

Numerical skills

(1) $x+y = 12$ / $x^2 + y^2 = 126$, $xy = ?$

$$(x+y)^2 = 12^2$$

$$x^2 + 2xy + y^2 = 144.$$

$$(x^2 + y^2) + 2xy = 144$$

↓

$$126 + 2xy = 144$$

$$2xy = 144 - 126$$

$$2xy = 18$$

$$\therefore xy = \frac{18}{2} = 9 \leftarrow \text{Ans;}$$

(2) 79% of total capacity = 118 million gallons

$$\frac{200 \text{ ft}}{\text{Capacity}} = ?$$

$$= \frac{100}{79} \times 118$$

$$= 149.36 \text{ gallons. (Total capacity)}$$

$$= 149 - 96 \text{ gallons (Original quantity)}$$

$$\text{Ans; } \Rightarrow = 53 \text{ gallons.}$$

(3) Walk $\Rightarrow 1 \text{ min / block}$

Bicycle $\Rightarrow 20 \text{ s / block.}$
 $(\frac{1}{3} \text{ min / block})$

$$\text{Walk} = x \text{ blocks (1 min)}$$

$$\text{Bicycle} = \frac{x}{3} \text{ blocks. (20s)}$$

x blocks or 10 min \Rightarrow 10 min \Rightarrow 600 s

$$600 + \frac{x}{3} = 10$$

$$\frac{3x + x}{3} = 10$$

$$\frac{2x}{3} = 10$$

$$2x = 30 \\ \Rightarrow x = \frac{30}{2} = 15 \text{ blocks}$$

④ Total charge = ₹ 867.50

each member paid = ₹ 92

members = ?

$$= \frac{867.50}{92}$$

$$= 20 \leftarrow \text{Ans:}$$

⑤ 5 series = R, B, Black, white, yellow

5 क्रम अनुकूल शृङ्खला

Black का शृङ्खला का अनुरूप विकास करता है।

(5 क्रमानुकूल संख्याएँ + 3 क्रमानुकूल संख्याएँ)

$$= 5 \times 1, 5 \times 2, 5 \times 3, 5 \times 4,$$

$$5 \times 5, 5 \times 6, 5 \times 7,$$

$$5 \times 8, 5 \times 9,$$

$$5 \times 10,$$

$$5 \times 11, 5 \times 12,$$

$$5 \times 13, 5 \times 14,$$

$$5 \times 15$$

$$+ 3$$

$$\Rightarrow 78 \leftarrow$$

⑥ $4x+y=8$, $y-3x=7$, $\underline{x+2y=?}$

$$y-3x=7$$

$$(y=7+3x) - ①$$

$$4x+y=8$$

$$4x+7+3x=8$$

$$7x=8-7$$

$$7x=1$$

$$x=\frac{1}{7}, -②$$

$$= \frac{1}{7} + 2(7+3x)$$

$$= \frac{1}{7} + 14 + 6x$$

$$= \frac{1}{7} + 14 + \frac{6}{7}$$

$$= \frac{1+98+6}{7}$$

$$= 15 \leftarrow \text{Ans:}$$

⑦ Total no of games = G

50% of $\frac{st}{160}$ games won = 30 games

$$\text{remaining Games} = (G - 60)$$

80% of remaining games won = $0.8(G - 60)$

60% of Total games won = $0.6G$

$$\begin{aligned} \text{Total no of games won} &= \\ \frac{st}{160} \text{ games (won)} + 0.8(G - 60) &= 0.6G \end{aligned}$$

$$30 + 0.8G - 48 = 0.6G$$

$$0.8G - 0.6G = 48 - 30$$

$$0.2G = 18$$

$$G = \frac{18}{0.2} = \frac{180}{20} = 90$$

⑧ Revenues = R

$$\text{Marketing} = \frac{1}{4}R = R/4$$

$$\text{Remainder} = R - R/4 = \frac{4R-R}{4} = \frac{3R}{4}$$

$$\text{For maintenance} = \frac{1}{7} \text{ of remainder}$$

$$= \frac{1}{7} \times \frac{3R}{4} = \frac{3R}{28}$$

Fraction of original revenues = $\frac{\text{Marketing}}{R} - \text{For maintenance}$

$$= \frac{3R}{4} - \frac{3R}{28}$$

$$= \frac{21R}{28} - \frac{3R}{28}$$

$$= \frac{18}{28} R$$

$$= \frac{9}{14} R$$

$$⑨ \text{ Revenues} = R, \text{ % of profit} 1999 = ?$$

In 1998

$$\text{Revenue} = 100\%$$

$$\text{Profit} = 10$$

In 99

$$\text{Profit} = 12\%$$

$$\text{Revenue} = 100 - 20 = 80\%$$

$$\text{Profit} = 12\% \text{ of } 80 = 12 \times 80 \times 0.01$$

$$\frac{\text{Profit \% (1999)}}{\text{Profit \% (1998)}} = \frac{\text{Profit} 10}{\text{Profit} 12} = \frac{\text{Revenue} 100\%}{?}$$

$$= \frac{10}{12} \times 100\%$$

$$= 12 \times 10 = 120\% \leftarrow$$

⑩

$$\text{original speed} = 100\%$$

$$\text{increased speed} = 20\% \text{ of } \text{original speed}$$

$$\text{Total speed} = \text{original speed} + \text{increased speed} \\ = 100 + 20 = 120\%$$

⑩

$$\text{Original speed} = 100\%$$

$$1^{\text{st}} \text{ increased speed} = 30\% \rightarrow 130 \text{ increased!}$$

$$2^{\text{nd}} \text{ increased speed} = 10\% \text{ of } 1^{\text{st}} \text{ increased speed} \times$$

$$= 13$$

$$\text{Total final speed} = 130 + 13 = 143\%$$

$$\frac{\text{Total speed}}{\text{original speed}} = \frac{143\%}{100\%} = 143\% \leftarrow$$

(11) works 10% fewer hours each week.

1 hr \Rightarrow 10 bears 2 yrs old.

with Assistant \Rightarrow 80% more bears

\Rightarrow 100% + 80%.

= 180 bears. 2 yrs old (~~old~~)

working hours = 10% every 2 yrs

= 9 hrs.

(12) loan 150 \$ \Rightarrow 12% interest (Rate) (For 1 month)

For 12 months \Rightarrow ?

Interest \Rightarrow ~~150~~ $\times \frac{12}{100}$ $150 \times \frac{12}{100}$
per month \Rightarrow 18 \$

Interest + loan \Rightarrow 18 \$ + 150 \$

\Rightarrow 168 \$. (1 year).

12 months \rightarrow ~~18~~ 18 (Interest).

10 months - ?

$\rightarrow \frac{10}{12} \times 18$

≈ 15

\therefore Total amount \Rightarrow loan + interest for 10 months

\Rightarrow 150 + 15

\Rightarrow 165 \$ \Leftarrow

(13)

$$\text{Ques. } 14 \quad \text{SL : P} \Rightarrow 4 : 11$$

$$x : (x+84) = 4 : 11$$

$$\frac{x}{x+84} = \frac{4}{11}$$

$$11x = 4x + 336$$

$$11x - 4x = 336$$

$$7x = 336$$

$$\therefore x = \frac{336}{7}$$

$$\text{Ques. } 15 \quad \text{no of CR} = x \quad (?)$$

$$\text{no of in CR} = 100 - x$$

$$x - 2(100 - x) = 73$$

$$x - 200 + 2x = 73$$

$$3x = 73 + 200$$

$$3x = 273$$

$$\therefore x = \frac{273}{3} = 91 \leftarrow$$

$$\text{Ques. } 16 \quad \text{Sale price} = x.$$

$$\text{S.P. (1)} = 200 + 0.04(x - 1000) \quad \text{--- (1)}$$

$$\text{S.P. (2)} = 0.06x \quad \text{--- (2)}$$

$$200 + 0.04(x - 1000) = 0.06x$$

$$200 + 0.04x - 40 = 0.06x$$

$$240 = 0.06x - 0.04x$$

$$240 = 0.02x$$

$$\frac{240}{0.02} = x, \quad x = \frac{24000}{2} = 12000 \leftarrow$$

$$160 = 0.02x$$

$$x = \frac{160}{0.02}$$

$$= 8000 \leftarrow$$

$$\begin{aligned}
 17) \quad x &= 800,000 - 50y, y = 15000 \\
 &= 800000 - 50(15000) \\
 &= 800000 - 750000 \\
 &= 50000
 \end{aligned}$$

Revenue = Sale price \times no. of cars

$$\begin{aligned}
 &= 15000 \times 50000 \\
 &= 750000000 \leftarrow \text{E}
 \end{aligned}$$

$$18) \quad \sqrt{x+1} = 3, (x-3)^2 = ?$$

$$(\sqrt{x+1})^2 = 3^2$$

$$x+1 = 9$$

$$x = 9-1 = 8$$

$$\therefore (x-3)^2 = (8-3)^2 = 5^2 = 25 \leftarrow \text{S}$$

$$19) \quad x^2 - 2x - 15 = (x+r)(x+s), r+s = ? \quad \text{as base is } 15 \quad \text{d = wanted} \\
 x + 3 \\
 x - 5 \quad (x-s)(x+r) = (x+r)(x+s)$$

$$r = -5, s = 3$$

$$r-s = -5 - (-3) = -5 + 3 = -2$$

$$\text{as } r+s = -5 + 3 = -2$$

$$A \Rightarrow r+s = -2$$

$$\text{as } r+s = -2$$

$$3028 - 3886 = -858$$

$$052 \approx 0.5$$

$$19 \quad x^2 - 2x - 15 = (x+3)(x-5)$$

$$\begin{array}{r} x+3 \\ \times x-5 \\ \hline \end{array}$$

$$(x+3)(x-5) = (x+3)(x-5)$$

$$r = 3, s = -5$$

$$r-s = 3 - (-5)$$

$$= 3+5 = 8 \Leftarrow A$$

201

$$2.0314 \times 10^x < 210000$$

$$10^x < \frac{210000}{2.0314}$$

$$10^x < 98406.74$$

$$10^x < 9.8 \times 10^4$$

$$x = 4.$$

$$Ans: ①$$

Or. seat = a

balcony = b

$$b-a = ?$$

$$12a + 8b = 3320 \quad | \quad ①$$

$$\Rightarrow b = 350 - 130$$

$$a + b = 350 \quad | \quad ②$$

$$b = 350 - a \quad | \quad \therefore b-a = 220 - 130$$

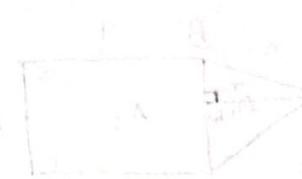
$$12a + 8(350 - a) = 3320 \quad | \quad 90 \Leftarrow A$$

| | | |
|--|--------------------------|--|
| | $12a + 2800 - 8a = 3320$ | |
| | $4a = 3320 - 2800$ | |
| | $4a = 520$ | |

$$\Rightarrow a = 130,$$

(22)

$$1 \quad 3x + 5 < 17$$



$$1 \quad 3x + 5 = -4(3x)$$

$$3x + 5 < 12 = 3x < 12$$

$$-4 < 3x < 12$$

$$-\frac{4}{3} < \frac{3x}{3} < \frac{12}{3}$$

$$-1.3 < x < 4$$



Answers $\Rightarrow S$

(23)

$$\text{Profit} = x$$

$$\begin{matrix} 5x & 7x & 8x \\ A & B & C \end{matrix}$$

$$5x = 3500$$

$$x = 700 \text{ } \leftarrow$$

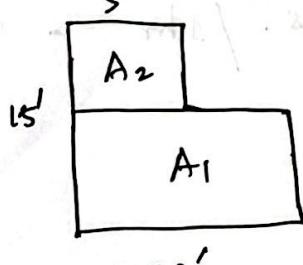
$$7x + 8x = 7(700) + 8(700)$$

(B) C.C

$$= 4900 + 5600$$

$$S' \rightarrow 10500 \text{ } \leftarrow. \quad (E)$$

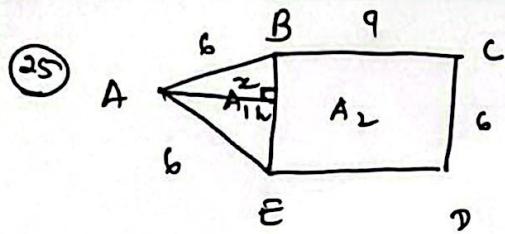
(24)



$$A_1 = 20' \times 8' = 160'$$

$$A_2 = 7 \times 5 = 35$$

$$A_1 + A_2 = 160 + 35 = 195 \text{ } \leftarrow.$$



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

$$x^2 = 6^2 - 3^2 = 36 - 9$$

$$x^2 = 27.$$

$$x = 3\sqrt{3}$$

$$A_1 = \frac{1}{2} b \times h$$

$$= \frac{1}{2} \times 6 \times 3\sqrt{3}$$

$$= 9\sqrt{2}$$

$$\text{Ans: } \Rightarrow A_1 + A_2 = [9\sqrt{2} + 54] \Leftarrow \textcircled{B}$$

$$(26) 7^b + 7^b + 7^b + 7^b + 7^b + 7^b + 7^b = 7 \times 7^b$$

$$= 7^{(1+b)} = 7^{b+1} \Leftarrow \textcircled{B}$$

$$(27) \text{ Roof Ar} = 13 \times 26 = 338 \text{ inch}^2$$

$$\text{A Rug Ar} = 12 \times 18 = 216 \text{ inch}^2$$

$$\text{Area of uncovered} = 338 - 216$$

$$= 122 \text{ sq. inch} \Leftarrow \textcircled{D}$$

$$(28) \text{ Machine A} \quad 5 \text{ hrs} = 1000 \text{ widgets} / 1 \text{ hr} = 200 \text{ widgets}$$

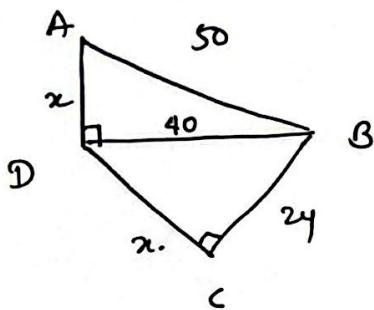
$$\text{Machine B} \quad 3 \text{ hrs} = 450 \text{ widgets} / 1 \text{ hr} = 150 \text{ widgets}$$

$$350 \text{ widgets} \rightarrow 1 \text{ hr.}$$

$$2000 \text{ widgets} \rightarrow ?$$

$$\frac{2000}{350} \times 1 = 5.714 = 5 \frac{5}{7} \text{ hr} \Leftarrow \textcircled{D}$$

(29)



$$\Delta ADB = ? \quad \frac{1}{2} \times b \times h$$

~~$$50^2 = x^2 + 40^2$$~~

~~$$2500 = x^2 + 1600$$~~

~~$$x^2 = 2500 - 1600$$~~

~~$$x^2 = 900$$~~

~~$$x = 30$$~~

~~$$\begin{aligned} \Delta ADB &= \frac{1}{2} \times b \times h \\ &= \frac{1}{2} \times 30 \times 40 \\ &= 600 \end{aligned}$$~~

$$\Delta CDB = ?$$

$$= \frac{1}{2} \times b \times h$$

$$40^2 = 24^2 + x^2$$

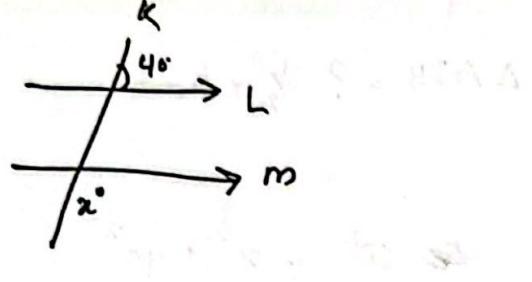
$$x^2 = 40^2 - 24^2 = 1600 - 576$$

$$x^2 = 1024$$

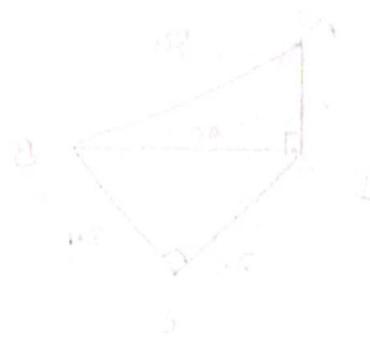
$$x = \sqrt{1024} = \sqrt{32 \times 32} = 32$$

$$ABCD = 50 + 24 + 30 + 32$$

$$= 136 \leftarrow \textcircled{E}$$



$$x = 145^\circ \quad \text{A} \leftarrow$$



$\angle B = 35^\circ$

$\angle C = 20^\circ$



$\angle B = 35^\circ$

$\angle C = 20^\circ$

$$\angle B + \angle C = 55^\circ$$

$\angle A = 145^\circ$

$$\angle A = 145^\circ \Rightarrow 145^\circ \times 10$$

$$145^\circ + 55^\circ + 10^\circ = 210^\circ$$

$\text{Exterior angle} = 180^\circ$

∴ $180^\circ - 210^\circ = -30^\circ$

DATA SUFFICIENCY

1. What is x ? **B**

(1) $x+y=7$

(2) $2x+4=14$

2. A shopper bought a tie and a belt during a sale. Which item did he buy at the greater dollar value? **E**

(1) He bought the tie at a 20 percent discount.

(2) He bought the belt at a 25 percent discount.

3. If he did not stop along the way, what speed did Bill average on his 3-hour trip?

D (1) He traveled a total of 120 miles.

(2) He traveled half the distance at 30 miles per hour, and half the distance at 60 miles per hour.

60:0000

4. What is the number of pages of a certain journal article?

E (1) The size of each page is $5\frac{1}{2}$ inches by 8 inches. **X**

(2) The average (arithmetic mean) number of words per page is 250.

5. If a certain vase contains only roses and tulips, how many tulips are there in the vase?

S 1 (1) The number of roses in the vase is 4 times the number of tulips in the vase. $R = 4T \rightarrow ①$

S 2 (2) There is a total of 20 flowers in the vase. $R + T = 20 \rightarrow ②$

6. The cost of 10 pounds of apples and 2 pounds of grapes was \$12. What was the cost per pound of apples?

$$10A + 2G = 10 + 12 \quad 10A + 2G = 22$$

A (1) The cost per pound of grapes was \$2. $G = 2 \leftarrow$

(2) The cost of 2 pounds of apples was less than the cost of 1 pound of grapes. $2G = 0$

7. What was the median annual salary for the employees at Company X last year?

E (1) Last year there were 29 employees at Company X. ~~கொடுமையான கணினியில்~~

(2) Last year 12 employees at Company X had an annual salary of \$24,000.

8. How many basic units of currency X are equivalent to 250 basic units of currency Y?

D (1) 100 basic units of currency X are equivalent to 625 basic units of currency Y. $100X = 625Y$

(2) 2,000 basic units of currency X are equivalent to 12,500 basic units of currency Y. $2000X = 12500$

9. In the xy-coordinate plane, what are the x-coordinates of the four vertices of square JKMN?

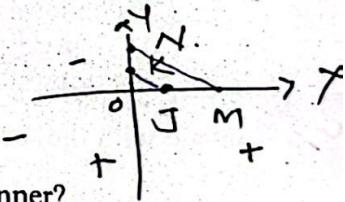
E (1) J and M are on the x-axis, and K and N are on the y-axis.

(2) The center of the square is at the origin.

10. A company bought 3 printers and 1 scanner. What was the price of the scanner?

22 விடை: மும்பாக
1m²/2m² ரூ

A (1) **B** (2) **C** (3) **D** (4) **E** (5) **F** (6) **G** (7) **H** (8) **I** (9) **J** (10)



$$S + P = 100$$
$$P = 4S \quad \text{---} \quad 1$$

(1) The total price of the printers and the scanner was \$1,300.

(2) The price of each printer was 4 times the price of the scanner.

11. Each of the 256 solid-colored marbles in a box is either blue, green, or purple. What is the ratio of the number of blue marbles to the number of purple marbles in the box?

(1) The number of green marbles in the box is 4 times the number of blue marbles in the box. $4G = 4B$ $yL = Lx$

(2) There are 192 green marbles in the box. $G = 192$ $\frac{x}{2} = \frac{2}{1}$

12. The research funds of a certain company were divided among three departments, X, Y, and Z. Which one of the three departments received the greatest proportion of the research funds?

(1) The research funds received by departments X and Y were in the ratio 3 to 5, $\frac{X}{Y} = \frac{3}{5}$, respectively.

(2) The research funds received by departments X and Z were in the ratio 2 to 1, $\frac{X}{Z} = \frac{2}{1}$, respectively.

13. Each of the marbles in a jar is either red or white or blue. If one marble is to be selected at random from the jar, what is the probability that the marble will be blue?

(1) There are a total of 24 marbles in the jar, 8 of which are red. $\frac{5x}{2} = 3y$

(2) The probability that the marble selected will be white is $\frac{1}{2}$. $2z = x$

14. What is the value of 10 percent of y? $10\%y$?

(1) 5 percent of y is 60.

(2) y is 80 percent of 1,500.

15. Last semester, Professor K taught two classes, A and B. Each student in class A handed in 7 assignments, and each student in class B handed in 5 assignments. How many students were in class A?

(1) The students in both classes combined handed in a total of 85 assignments. $7A + 5B = 85$

(2) There were 10 students in class B. $B = 10$

16. What was the range of the selling prices of the 30 wallets sold by a certain store yesterday?

(1) $\frac{1}{3}$ of the wallets had a selling price of \$24 each.

(2) The lowest selling price of the wallets was $\frac{1}{3}$ the highest selling price of the wallets.

17. Three houses are being sold through a real estate agent. What is the asking price for the house with the second-largest asking price?

30%W + 60%D + 10%

- (1) The difference between the greatest and the least asking price is \$130,000.
 (2) The difference between the two greater asking prices is \$85,000. (E)

18. If $a + b + c = 12$ what is the value of b ?

(1) $a + b = 8$

(C)

(2) $b + c = 6$

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19. How many people in a group of 50 own neither a fax machine nor a laser printer?

- (1) The total number of people in the group who own a fax machine or a laser printer or both is less than 50. $n < 50$ (የይደንጋኝ ማረጋገጫዎች ይኖር)
- (2) The total number of people in the group who own both a fax machine and a laser printer is 15. $n = 15$ (E)

20. What is the value of t ?

(1) $s + t = 6 + s$

(2) $t^3 = 216$

(B) (D)

$$a + z = 18$$

$$x + y + z = 30$$

$$y = 22$$

20. The people in a line waiting to buy tickets to a show are standing one behind the other.

Adam and Beth are among the people in the line, and Beth is standing behind Adam with a number of people between them. If the number of people in front of Adam plus the number of people behind Beth is 18, how many people in the line are behind Beth?

(1) There are a total of 32 people in the line.

(2) 23 people in the line are behind Adam.

(A) (B) (C)

$$\frac{1}{x} A \frac{23}{z} B \frac{1}{x}$$

$$(B) (C)$$

21. If a school district paid a total of \$35 per desk for x desks and a total of \$30 per table for y tables, what was the total amount that the district paid for these desks and tables?

(1) The total amount the district paid for the y tables was \$900.

$$y = \$900 \quad (30)$$

(2) $x = 90$, and the total amount the district paid for the x desks was 3.5 times the total amount the district paid for the y tables. (B) $x = 3.5y \quad (35 \times 90)$

22. Three children inherited a total of X dollars. If the oldest child inherited \$7,000 more than the youngest child, and the youngest child inherited \$9,000 less than the middle child, what is the value of X?

(1) The middle child inherited \$27,000.

(2) The youngest child and the middle child together inherited a total of \$45,000.

$$\begin{aligned} x - y &= 27000 \\ x - z &= 7000 \\ z &= y - 9000 \\ y &= 27000 \end{aligned}$$

23. In a sequence of numbers in which each term is 2 more than the preceding term, what is the fourth term?

(1) The last term is 90.

(2) The first term is 2

(A) (B)

$$\begin{array}{ccccccc} x, & x+2, & x+4, & x+6, & & & \\ 84, & 86, & 88, & 90, & & & \end{array}$$

5. n is an integer.

24. Is x an integer?

$$(1) \frac{3}{x} = 8$$

$$(2) x = \sqrt{4}$$

25. Is n equal to zero?

(1) The product of n and some nonzero number is 0. $n \times 2 = 0$

(2) The sum of n and 0 is 0. $n + 0 = 0$

26. Jones has worked at Firm X twice as many years as Green, and Green has worked at Firm X four years longer than Smith. How many years has Green worked at Firm X?

(1) Jones has worked at Firm X 9 years longer than Smith.

(2) Green has worked at Firm X 5 years less than Jones.

28. Did the sum of the prices of three shirts exceed \$60?

(1) The price of the most expensive of the shirts exceeded \$30.

(2) The price of the least expensive of the shirts exceeded \$20.

29. If n is a positive integer, what is the tens digit of n?

(1) The hundreds digit of $10n$ is 6.

(2) The tens digit of $n + 1$ is 7.

30. What is the value of $\frac{2t+t-x}{t-x}$?

$$(1) \frac{2t}{t-x} = 3 \quad 2t = 3(t-x)$$

$$(2) t-x=5$$

31. A blue car and green car in line at the drive-in bank. How many cars are in the line?

(1) There are 4 cars between the green car and the blue car.

(2) There are 6 cars ahead of the green car and 5 cars behind the blue car.

32. What is the distance from city A to city B?

(1) Jane drives the trip at an average speed of 50 kilometers per hour.

50 km/hr

(2) Sally takes 3 hours to drive between the two cities.

3hr

Ans:

A \longleftrightarrow B