

Paper 3 Nov 2022

1) $2^x = 32$

$2 \times 2 \times 2 \times 2 \times 2 = 32$

$x = 5$

2) $1.8 \times 10^{-4} = 0.00018$

3) $6x^2(x^3+2) = 6x^5 + 12x^2$

4) $30 < x < 300$

x is 200% of y

therefore $15 < y < 150$

5) Area = $\frac{1}{2}(14+20)11$
 $+ \frac{1}{2}10 \times 7$
 $= 222$

6) Joe Kim Lin
 $6 : 5 : 9$

$72 : 60 : 108$

Total = £240

7) 1 2 3 4
 a) $33 \quad x \quad x+33 \quad 2x+33$

$2x+33 = 73$

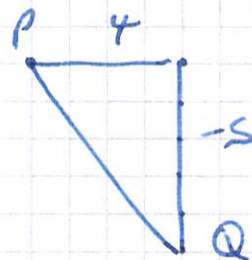
$x = 20$

b) Suppose $n = -10$
 $n^2 = 100$
 $n - n^2 = -10 + 100$
 $= 90$

So Ruth is incorrect.

8) $\frac{\text{Total Height A}}{\text{Total Height B}} = 1.125$

9)



gradient PQ = $-\frac{5}{4}$

10)

	250	50	300
H	128	19	147
T	<u>122</u>	<u>31</u>	<u>153</u>
	250	50	300

50 spins H:T 19:31

11) semicircle radius = $22\frac{1}{2}$
 length = $22\frac{1}{2}\pi + 75$
 speed = $\frac{22\frac{1}{2} + 75}{18} = 8.1 \text{ m/s}$

12) single transformation is
 translation $\begin{bmatrix} 6 \\ 4 \end{bmatrix}$
 then ABC sits over DEF

13 a) Probabilities $0.1 + 0.3 + 0.6 = 1.0$

so red green & blue are only colours.

b) $P(\text{red or blue}) = 0.1 + 0.3 = 0.4$

c) $P(\text{even AND blue}) = 0.5 \times 0.3 = 0.15$

14) Mass X = 10.976 kg
 $\sqrt{784} = 28$
 Density = $\frac{10.976 \text{ grams}}{28^3} = 0.5 \text{ gram/cm}^3$

b) Density Y is less than X.

15) a) $10:00 \text{ am} + 26 \text{ min}$
 $= 10:26$

b) % change at 40% flow
 $= 80\%$

c) Rate in work = $\frac{20\%}{60 \text{ min}}$
 $= \frac{1}{3} \% \text{ per min.}$

16) a) $H \propto \frac{1}{\sqrt[3]{L}}$

$7 = \frac{K}{\sqrt[3]{64}}$

$K = 28$

$H = \frac{28}{\sqrt[3]{L}}$

b) $H = \frac{28}{\sqrt[3]{2744}}$
 $= 2$

17) $\angle BOC = 64^\circ$
 $\angle C = 90^\circ - 64^\circ$
 $= 26^\circ$

18) $9m + 4(2m-1) = p^2 + pm$
 $9m + 8m - 4 = p^2 + pm$
 $17m - pm = p^2 + 4$
 $m(17-p) = p^2 + 4$
 $m = \frac{p^2 + 4}{17-p}$

19) $x^2 + y^2 = 11^2$
 it's that simple.

20) a) $P(\text{three trains leave on time})$
 $= 0.9 \times 0.8 \times 0.8$
 $= 0.576$

b) At 2:00 pm train doesn't leave on time.

$P(\text{exactly one of next two leaves on time})$
 $= P(\text{on time then not on time})$
 $+ P(\text{not on time then on time})$
 $= (0.65 \times 0.2) + (0.35 \times 0.65)$
 $= 0.3575$

21) scale factor = $-\frac{1}{2}$
 centre $(2, -1)$

22) $\frac{2}{x+1} + \frac{7-5x}{3} + 4x$
 $= \frac{2(3)}{3(x+1)} + \frac{(7-5x)(x+1)}{3(x+1)} + \frac{4x(3)(x+1)}{3(x+1)}$
 $= \frac{6+7x+7-5x^2-5x+12x^2+12x}{3(x+1)}$
 $= \frac{13+14x+7x^2}{3(x+1)}$

23) Original volume cone
 $= \frac{1}{3} \pi 9^2 \times 30$
 Removed = $\frac{1}{3} \pi 6^2 \times 20$
 $+ \frac{2}{3} \pi 6^2$
 Left = $810\pi - 240\pi - 144\pi$
 $= 426\pi$

24) After 5 years

$$\text{car} = £14000 \times 0.65 \times 0.9^5$$
$$= £5971$$

$$\text{painting} = £5000 \times 1.04^5$$
$$= £6083.$$

Therefore after 5 years the painting is worth more than the car.

25) Area = $\frac{1}{2} ab \sin C$

$$= \frac{1}{2} (7.25 \times 13.65$$

× sin 102.5)

$$= 46.64 \text{ cm}^2.$$

26)

a)



b)

