4 |
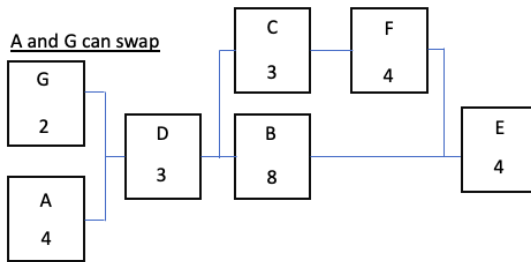
Critical Path = 19 minutes

4.

| D 3 | A 3 | H 1 | E 2 | B 5 | G 4 | C 5 | F 1 |

B and G can swap
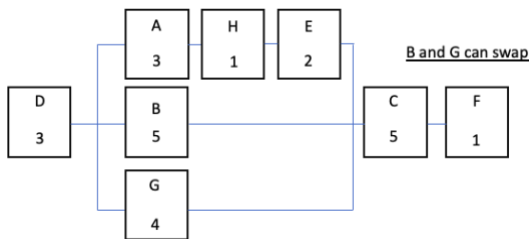
Critical Path = 15 hours

5.

| C 2 | A 2 | E 3 | D 4 | H 2 | G 4 | F 5 | B 4 |

Critical Path = 19 hours

6.

| B 11 | F 8 | C 8 | I 10 | A 14 | G 12 | E 17 | H 5 | D 11 |
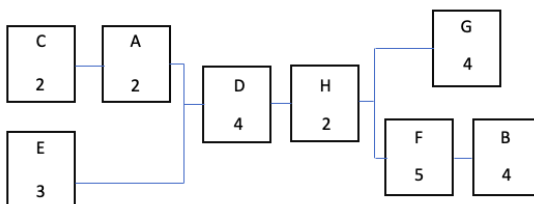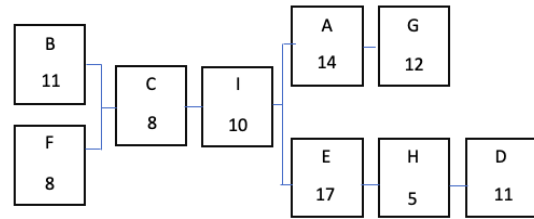
Critical Path = 62 minutes

7.

| A 8 | E 5 | D 2 | G 3 | H 4 | F 2 | B 3 | I 4 | C 2 |

Can swap D and G
F and B
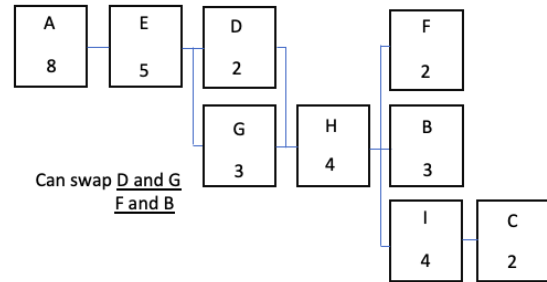
Critical Path = 26 minutes

8.

| C 2 | F 3 | J 2 | A 5 | D 2 | E 2 | G 1 | H 2 | B 4 | I 7 |

C and F can swap

Critical Path = 19 hours

9.

| G 5 | A 3 | C 4 | J 5 | D 1 | B 1 | I 4 | F 6 | E 7 | H 1 |

C, J can swap with E,H
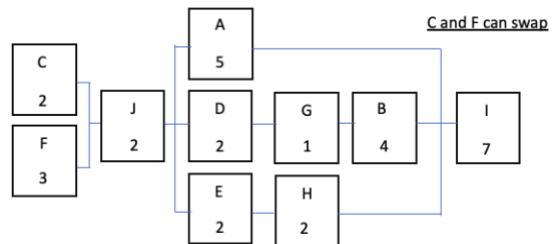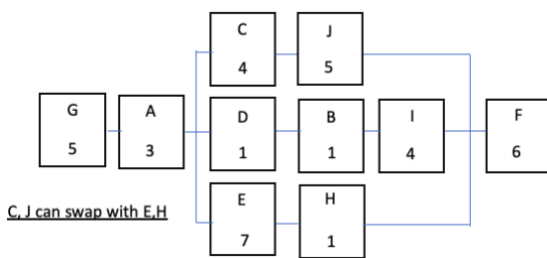
Critical Path = 23 hours

10.

| A 10 | H 15 | C 5 | K 10 | E 10 | F 20 | J 5 | I 15 | D 15 | B 10 | G 15 |
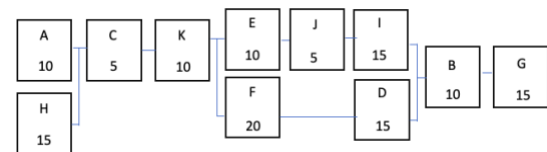
Critical Path = 80 minutes